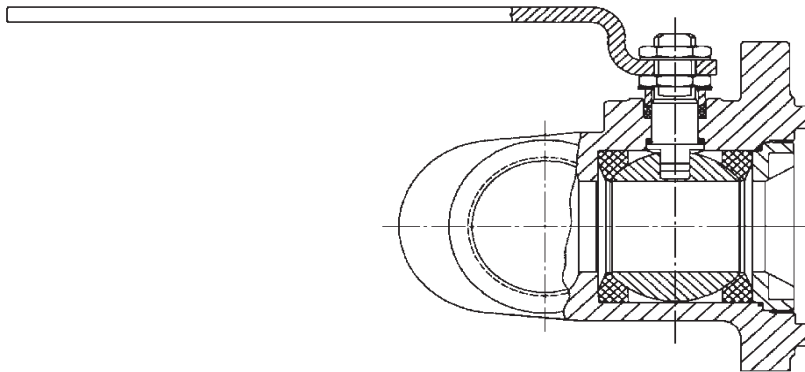


# Fire-Tite® Tank-Car Angle Valves 2" (DN 50) 5RNT

Installation, Maintenance and  
Operating Instructions



## Table of Contents

<b>1</b>	<b>GENERAL .....</b>	<b>3</b>
1.1	Scope of the Manual .....	3
1.2	Valve Markings.....	3
1.3	Safety Precautions .....	3
<b>2</b>	<b>TRANSPORTATION AND STORAGE.....</b>	<b>3</b>
<b>3</b>	<b>INSTALLATION .....</b>	<b>4</b>
3.1	General .....	4
3.2	Handles.....	4
3.3	Installing on tank car .....	4
3.4	Commissioning .....	4
<b>4</b>	<b>MAINTENANCE.....</b>	<b>4</b>
4.1	General .....	4
4.2	Disassembly .....	5
4.3	Checking Parts .....	5
4.4	Assembly .....	6
4.5	Testing the Valve.....	7
<b>5</b>	<b>SERVICE KITS.....</b>	<b>7</b>
<b>6</b>	<b>SERVICE/SPARE PARTS.....</b>	<b>7</b>
<b>7</b>	<b>HOW TO ORDER.....</b>	<b>7</b>
<b>8</b>	<b>EXPLODED VIEWS &amp; PART LISTS.....</b>	<b>8</b>

### **READ THESE INSTRUCTIONS FIRST!**

These instructions provide information about safe handling and operation of the valve.  
 If you require additional assistance, please contact the manufacturer or manufacturer's representative.  
 Addresses and phone numbers are printed on the back cover.  
 See also [www.metso.com/valves](http://www.metso.com/valves) for the latest documentation.

### **SAVE THESE INSTRUCTIONS!**

## 1 GENERAL

### 1.1 Scope of the Manual

This instruction manual contains important information regarding the installation, operation and troubleshooting of the Jamesbury® 2" (DN 50) 5RNT Tank Car Fire-Tite Top-Loading Angle Valves with standard handle and GZ and HZ handles options (See **Figures 5, 6, and 7**). Please read these instructions carefully and save them for future reference.

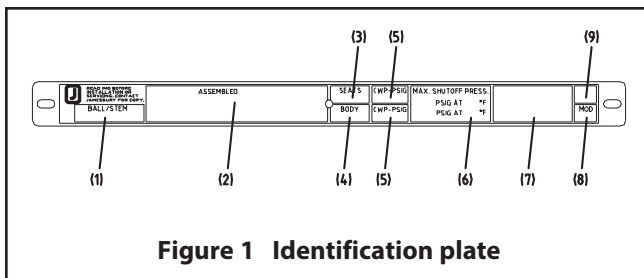
#### WARNING:

AS THE USE OF THE VALVE IS APPLICATION SPECIFIC, A NUMBER OF FACTORS SHOULD BE TAKEN INTO ACCOUNT WHEN SELECTING A VALVE FOR A GIVEN APPLICATION. THEREFORE, SOME OF THE APPLICATIONS IN WHICH THE VALVES ARE USED ARE OUTSIDE THE SCOPE OF THIS MANUAL.

IF YOU HAVE ANY QUESTIONS CONCERNING THE USE, APPLICATION OR COMPATIBILITY OF THE VALVE WITH THE INTENDED SERVICE, CONTACT METSO FOR MORE INFORMATION.

### 1.2 Valve Markings

The valve has an identification plate (22) attached to the flange (see **Figure 1**).



