



SAPAG

## Cast Check Valves Pressure Seal -Style A- Swing Check and Tilting Disc Configuration

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### Section 1 - Valve Storage

#### 1.1 Preparation and Preservation for Shipment

All valves are properly packed in order to protect the parts that are subject to deterioration during transportation and storage on site. In particular, the following precautions should be taken:

1. The weld ends surface shall be protected with suitable protective like Deoxaluminite. The end shall be closed with plywood or plastic disc fixed at the edge by strips.
2. The type of packing must be defined in the Customer's Order and shall be appropriate to ensure safe transportation to final destination and eventual conservation before installation.

#### 1.2 Handling Requirements

##### A - Packed Valves

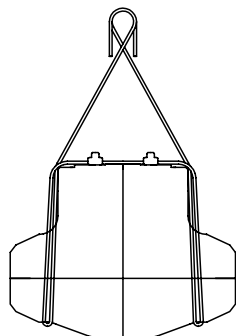
Crates: Lifting and handling of the packed valves in crates will be carried out by a fork lift truck, by means of the appropriate fork hitches.

Cases: The lifting of packed valves in cases should be carried out in the lifting points and at the center of gravity position which have been marked. The transportation of all packed material must be carried out safely and following the local safety regulations.

##### B - Unpacked Valves

1. The lifting and the handling of these valves has to be carried out by using appropriate means and at respecting the carrying limits. The handling must be carried out on pallets, protecting the machined surfaces to avoid any damage.
2. With valves of large dimensions, the sling and the hooking of the load must be carried out using the appropriate tools (brackets, hook, fasteners, ropes) and load balancing tools in order to prevent them from falling or moving during the lifting and handling.

### Valve slinging



Swing Check and Tilting Disc Valves

Figure no. 1

### 1.3 Storage and Preservation before Installation

In case the valves have to be stored before installation, the storage has to be carried out in a controlled way, and has to be performed in accordance with the following criteria:

1. The valves have to be stocked in a closed, clean and dry storage room.
2. The disc must be in the closed position, and the end faces must be protected with plastic or wooden discs fixed with straps. If possible, keep the original protection.
3. Periodical checks have to be carried out in the storage area to verify that the above mentioned conditions are maintained.



#### Note

Storage in an open area for a limited period can be considered only in case the valves have appropriate packing (packed in cases lined with tarred paper, and contents well protected with barrier sacks).

Do not place consignment packages directly on the ground.

Do not expose consignment packages to the weather or directly to the sun.

Check the packaging every two months.



#### Warning

For valve handling and/or lifting, the lifting equipment (fasteners, hooks, etc.) must be sized and selected while taking into account the valve weight indicated in the packing list and/or delivery note. Lifting and handling must be made only by qualified personnel.

Caution must be taken during the handling to avoid that this equipment passes over the workers or over any other place where a possible fall could cause damage. In any case, the local safety regulations must be respected.

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## Section 2 - Installation

### 2.1 Preparation before Installation

1. Carefully remove the valve from the shipping package (box or pallet) avoiding any damage to the valve.
2. Clean the inside of the valve using an air line. Ensure that there are no solid objects such as pieces of wood, plastic or packing materials within the valve or on the valve seat.
3. Confirm that the materials of construction listed on the valve nameplates (service and temperature) are appropriate for the service intended and are as specified.
4. Define the preferred mounting orientation with respect to the system pressure. The arrow on the body identifies the upstream side (high pressure) and downstream side (low pressure).



#### Warning

Verify that the direction of the flow in the line corresponds to the arrow indicated on the valve body.

## 2.2 Installation Instructions

Check valves are normally installed in horizontal pipe, but can also be installed in vertical pipe with upward flow.

For a correct operation, Sapag recommends that the valve shall be installed and oriented following the indications of fig. 2.

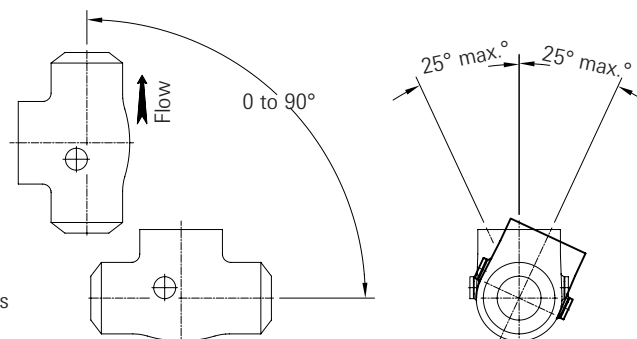
This can help minimize any problem associated with solid particles present in the fluid that otherwise could deposit in the lower part of the body and be obstacle to the disc complete closure. Unless otherwise recommended by Sapag, the valve should be installed with the disc in the closed position, to ensure that the seat ring in the disc is not damaged during installation.

