FLOWSERVE

INSTRUCTION MANUAL

Anchor Darling 1878 Swing Check Valves with Pressure Seals

Sizes 1/2” through 2”

Installation
Operation
Maintenance

FCD ADENIM0007-00

Experience In Motion

Table of Contents

1.0 PHYSICAL DESCRIPTION AND OPERATION OF EQUIPMENT

1.1 Swing Check Valve

The swing check valve is designed for use in a system where protection against reversal of flow in the line is desired. The force of the upstream fluid swings the disc out of the waterway, allowing the fluid to pass through the valve with minimal pressure drop. However, should the direction of flow completely reverse, the disc weight will cause the disc to swing into the waterway and, along with the force of the reversed flow, force it to seal against the seat.

A dual seat may be supplied which provides a hard surface for high differential pressure sealing and a resilient seat for sealing during low differential pressure.

2.0 Design Conditions

Refer to the applicable drawing in Section 13 of this manual.

3.0 Operating Conditions

Refer to the applicable drawing in Section 13 of this manual.

4.0 Test Conditions

4.1 Each valve covered by this manual has received the following hydrostatic tests:

4.1.1 Shell hydrostatic test at 1.5 times the 100°F pressure rating.

4.1.2 A seat leakage and disc closure test at 110% of the 100°F pressure rating.

5.0 Operating Precautions And Limitations

5.1 Maximum hydrostatic test pressure shall not exceed the values imposed by the ASME Code, Section III.

6.0 Installation Instructions

6.1 Lifting and Handling Requirements and Limitations

6.1.1 Good judgment should be exercised in selecting a lifting device that will safely support the unit's weight.

6.1.2 Remove the end covers.

6.1.3 Remove blocks or heavy paper used to hold check valve discs open during shipping.

6.2 Assembly Instructions

6.2.1 Although the valves have been shipped in a clean condition, prior to installing the valves, examine the lines and the valve ports for foreign matter and clean them thoroughly if they have been exposed to the elements. (BEFORE CLEANING IN THIS FASHION, CHECK AT THE SITE TO SEE IF A SPECIFIC CLEANING PROCEDURE SHOULD BE FOLLOWED.) Open the valves fully and flush them out with water if possible; otherwise blow them out with air or steam.

6.2.2 Ensure that there is no line sag at the point of installation. Eliminate any pipeline deviation by the proper use of pipeline hangers or similar device.

6.2.3 Extreme caution should be taken when installing check valves. The arrow on the valve body indicates flow direction. Note that the disc swing is upward and away from the inlet end of the valve. Therefore, when installing a check valve, place it so that the flow of the incoming fluid will open the valve and return flow will close it. Check valves installed in reverse position will stop the flow in the normal flow direction. Check valves installed in horizontal piping shall have the hinge pin in a horizontal plane with the bonnet on top. Check valves installed in vertical piping shall have the hinge pin in a horizontal plane with flow upward.

6.2.4 The valves should then be blocked or slung into position with apparatus that is sufficient to hold the valve assembly weight while the valve is being welded into the line. Care should be taken during welding that foreign material or dirt does not enter the valve and cause interference with subsequent operation. **For valves with resilient seats** - caution should be exercised so that the resilient seat material is not subjected to temperatures greater than 400°F.

7.0 Maintenance Requirements

7.1 Preventative Maintenance

7.1.1 Check all bolting periodically to ensure tightness and to forestall possible leaks. Refer to section 11.0 for bolting torque valves.

7.2 Recommended Spare Parts

7.2.1 Recommended spare parts are pressure seal gaskets, machine screws and resilient seats. The recommended quantity is 1 gasket, 4 machine screws and 1 resilient seat for every 2 valves of a particular type but not less than 1 set of each type.

8.0 Periodic In-service Testing Recommendations And Procedures

8.1 This is not required for swing check valves without external operators.

9.0 Maintenance Instructions

9.1 The following instructions cover the disassembly and reassembly of a swing check valve. Typical valve configurations are shown in Figure 1 (see Section 12).

CAUTION
CHECK LINE PRESSURE: IF LINE IS STILL UNDER PRESSURE,
VENT BEFORE VALVE DISASSEMBLY IS STARTED.

9.1.1 Disassembly

Extreme care should be taken to ensure that the hinge pin, hinge and disc do not separate when removed as one unit. Failure to do so may cause damage to the disc.

After removal from the valve, care should be taken to protect the seating surface of the disc from damage. The disc should be placed in a clean area until ready to replace in the valve. THE SLIGHTEST NICK OR SCRATCH ON A SEATING SURFACE MAY PREVENT COMPLETE SHUT-OFF AND NECESSITATE EXTENSIVE REWORK OR REPLACEMENT.

9.0 Maintenance Instructions (Continued)

9.1.1 Disassembly (Continued)

WARNING
PRIOR TO PERFORMING DISASSEMBLY,
CLOSE OFF THE LINE PRESSURE TO THE VALVE,
AND RELEASE ALL PRESSURE IN THE VALVE.

1) Remove the anti-rotation pin (258) and bonnet capscrew (216). The bonnet retainer (034) may now be unscrewed and removed. Now thread the bonnet capscrew (216) directly into bonnet (002) and pull bonnet capscrew (216) directly upward.