**Figure 1 Identification plate**

Identification plate markings:

1. Ball/Stem material
2. Valve catalog code & Serial Number
3. Seat Material
4. Body Material
5. Maximum operating pressure
6. Maximum/minimum shut-off pressure/temperature
7. Approvals/Special Service marking
8. Valve Model
9. Assembly date

## 1.3 Safety Precautions

#### WARNING:

##### DO NOT EXCEED THE VALVE PERFORMANCE LIMITATIONS!

EXCEEDING THE PRESSURE OR TEMPERATURE LIMITATIONS MARKED ON THE VALVE IDENTIFICATION PLATE MAY CAUSE DAMAGE AND LEAD TO UNCONTROLLED PRESSURE RELEASE. DAMAGE OR PERSONAL INJURY MAY RESULT.

#### WARNING:

##### SEAT AND BODY RATINGS!

THE PRACTICAL AND SAFE USE OF THIS PRODUCT IS DETERMINED BY BOTH THE SEAT AND BODY RATINGS. READ THE IDENTIFICATION PLATE AND CHECK BOTH RATINGS. THIS PRODUCT IS AVAILABLE WITH A VARIETY OF SEAT MATERIALS. SOME OF THE SEAT MATERIALS HAVE PRESSURE RATINGS THAT ARE LESS THAN THE BODY RATINGS. ALL OF THE BODY AND SEAT RATINGS ARE DEPENDENT ON VALVE TYPE AND SIZE, SEAT MATERIAL, AND TEMPERATURE. **DO NOT EXCEED THESE RATINGS!**

#### WARNING:

##### BEWARE OF BALL MOVEMENT!

KEEP HANDS, OTHER PARTS OF THE BODY, TOOLS AND OTHER OBJECTS OUT OF THE OPEN FLOW PORT. LEAVE NO FOREIGN OBJECTS INSIDE THE TANK CAR. WHEN THE VALVE IS ACTUATED, THE BALL FUNCTIONS AS A CUTTING DEVICE. FAILURE TO DO THIS MAY RESULT IN DAMAGE OR PERSONAL INJURY.

## 2 TRANSPORTATION AND STORAGE

Check the valve and the accompanying devices for any damage that may have occurred during transport.

Store the valve carefully. Storage indoors in a dry place is recommended.

Do not remove the protective packaging or flow port protectors until installing the valve.

Move the valve to its intended location just before installation.

The valve is usually delivered in the open position.

If the valve(s) will be stored for a long period, follow the recommendations given in IMO-S1 to maintain the valve integrity.

## 3 INSTALLATION

### 3.1 General

Remove the protective packaging and flow port protectors and check that the valve is clean inside. Clean valve if necessary.

Flush the tank car carefully before installing the valve. Foreign objects, such as sand or pieces of welding electrodes, will damage the ball and seats.

Read and follow all **WARNINGS!**

#### **WARNING:**

SERIES 5RNT VALVES ARE DESIGNED FOR MANUAL USE ONLY AND ARE NOT INTENDED FOR AUTOMATION! DO NOT FABRICATE OR ADD ON ANY TYPE OF AUTOMATING ACCESSORY.

The *Jamesbury* Series 5RNT are an end entry design with an internal insert. The insert contains a slot drive which can be identified by looking into the end of the valve before installation.

### 3.2 Handles

If the Series 5RNT valve handle (17) has to be removed for any reason, the handle must be remounted with the handle as shown in **Figure 5, 6, or 7**.

#### **WARNING:**

FAILURE TO PROPERLY MOUNT THE HANDLE MAY RESULT IN IMPROPER VALVE OPERATION, DAMAGE OR PERSONAL INJURY.

### 3.3 Installing on tank car

#### **WARNING:**

THE VALVE SHOULD BE INSTALLED ON THE TANK CAR USING APPROPRIATE GASKETS AND FASTENERS COMPATIBLE WITH THE APPLICATION, AND IN COMPLIANCE WITH APPLICABLE PIPING CODES AND STANDARDS. CENTER THE FLANGE GASKET CAREFULLY WHEN FITTING THE VALVE.

The valve may be installed in any position and offers tightness in both directions. It is recommended, however, that the valve be installed with the tongue flange towards the tank car.

Refer to the **Section 4, MAINTENANCE** for stem seal adjustment. If there is weepage past the stem seals upon installation, it means the valve may have been subject to wide temperature variations in shipment. Leak-tight performance will be restored by a simple stem seal adjustment described in the **MAINTENANCE** section.

