

**Table 1**

Pos.	Quant.	Description
1	1	Body
•• 3	1	Ball
• 4	2	Seat
•• 5	1	Stem
• 6	1	Stem seal
• 7a	1	Packing 1
• 7b	1	Packing 2
• 7d	1	Packing 3
8a	1	Gland packing 1
8b	1	Gland packing 2
9	3	Spring washer
11	1	Cover
13	-	Cover bolt
• 14	1	Body seal 1
•• 19	1	Spring
•• 20	1	Antistatic ball
• 31	2	Bearing
• 32	2	Bearing disk
• 34	1	Body seal 2
• 35	1	Stem O-ring
41	-	Stud
42	-	Nut
• 43	2	Seat seal 1
44a	2	Seat ring 1
44b	2	Seat ring 2
44c	2	Seat ring 3
44d	2	Seat ring 4
45	-	Spring
• 46	2	Seat seal
•• 50	1	Subjection ring
68	1	Extension cover
86	8	Plug
• 109*	1	Body cover 2 seal
•• 110	1	Subjection ring seal
128*	1	Body cover 2
159	2	Lug
163*	-	Body cover 2 bolt
• 165	3	Stem bearing

- Start-up: 5% of ordered quantity
- SOFT PARTS
- METALLIC PARTS

Torque screw tightness values for fasteners  
(Nr. 41 and 42) can be found attached in  
document DC-08-07-03 PF "Screw torque."

## 1. SCOPE

This manual is intended as a guide to assist customers or end-users in the correct storage, installation and maintenance of PEKOS Full Trunnion Cryogenic Top Entry ball valves.

## 2. APPLICABILITY

This manual is applicable to PEKOS Full Trunnion Top Entry unidirectional ball valves in a cryogenic service as per norm ANSI with full bore or reduced bore and soft seats. Nominal sizes and pressures covered by this manual: Full bore: NPS 3" – 42" Class 150-600; Reduced bore: NPS 4" – 42" Class 150-600;


## 3. STORAGE

### 3.1 Maintenance during the storage

- Stainless steel and carbon steel valves should be stored separately, to protect the stainless steel against corrosion.
- Valves must remain in open position with plastic end covers fitted.
- If possible, it would be advisable to leave the ball valves in their own packing cases.
- Valves to be stored for a long time shall be checked by the quality control personnel every 6 months.
- The cleanliness is of utmost importance due to the valves are degreased. The functionality of the valve depends on a proper cleanliness.
- The valves must be stored into plastics with drying salts.

### 3.2 Environment conditions

- Valves shall be stored in dry conditions. Other corrosive environment conditions must be also avoided.
- Valves must be protected against ambient dust.

	<b>MANUAL INSTRUCTION</b> FOR STORAGE, INSTALLATION, OPERATION AND MAINTENANCE OF PEKOS BALL VALVES	<b>ANSI Full Trunnion Cryogenic Top Entry (ZTEFGOSU)</b> Class 150-600 NPS 3"- 42" (Reduced bore 4"-42")	<b>Nr.403</b> 27/11/19 Rev.0
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#### 4. INSTALLATION

- As the valves are degreased, they have to be completely free of dirt. Handle carefully.
- Verify that valves have not been damaged during transit. Inspect inside of the valves and the pipeline of the installation to be able to verify there are no strange particles.
- It is advisable to use protective filters during the installation and check-in period while the possibility of dirt or even oxidation of the pipes exists. They have to be used until pipes are absolutely free of particles in suspension.
- If possible, valve shall be mounted in such way to allow periodic inspections.
- Valves are unidirectional, so fluid can only run in one direction (as it is indicated in the valve).
- In order to enable a correct maintenance valves must be mounted with the valve in horizontal position and the stem in vertical position and upwards.
- It is necessary to obtain correct alignment and parallelism to avoid any kind of stress.
- Once the installation is completed, valve must be operated for at least one opening and closing action to ensure perfect operation.
- After cleaning, protective filters could be removed.
- Protective filters should remain installed on dirty applications.