For operating temperatures above 200°C (392°F) thermal insulation of the valve body is recommended.

Handling and lifting of the valves during installation **MUST** be performed following the same criteria and instructions described in previous points "1.2 Handling Requirements" and "1.3 Storage and Preservation before Installation".

### Buttweld Valves

Position the valve and check the alignment with the pipe, then proceed with welding, in accordance with the applicable welding procedure.



**Figure no. 2**  
Installation positions recommended

**Table I: Bolt Torque to Ensure Tightness of Pressure Seal Gasket**

#### Position 31 for Check Valves

Stud	Torque ft.lbs.	Torque Nm
3/8	18	24,5
1/2	37	50
5/8	74	100
3/4	125	170
7/8	207	280
1	310	420
1 1/8	443	600
1 1/4	627	850
1 3/8	811	1100

#### Important

To ensure tightness of Pressure Seal gasket, pull up bolts must be tightened when valve is under fully hydrostatic test pressure.

#### Important

After the valves installation and before the line testing, it is recommended to perform an accurate cleaning of the lines to eliminate dirt and any foreign objects that could seriously jeopardize the tightness between seat/disc and the correct operation of the valve.

### 2.3 Valve Verification before Start Up

1. If the valve has been stored for a long time, check the bolt torque for bolting (pos. 31) in accordance with table I.

#### Important

If piping system is pressurized with water for testing, and in case the piping system has been shut down after testing for a long time, the following recommendations should be adopted.

- a. Use corrosion inhibitor with water to pressurize the piping system
- b. After testing, the piping system should be depressurized and the test water completely drained.

### 2.4 Operations Instructions

1. Style A Series Check Valves do not require special care to work properly. The following instructions will help provide a satisfactory and long life service.
2. Make sure to perform periodic valve verification as described in paragraph 2.5.

### 2.5 Periodic Valve Verification during Service

#### A - Normal Check

1. Verify monthly that there is no leakage from the body/bonnet area. If the leakage has been detected from the body/bonnet area, tighten the nuts (pos. 31) as indicated in Table I. If the leakage does not stop, follow the maintenance procedure for the replacement of the body/ bonnet gasket (3.2, 3.3).

#### B - Preventive Actions

1. Every 4 years disassemble the critical service valves, verifying the sealing surfaces and lap them again when necessary. Substitute the bonnet gasket.

### Troubleshooting Guide

Symptom	Possible Cause	Solution
Body-Bonnet leaking	1. Gasket bolting loose (pos 31) 2. Gasket damaged	1. Tighten bolting (pos 31) 2. Replace gasket
Valve leaking	1. Valve not fully closed 2. Debris trapped in valve 3. Sealing surface damaged	1. Flush valve in order to close it 2. Cycle and flush (with valve open) to remove debris 3. Recondition the sealing surface

### Section 3 - Maintenance

The Style A Series Valves have been designed to require minimum maintenance.

This manual describes on site repairs as:

- Body/Bonnet Gasket Replacement

All the other repairs should be performed by Sapag or Nominated Service Company.

#### 3.1. Bonnet Gasket Replacement



#### Warning

Before starting any maintenance, depressurize, drain and vent the line; check that the valves are not in temperature.

Failure to do so may cause serious personal injury and/or equipment damage.

Please refer to Figure no. 3.

1. Unscrew the nuts (pos.31).
2. Remove the retaining ring (pos.311).
3. Remove the segment rings, push them out from the body groove by using the body holes placed radially on the top of the body.
4. Lift up the bonnet (pos.6) and pressure seal body gasket (pos.5).
5. Carefully clean all the gasket housing and lubricate with suitable grease.
6. Replace the body gasket.
7. Reassemble all parts following backwards the above mentioned steps.



#### Caution

The nuts (pos.31) need to be retightened after valve first pressurization, as indicated in Table I.

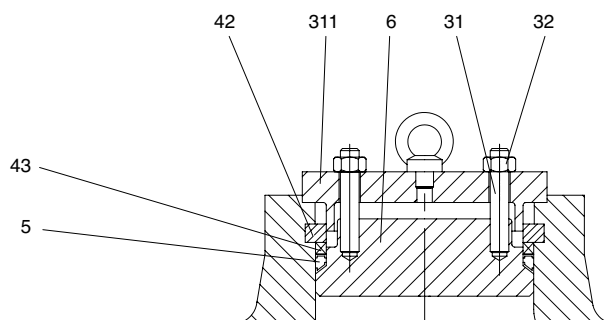


Fig. no. 3

### Section 4 - Valve Removal

If the valve needs to be removed from the line for some extraordinary reason, the user should ensure the following:

1. The valve is depressurized, drained and vent;
2. The pipe shall be cut as far away from the valve as possible.

### Section 5 - Special Tools

No special tool required for the Maintenance Operation described in this Manual.