## 3.4 Commissioning

Ensure that there is no dirt or foreign objects left inside the valve or tank car. Flush the tank car carefully. Make sure that the valve is fully open when flushing.

Ensure that all nuts and fittings are properly fastened.

#### **WARNING:**

GOOD PRACTICE DICTATES THAT ONCE INSTALLED, BUT PRIOR TO FIRST USE, THE VALVE IS LEAK TESTED IN PLACE TO ASSURE LEAK-TIGHTNESS HAS NOT BEEN COMPROMISED BY THE INSTALLATION PROCESS. INSTALLATION ACTIONS THAT CAN CAUSE LEAKAGE INCLUDE, BUT ARE NOT LIMITED TO; WRENCHING, SOLDERING, WELDING AND/OR HOISTING. **SEE SECTION 4.5**

## 4 MAINTENANCE

### 4.1 General

Good operating procedure requires periodic observation to ensure that the valve is functioning well. The frequency of observation will depend on the application. Routine maintenance consists of tightening the lower stem nuts (item 16 in **Figure 5, 6 or 7**) to 160-170 in·lbs (18.1-19.2 N·m) periodically to compensate for stem seal wear. More frequent observation is recommended under extreme operating conditions.

To tighten the lower stem nut, loosen the handle nut (16). Tighten the lower stem nut (16) to 160-170 in·lbs (18.1-19.2 N·m). Retighten the handle nut to the same valve.

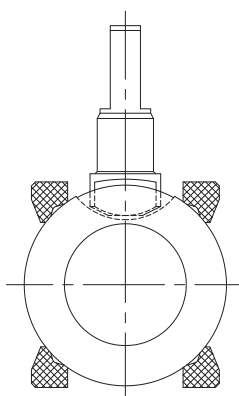
Overhaul maintenance consists of replacing seats and seals. A standard service kit consisting of these parts may be obtained through your authorized Metso Distributor.

**NOTE:** Service kits include stem bearings (24), secondary stem seal (7), seats (5), body seal (6) and stem seals (8). Refer to the Service Kit chart (**see Table 1**).

**WARNING:**

FOR YOUR SAFETY IT IS IMPORTANT THE FOLLOWING PRECAUTIONS BE TAKEN PRIOR TO INSTALLATION, SERVICING OR REMOVAL OF THE VALVE FROM THE TANK CAR OR BEFORE ANY DISASSEMBLY:

1. WEAR ANY PROTECTIVE CLOTHING OR EQUIPMENT NORMALLY REQUIRED WHEN WORKING WITH THE FLUID INVOLVED.
2. DEPRESSURIZE THE TANK CAR AND CYCLE THE VALVE AS FOLLOWS:
  - A. PLACE THE VALVE IN THE OPEN POSITION AND DRAIN THE TANK CAR.
  - B. CYCLE THE VALVE TO RELIEVE RESIDUAL PRESSURE IN THE BODY CAVITY BEFORE REMOVAL FROM THE TANK CAR.
  - C. AFTER REMOVAL AND BEFORE ANY DISASSEMBLY, CYCLE THE VALVE AGAIN SEVERAL TIMES.
3. THESE VALVES ARE SUITABLE FOR A WIDE VARIETY OF FLUIDS AND GASES. BE CERTAIN THAT THE VALVE MATERIALS SELECTED ARE SUITABLE FOR THE APPLICATION.



**Figure 2**

## 4.2 Disassembly

1. Comply fully with **ALL WARNINGS** prior to working on the valve.
2. Open and close the valve and leave in the half open position.
3. Remove the handle nut (16), lockwasher (19) handle (17), stem nut (16), stem washer (14), and compression ring (21).
4. Close the valve.
5. Clamp the valve body (1) securely in a vise in the vertical position with the insert end up, taking care not to damage any valve sealing surfaces.
6. Unscrew and remove insert (2). The insert design requires that the insert be unscrewed in a counterclockwise motion.

**NOTE:** If complete disassembly becomes necessary; it is recommended to replace all seats and seals. Refer to the Service Kit chart (see **Table 1**).