#### 5. MAINTENANCE

Pekos recommends inspecting the valves at least every five (5) years. These inspection intervals could be affected by the process service (fluid, temperature, service, and cycles), and environmental condition.

##### 5.1 Valves revision

PEKOS ball valves do not need lubrication and the packing does not need maintenance (auto-adjustable).

*Seats set (4 +44a), stem seal (6), stem packing (7a, 7b and 7d), bearings (31), bearing disks (32), stem O-ring (35), body seals (14 and 34), seat seals (43 and 46), stem bearings (165), ball (3) and stem (5)* can be replaced easily using common tools. As replacement pieces is advisable to follow the instructions below table1 in page 1.

Prior to carrying out work on valves the pipeline must be completely empty, including the ball valve body cavity by half opening valve to allow any pressure build up to escape.

Care must be taken to avoid contact with dangerous or toxic chemical products. The valves must be thoroughly cleaned, in particular the body cavity, before handling and dismantling.

##### 5.2 Stem leakage

The packing system of the *stem (5)* of PEKOS ANSI ball valves has been designed for a long life. The *spring washers (9)* compensate any looseness inside the packing. In case of leakage, the stem seals shall be replaced as it follows:

- If the valve comes with a handle installed, loosen the *handle bolt (17)* and remove the *handle (16)*.
- Remove the *subjection ring (50)* and the *subjection ring seal (110)* from the *stem (5)*.
- Make alignment marks on the *body (1)* and *extension cover (68)* prior to dismantling, to ensure a correct alignment when reassembling. Loosen the *lugs (159)* and the *nuts (42)*.
- Remove the *extension cover (68)* from the *body (1)*.
- Loosen the *cover bolts (13)* from the *cover (11)* and check the *stem bearing (165)*.
- Remove the *stem (5)* from the *extension cover (68)*.
- Remove the *spring washers (9)*, the *gland packing (8a and 8b)*, the *stem packing (7a, 7b and 7d)*, the *stem O-ring (35)* and the *stem bearing (165)* from the *extension cover (68)*, check and replace them if necessary.
- Remove the *stem seal (6)* from the *stem (5)*, check it and replace it if necessary.
- Reassemble the pieces accordingly as indicated in point 6.

##### 5.3 Body leakage

The shell of these valves is constructed in 2 pieces; *body (1)* and *extension cover (68)*. Body fasteners should be checked for tightness. If leakage occurs, and if necessary, the *body seal 2 (34)* should be replaced as it follows:

- Make alignment marks on the *body (1)* and *extension cover (68)* prior to dismantling, to ensure a correct alignment when reassembling. Loosen the *nuts (42)*.
- Remove the *extension cover (68)* from the *body (1)*.
- Substitute the *body seal 2 (34)* from the *body (1)*.
- Reassemble the pieces accordingly as indicated in point 6.

##### 5.4 Body Cover 2 leakage


- Loosen *body cover bolts (163)* and remove the *body cover 2 (128)*.
- Replace the *bearing (31)* and the *body cover 2 seal (109)* if necessary.
- Reassemble the pieces accordingly as indicated in point 6.

##### 5.5 Seat leakage

According to API 598 it is not allowed any leakage.

The tools for the extraction of the ball and seats (mounting screws) are not standard and will be supplied by Pekos.

- Make alignment marks on the *body (1)* and *extension cover (68)* before disassembling, to ensure proper alignment when reassembling. Loosen the *lugs (159)* and the *nuts (42)* and remove the *extension cover (68)*.
- Remove the *plugs (86)* of the *body (1)* and introduce the *seats mounting screws (191)*.

