



**Table 1**

Pos.	Quant.	Description
1	1	Body 1
2	1	Body 2
•• 3	1	Ball
• 4	2	Seat
•• 5	1	Stem
• 6	2	Stem seal
• 7	1	Stem packing
• 7d	1	Stem packing d
8	1	Gland packing
8a	1	Gland packing a
9	-	Spring washer
11	1	Cover
13	-	Cover bolt
• 14	1	Body seal 1
15	-	Body bolt
16	1	Handle
17	1	Handle bolt
•• 19	1	Spring
•• 20	1	Antistatic ball
22	2	Stop pin
• 34	1	Body seal 2
• 35	1	Stem O-ring
• 44a	1	Ring seat 1
44b	1	Ring seat 2
45	-	Spring seat
• 46	1	Seat seal
•• 50	1	Subjection ring
68	1	Casing extension
• 71	1	Housing seal
75	4	Bolt extension
• 127	1	Bearing
• 165	1	Stem bearing

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

Suggested materials to be checked at least every five (5) year service.

**See point 5 (Maintenance)**

Torque screw tightness values for bolts (Nr. 15) 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 ball valves.

**2. APPLICABILITY**

This manual is applicable to PEKOS ball valves as per norm ANSI unidirectional bore in a cryogenic service. Nominal pressures and sizes covered: Class 600 NPS 1/2" - 2".

**3. STORAGE**

**3.1 Maintenance during the storage**

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

**3.2 Environment conditions**

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

#### 4. INSTALLATION

- a. As the valves are degreased they have to be completely free of dirt. Handle carefully.
- b. 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.
- c. 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.
- d. If possible, valve shall be mounted in such way to allow periodic inspections.
- e. Valves are unidirectional, so fluid can only run in one direction (as it is indicated in the valve).
- f. Valves can be mounted in any position (except valves in liquid service, only capable of operating with the valve stem 45° at or above the horizontal position).
- g. It is necessary to obtain correct alignment and parallelism to avoid any kind of stress.
- h. Once the installation is completed, valve must be operated for at least one opening and closing action to ensure perfect operation.
- i. After cleaning, protective filters could be removed.
- j. 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 manual adjust (auto-adjustable).

*Ball (3), seats (4), stem (5), stem seals (6), stem packing (7 and 7d), body seals (14 and 34), stem o-ring (35), seat seal (46), extension seal (71) and stem bearing (165)* can be replaced easily using common tools. As replacement pieces is advisable to follow the instructions below table 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 (see point 4a), in particular the body cavity, before handling and dismantling.

##### 5.2 Stem leakage

The packing system of the *stem (5)* of ANSI ZFOSU ball valves is designed for a long life. The *spring washers (9)* compensate any looseness inside the packing. In case of leakage, the sealing materials must be replaced as it is shown:

- a. If the valve contains handle, loosen the *handle bolt (17)* and remove the *handle (16)*.
- b. Loosen the *cover bolts (13)* and remove the *subjection ring (50)*, the *stem bearing (165)* and the *cover (11)*.
- c. Loosen the *bolt extension (75)* and remove the *casing extension (68)*.
- d. From *extension casing (68)* remove the *spring washers (9)*, the *gland packing (8 and 8a)*, the *stem packing (7 and 7d)* and the *stem seal (6)*, and replace the damaged items.
- e. Reassemble the pieces accordingly as it is indicated in point 6.

##### 5.3 Body leakage

This ball valve ANSI ZFOSU is constructed in 2 pieces, *body (1)* and *body 2 (2)*. Body fasteners should be checked for tightness. If leakage occurs and if necessary, *body seals (14 and 34)* should be replaced as it is shown:

- a. Make alignment marks on the *body1 (1)* and *body 2 (2)* prior to dismantling, to ensure a correct alignment when reassembling.
- b. Remove *body bolts (15)* and disassemble *body 2 (2)*.
- c. Substitute the *body seals (14 and 34)*.
- d. Assemble the pieces accordingly as it is indicated in point 6.

##### 5.4 Seats leakage

In case of leakage, the *seats (4)* shall be replaced as it is shown:

- a. Maintain the valve in the closed position, loosen and remove the *bolts (15)*, remove the *body 2 (2)* from the *body 1 (1)*.
- b. Use this moment for checking the *ball (3)*, the *seats (4)*, the *ring seats (44a and 44b)* and the *seat seal (46)* (see section 5.3). If necessary, bang the ball gently with a soft tool. Replace the damaged components.
- c. Reassemble the pieces accordingly as it is indicated in point 6.

#### 6. RE-ASSEMBLY

The valves are made up of two main parts; the body and the extension. They have to be assembled separately and later on, joint them.

Prior to re-assembly, all components and body cavity should be totally cleaned and degreased.

First of all, the body should be mounted:

- a. Put the *seat (4)* into its housing of the *body 1 (1)*. Assure that it is well settled, and if necessary bang it gently with a soft tool.
- b. Put the *stem seal (6)* in the *stem (5)*. Check the antistatic devices (pos. 19, 20).
- c. Assemble the *stem (5)* into the valve *body 1 (1)* as the arrow shows in the principal figure.
- d. Assemble the *bearing (127)* in the *stem (5)*. Put the *stem (5)* in closed position.

- e. Introduce the *ball (3)* carefully inside the *body 1 (1)* aligning the ball groove with the *stem (5)*.
- f. Introduce the *body seals (14 and 34)* into their housings in the *body 1 (1)*.
- g. Put the *springs (45)* into their housings in the *body 2 (2)*. Later, introduce the following components in this order: *ring seat 2 (44b)*, *seat seal (46)* and *ring seat 1 (44a)* + the second *seat (4)*.
- h. Maintain the valve in its closed position and position *body2 (2)* to *body1 (1)* ensuring that alignment marks are matched. Assemble *bolts (15)* evenly tighten in diagonal using a torque wrench and the values indicated attached in document DC-08-07-03 PF "Screw torque".

To continue, assemble the extension:

- i. In the *stem (5)* put the *stem seal (6)* and the *stem o-ring (35)*.
- j. Introduce the *stem (5)* in the *casing extension (68)*.
- k. Assemble the following component into the *casing extension (68)* in this order: the *stem packing (7)*, the *gland packing (8)*, the *stem packing d (7d)*, the *gland packing a (8a)* and the *spring washers (9)*.
- l. Put the stem bearing (*165*) in the *cover (11)*, and put both of them into the extension casing (*68*). Joint the *cover (11)* and the *extension casing (68)* by means of the *cover bolts (13)*.
- m. Put the *subjection ring (50)*.

Finally, joint the main parts:

- n. Put the *housing seal (71)*. Assemble the *extension casing (68)* and the previously mounted body by means of *extension bolt (75)*.
- o. If the valve contains handle, introduce the *handle (16)* into its housing in the *stem (5)*. Tighten the *handle bolt (17)*.
- p. Slowly cycle the valve until completing 1 cycle to ensure coupling between the *seats (4)* and *ball (3)*.
- q. Carefully cycle the valve twice in order to check the correct working. Stem should rotate smoothly offering resistance as indicated by the manufacturers torque figures. Tests should be carried out according to API 598, at the pressure rating that corresponds to the valve, 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.