**NOTE:** Always use original OEM parts to make sure that the valve functions properly.

7. Remove and discard the old body seal (6). **BE CAREFUL NOT TO DAMAGE THE SEALING SURFACES.**
8. With the ball in the closed position, remove the top seat (5), ball (3) and bottom seats (5). **NOTE:** A piece of wood or other soft material may be used to unseat the parts from the opposite side by gently tapping the ball from the end opposite the insert. **BE CAREFUL NOT TO DAMAGE THE BALL OR SEATING SURFACES IN THE BODY.**
9. Press the stem (4) into the body (1) and remove it through the insert side of the valve. It may be necessary to tap it with a piece of wood or some other soft material. **BE CAREFUL NOT TO DAMAGE THE STEM OR BODY SEALING SURFACES.**
10. Carefully remove and discard the old stem seals (8) and stem bearings (24) and secondary stem seal (7). **BE CAREFUL NOT TO DAMAGE THE SEALING SURFACES.**

**WARNING:**

DAMAGING SEALING SURFACES WILL NEGATIVELY AFFECT VALVE SEALABILITY AND PERFORMANCE.

## 4.3 Checking Parts

**NOTE:** For detailed instructions on visual inspection of critical components, refer to IMO-R26.

1. Clean all disassembled parts.
2. Check the stem (4) and ball (3) for damage. Pay particular attention to the sealing areas.
3. Check all sealing and gasket surfaces of the body (1) and insert (2).
4. Replace any damaged parts.

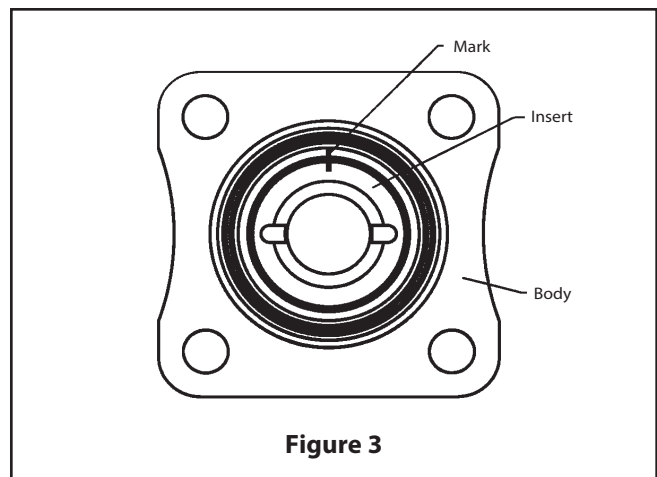
**NOTE:** When ordering spare parts not included in the standard service kits listed in **Table 1**, always include the following information:

- a. Valve catalog code from Identification plate,
- b. The serial number (stamped on the valve Identification plate),
- c. From **Figure 5, 6 or 7**, the ballooned part number, part name and quantity required.

#### 4.4 Assembly

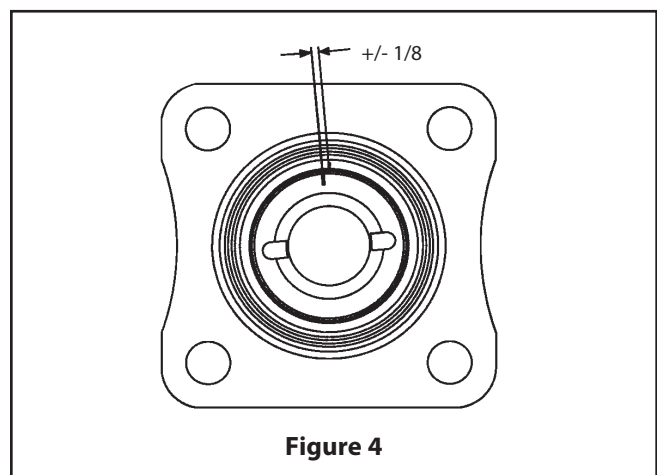
Refer to standard service kit shown in **Table 1** for replacement seats and seals. Apply a good lubricant compatible with the flow medium lightly to insert threads (2).