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		Class 150-600 NPS 3"- 42" (Reduced bore 4"-42")	

- c. Turn the 4 *seats mounting screws (191)* at the same time clockwise in order to separate the *Ring seat 2 (44b)* from the *ball (3) + ring seat set (4+44a)*.
- d. Screw a lug to the *ball (3)* in order to elevate the *ball (3) + ring seat set (4+44a)* and check the *seats (4)*.
- e. Check and replace the *bearing disks (32)* if necessary.
- f. Turn the *seats mounting screws (191)* counter clockwise in order to remove the *ring seats 2 (44b)* and check them.
- g. Replace *seat seals (43 and 46)* if necessary.
- h. Assemble the pieces accordingly as indicated in point 6.

## 6. RE-ASSEMBLY

Prior to re-assembly, all components and body cavity should be cleaned of any incrustation, dirt, rust etc., especially in the locations of seats and seals.

### Body

- a. Put the *body seal 2 (34)* into the housing of the *body (1)*.
- b. For 6"-8" valves put the *bearing (31)* into the housing of the *body (1)*.

### Fixed guide seats

- c. The *ring seat 3 (44c)*, the *ring seat 4 (44d)* and the *springs (45)* will be supplied by Pekos in an assembled Kit.
- d. Place the seat seal (46) and the *seat ring 2 (44b)* over the previous *ring set* and introduce it in the cavity of *body (1)*.
- e. Repeat these steps with the other seat.

### Body - Body Cover 2 (for 10"-12" valves)

- f. Introduce the *body cover 2 seal (109)* and the *bearing (31)* onto the *body cover 2 (128)*.
- g. Fasten the *body cover 2 (128)* to the *body (1)* by means of the *body cover bolts (163)*.

### Ball – Seats

- h. Assemble the *bearing disks (32)* in the trunnion of the *ball (3)*.
- i. Screw the *seats mounting screws (191)* clockwise.
- j. Place the *seat seals (43)* in the *seat ring set (4+44a)*.
- k. Introduce both *seat ring sets (4+44a)* together with the *ball (3)* through the top entry of the *body (1)*, placing the *ball (3)* in closed position.
- l. Remove the *seats mounting screws (191)*.
- m. Screw the *plugs (86)*.
- n. The set ball-seats will be completely aligned when the *extension cover (68)* is fit into the *body (1)*.

### Stem - Extension cover

- o. Put the *stem seal (6)* and *stem bearings (165)* onto the *stem (5)*. Check the *antistatic devices (pos. 19, 20)*.
- p. Put the *body seal 1 (14)*, the *stem O-ring (35)* and the *bearing (31)* into the housing of the *extension cover (68)*.
- q. Assemble the *stem (5)* into the *extension cover (68)*.
- r. Slide in the following components onto the *stem (5)* in the following order: *packing 1 (7a)*, *packing 2 (7b)*, *gland packing 1 (8a)*, *stem packing 3 (7d)*, *gland packing 2 (8b)* and *spring washers (9)*, putting the *stem (5)* in closed position.
- s. Put the *stem bearing (165)* in the cover (11).
- t. Fasten the *cover (11)* onto the *extension cover (68)* by means of *body bolts (13)*.
- u. Put the *subjection ring (50)* onto the *stem (5)*.

### Body – Extension cover

- v. Ensure the alignment marks of the *body (1)* and the *extension cover (68)* match each other.
- w. Place the *extension cover (68)* and two *bolts (41)* and *nuts (42)* to guide the *ball-seats set* to its right position.
- x. Fasten the rest of the *nuts (42)* and evenly tighten them in diagonal using a torque wrench and the values indicated in document DC-08-07-03 PF "Screw torque" attached.
- y. If the valve comes with a handle installed, put the *handle (16)* into its housing in the *stem (5)*, and tighten the *handle bolt (17)*.
- z. Cycle slowly the valve until completing 1 cycle to ensure coupling between the *seats* and the *ball (3)*.
- aa. Cycle carefully the valve twice in order to check the correct operation. The *stem (5)* should rotate smoothly offering resistance as indicated by the manufacturers torque figures. Tests should be carried out according to API 598 before reinstallation.

The end user is responsible, in case that the fluid is not communicated, checking the compatibility of the service media/ fluid with the valve materials.