1. Clean all valve parts, if not previously cleaned.
2. Inspect the parts to ensure sealing surfaces are in good condition and all parts are properly cleaned and prepared for assembly. Look for damage to the seating areas, body and insert. Check stem finish in the sealing area. If there are marks, use 600 or greater grit sand paper and polish circumferentially not up and down. Replace any damaged parts.
3. Clamp the valve body (1) securely in a vise in the vertical position with the insert end up, taking care not to damage any valve sealing surfaces.
4. Place one valve seat (5) sidewise into the body cavity (1) to just below the stem hole and tilt it into place so that the proper face will come in contact with the ball (3) (see **Figure 2**).
5. Place the stem bearings (24) and secondary stem seal (7) on the stem (4) shown in **Figure 5, 6, or 7**.
6. Insert the stem (4) with the bearings into the valve body and through the stem bore in the body, as shown in (**Figure 5, 6, or 7**). Press it gently up into the stem bore until resistance is felt from the lower stem bearing. Be careful not to scratch or damage the seals.
7. Holding the stem in place from the inside, install the stem seal (8), the compression ring (21), and stem washer (14) over the end of the stem protruding out of the body stem bore.
8. Place the stem nut (16) on the stem (4).
9. Tighten the stem nut (16) until the stem comes snugly into place, then torque stem nut to 160-170 in·lbs (18.1-19.2 N·m). Rotate the stem gently to assure proper seating.
10. Make sure there is no dirt and grit in the insert (2) threads. Apply a lubricant compatible with the flowing media to the threads and screw the insert (2) into the body (1) by hand until it is fully seated. Mark the position as shown in (**Figure 3**). Counting the number of turns, remove the insert.



**Figure 3**

11. Align the stem (5) to the ball slot. Insert the ball (3) rotating it onto the stem (4) in the closed position. If necessary turn the stem blade to align with the ball slot.
12. Insert the second seat (7) with the seat sealing surface towards the ball. (See **Figure 2**).
13. Insert the body seal (6) into the body (1).
14. Make sure there is no dirt and grit in the insert (2) threads. Screw the insert (2) into the body (1) and tighten the insert. The insert must be tightened the same number of turns as in step 10, insuring that the marks are either lined up or insert mark is  $\pm 1/8$ " either side of the body mark, as shown in **Figure 4**.



**Figure 4**

15. Install handle (17), washer (19) on the stem (4), matching flats on the stem and handle. The handle should be in the orientation as shown in **Figure 5, 6 or 7**. Thread stem nut (16) onto the stem and tighten 160-170 in·lbs (18.1-19.2 N·m)
16. Cycle the valve slowly with a gentle back and forth motion to build gradually to the full quarter turn. A fast turning motion at this point may cut the seats before they have a chance to form the proper seal.

## 4.5 Testing the Valve

**WARNING:**

WHEN PRESSURE TESTING, EXERCISE CAUTION AND MAKE SURE ALL EQUIPMENT USED IS IN GOOD WORKING CONDITION AND APPROPRIATE FOR THE INTENDED PRESSURE.

If the valve is to be tested prior to returning to service make sure the test pressures are in accordance with an applicable standard.

When testing the valve for external tightness, keep the ball in the half open position.

If testing the valve seat tightness, please contact Metso for advice.

**WARNING:**

WHEN PERFORMING ANY TESTS, NEVER EXCEED THE MAXIMUM OPERATING PRESSURE OR MAXIMUM SHUT-OFF PRESSURE LISTED ON THE IDENTIFICATION PLATE!

## 5 SERVICE KITS

We recommend that valves be directed to our service center for maintenance. The service centers are equipped to provide rapid turnaround at reasonable cost and offer new valve warranty with all reconditioned valves. Standard Service Kits (Table 1) include seats, seals, and stem bearings.

## 6 SERVICE/SPARE PARTS

For further information or assistance on repair kits and spare parts visit our website at [www.metso.com/valves](http://www.metso.com/valves).

**NOTE:** When ordering spare parts, always include the following information:

- a. Valve catalog code from Identification plate,
- b. If the valve is serialized - the serial number (identification plate),
- c. From **Figure 5, 6, or 7**, the ballooned part number, part name and quantity required.

TABLE 1	
Service Kits	
PTFE Seats	RKR-48TT
Filled PTFE Seats	RKR-48MT
Xtreme® Seats	RKR-48XT

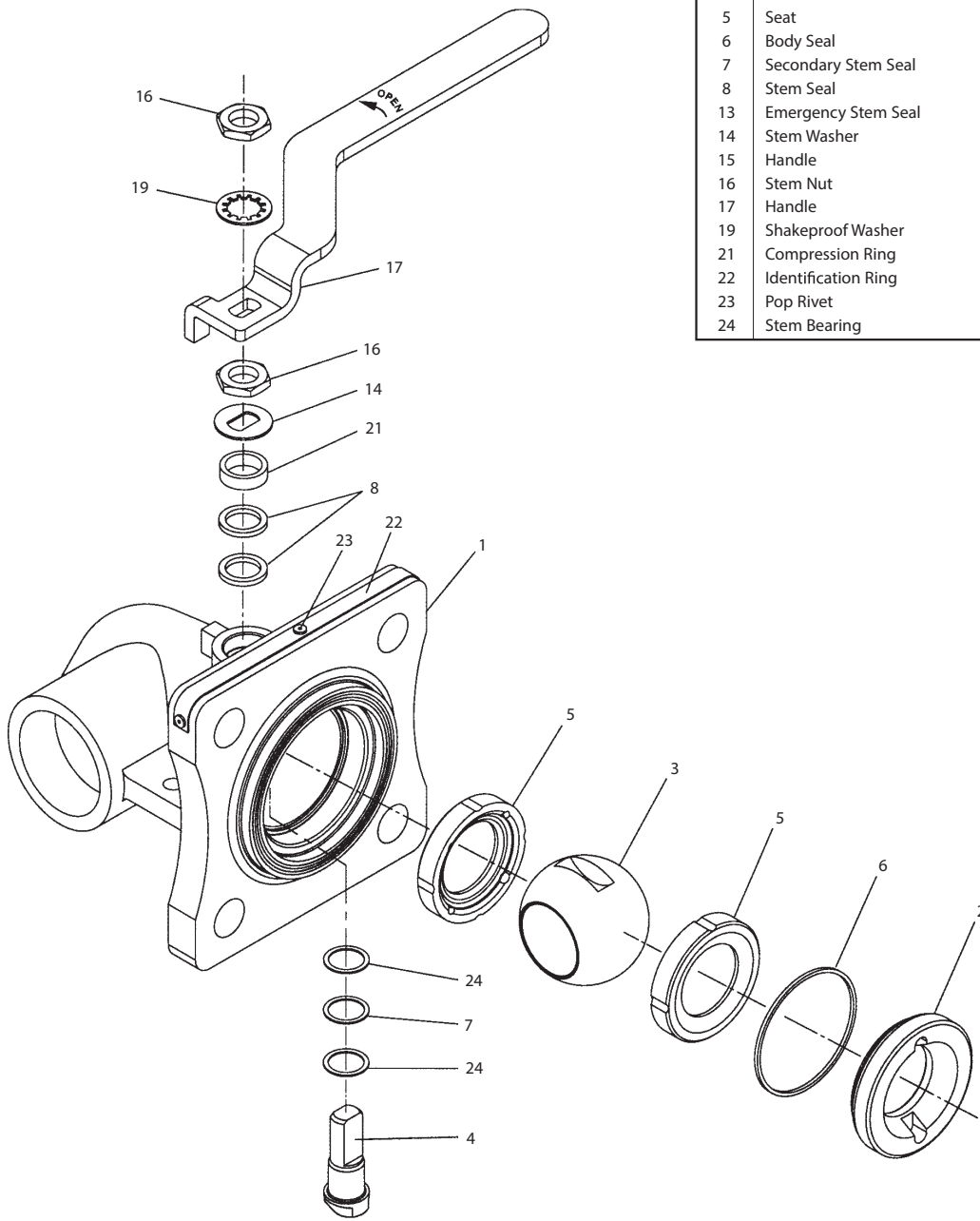
## 7 HOW TO ORDER 5RNT BALL VALVES

316 Stainless steel body and trim:

2" 5RNT3600XT

For PTFE seats, substitute "TT" for "XT".

VALVE OPENS IN COUNTER-CLOCKWISE DIRECTION

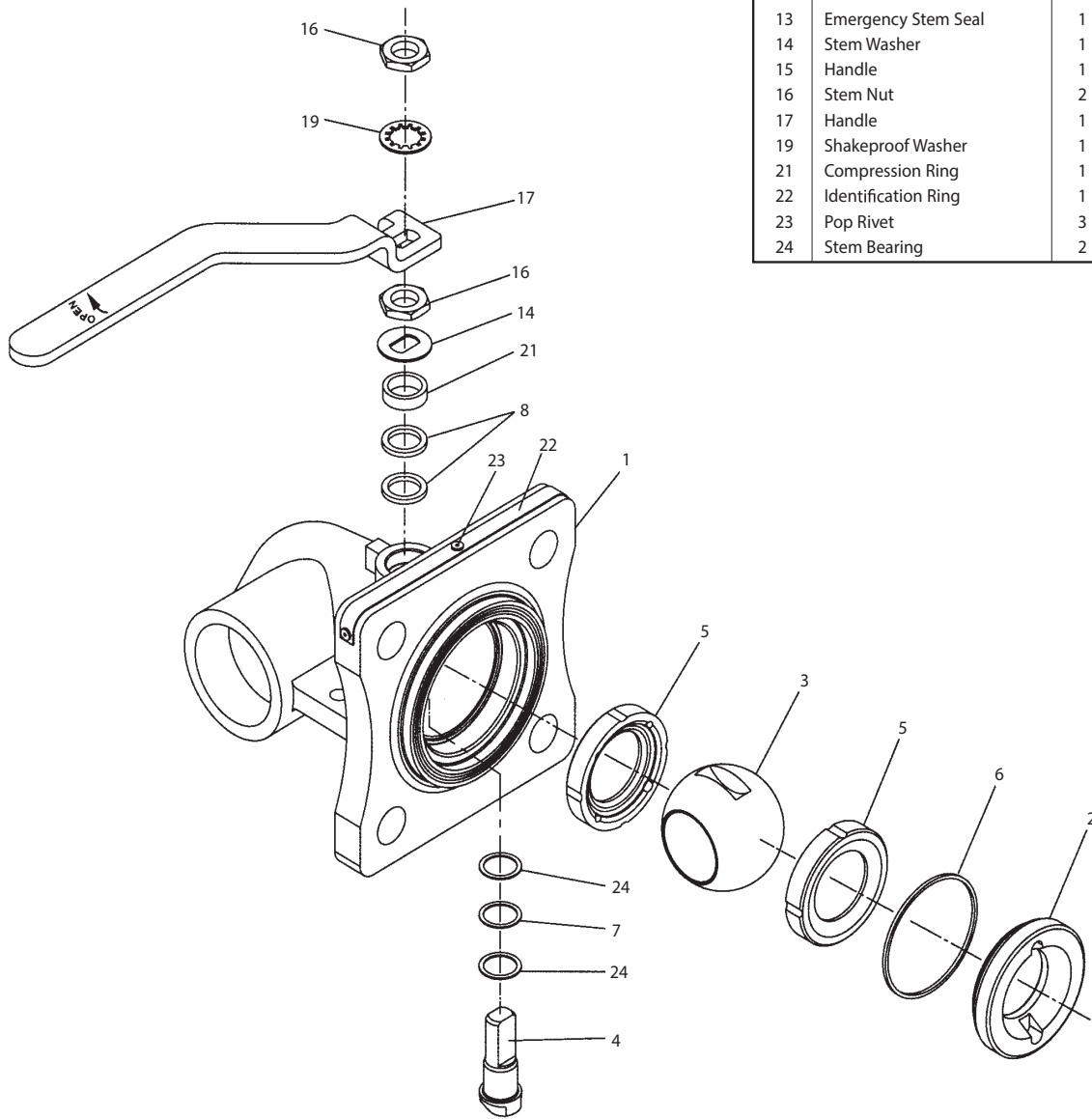


PARTS LIST		
ITEM	PART NAME	QTY
1	Body	1
2	Insert	1
3	Ball	1
4	Stem	1
5	Seat	2
6	Body Seal	1
7	Secondary Stem Seal	1
8	Stem Seal	2
13	Emergency Stem Seal	1
14	Stem Washer	1
15	Handle	1
16	Stem Nut	2
17	Handle	1
19	Shakeproof Washer	1
21	Compression Ring	1
22	Identification Ring	1
23	Pop Rivet	3
24	Stem Bearing	2

Figure 5 Standard Handle



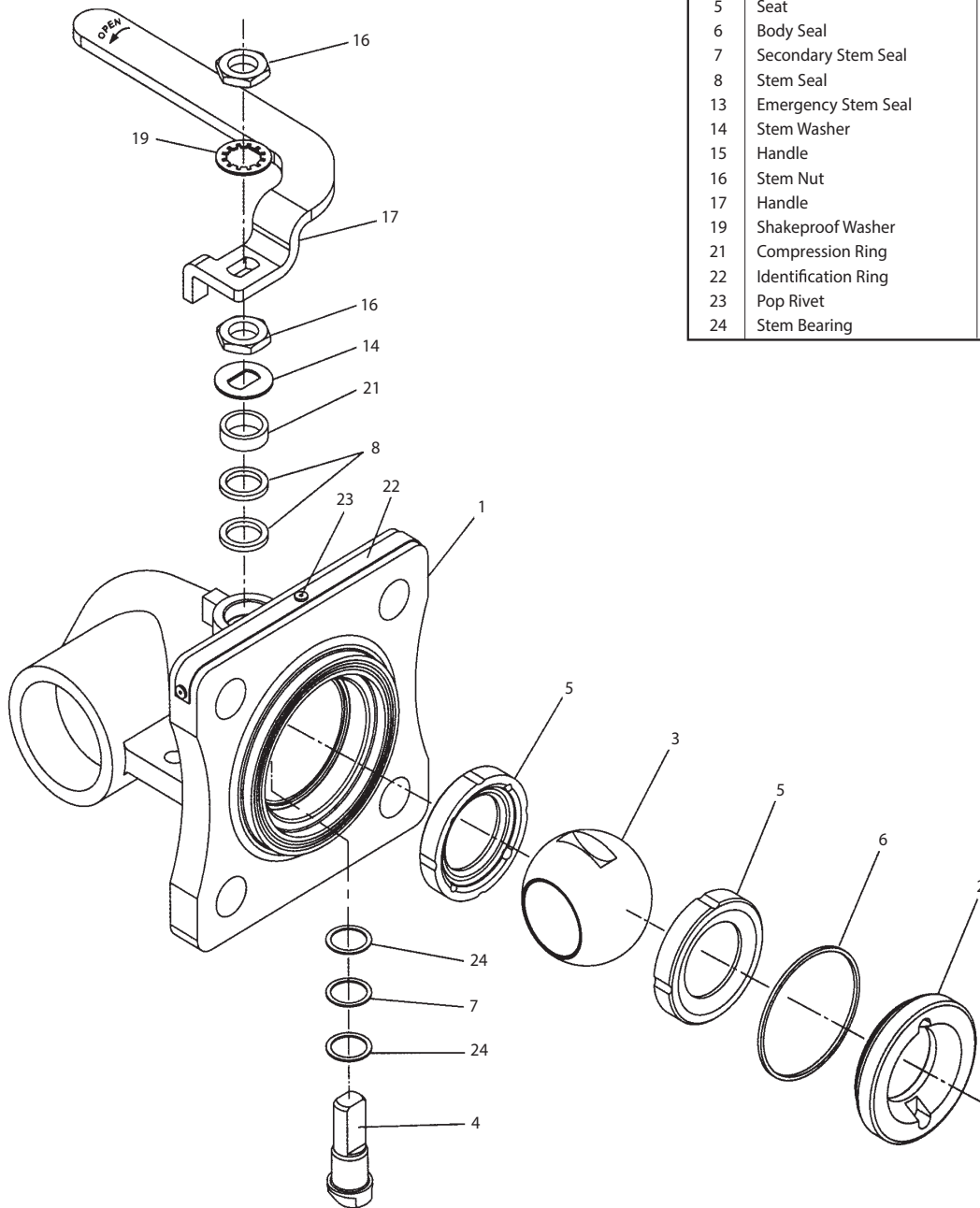
VALVE OPENS IN CLOCKWISE DIRECTION



PARTS LIST		
ITEM	PART NAME	QTY
1	Body	1
2	Insert	1
3	Ball	1
4	Stem	1
5	Seat	2
6	Body Seal	1
7	Secondary Stem Seal	1
8	Stem Seal	2
13	Emergency Stem Seal	1
14	Stem Washer	1
15	Handle	1
16	Stem Nut	2
17	Handle	1
19	Shakeproof Washer	1
21	Compression Ring	1
22	Identification Ring	1
23	Pop Rivet	3
24	Stem Bearing	2

Figure 6 GZ Handle Option

VALVE OPENS IN COUNTER-CLOCKWISE DIRECTION



PARTS LIST		
ITEM	PART NAME	QTY
1	Body	1
2	Insert	1
3	Ball	1
4	Stem	1
5	Seat	2
6	Body Seal	1
7	Secondary Stem Seal	1
8	Stem Seal	2
13	Emergency Stem Seal	1
14	Stem Washer	1
15	Handle	1
16	Stem Nut	2
17	Handle	1
19	Shakeproof Washer	1
21	Compression Ring	1
22	Identification Ring	1
23	Pop Rivet	3
24	Stem Bearing	2

Figure 7 HZ Handle Option



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Subject to change without prior notice.

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