2) Care should be taken to pull evenly and straight upward as not to score the neck walls of the valve and bonnet edges.

3) Pulling of the capscrew (216) will remove the bonnet (002), pressure seal gasket (030) and spacer ring (032).

4) Remove the two (2) locating pins (257). Take care to ensure the hinge pin / hinge / disc assembly (041, 006, 004) **DO NOT** drop into the body when the second locating pin (257) is removed.

5) Remove the hinge pin / hinge / disc assembly (041, 006, 004) from the body (001).

6) Remove the hinge pin (041) from the hinge (006).

7) Remove the disc nut pin (265) from the disc nut (239).

8) Remove the disc nuts (239) and the disc washer (248) from the disc (004) and remove the disc (004) from the hinge (006).

(9) Remove the Resilient Seat (306) from the Disc (004) by first grinding loose the lock weld between the Retaining Ring (015) and the Machine Screws (224). Unscrew the Machine Screws (224) from the disc/retaining ring assembly and then the Retaining Ring (015) can be lifted off the Disc (004) and the Resilient Seat (306) removed.

9.0 Maintenance Instructions (Continued)

9.1.2 Reassembly

REASSEMBLY OF THE VALVE is simply the reverse of disassembly, Paragraph 9.1.1. Read the following special instructions carefully.

First, all dirt, scale and foreign matter should be removed from inside the valve body and bonnet.

Before reassembling the valve, check the seating surfaces to determine that no scratches or minor imperfections are on the disc or seat ring. If any are evident – lap these surfaces until none are visible. (Reference Paragraph 9.2).

When replacing the bonnet capscrew (216) refer to Section 11.0 for correct torque to assure tightness of seal.

Remember to lock weld the machine screws (224) to the retaining ring (015) after installing a new resilient seat.

Use a nuclear grade lubricant on the bonnet capscrew thread reassembly.

9.2 Lapping Procedure

After the valve has been disassembled, a visual inspection of the seating surfaces of the Discs (004) and Seat Ring (013) can be made to determine if lapping is necessary to remove any minor scratches on these parts prior to assembling the valve. IF lapping is necessary, it may be accomplished in the following manner:

(1) Remove the Resilient Seat (306). Never lap the disc with the resilient seat in place.

(2) Place lapping compound between the Disc (004) and the Seat Ring (013) and, by hand, rotate the Disc (004) in a circular motion against the Seat Ring. Check periodically for signs of defects. Repeat this process until the defect is removed.

(3) A "medium" grade lapping compound should be used for the first and successive applications. A "fine" grade compound similar to "Clover A Grit No. 280" should be used for the final lapping process.

9.0 Maintenance Instructions (Continued)

9.3 Trouble Shooting

A. Leakage Between the Disc (004) and Seat Ring (013)

This could be an indication that there is foreign matter on the seating surfaces.

Disassemble the valve and remove the source of the trouble. If no foreign matter is found, inspect the seating surfaces of the valve for signs of a scarred or damaged seat - in which case the seating surfaces of the Disc (004) and Seat Ring (013) should be lapped until no visible defects remain. (Refer to Para. 9.2)

B. Leakage Between the Body (001) and Bonnet (002)

This would be a good indication that the pressure seal gasket (030) is worn out or damaged. Replacement of gaskets is set forth in Paragraph 9.1. Another source of the trouble might be that the bonnet capscrew is loose – if this should be the case – tighten it securely.

10.0 Storage Requirements

The valves have been shipped in the partially open position. Upon receipt of the valves at destination, the crates should be examined thoroughly for signs of mishandling or damage during shipment. With the valves strapped to the shipping skids, all bonnet bolting should be checked to ensure that the joints are secure. Bolting on occasion, may become loosened during shipment and handling.

The valves should then be stored in a sheltered area to protect them from the elements, dirt and foreign material. They should not be exposed to the atmosphere, uncrated or removed from the shipping skids except in a clean area just prior to installation.

If the valves are not to be installed within a short period of time after receipt, and will require long-term storage, the following should be adhered to:

(a) They should be stored in an upright position and where there are minimal temperature variations and the temperature does not drop below 50°F.

(b) In their storage condition, the valves should be wrapped in polyethylene to prevent accumulation of dust or foreign matter.

(c) A check-off tag should be affixed to each unit and should be dated and signed off by the inspector witnessing the inspection which is recommended at 6-month intervals.

The shelf life for resilient seat materials is 5 years.

The shelf life for ADVanseal® graphite gaskets is indefinite when stored under the proper conditions.

11.0 Bolting Torque Values, Gasket Data

BOLTING DATA:

VALVE SIZE	DESCRIPTION	QTY	SIZE	TORQUE (ft-lb) MAX.
1/2", 3/4", 1”	Bonnet Capscrew	1	3/8-16 x 1-1/4	15
1/2", 3/4", 1”	Disc Nut	1	5/16-18	6.5
1-1/2”, 2”	Bonnet Capscrew	1	1/2-13 x 1-1/2	37
1-1/2”, 2”	Disc Nut	1	7/16-14	19

GASKET DATA:

VALVE SIZE	DESCRIPTION	TAG NO.	TYPE	QTY
1/2", 3/4", 1”	Pressure Seal Gasket	A12198	ADVanseal®	1
1-1/2”, 2”	Pressure Seal Gasket	A12072	ADVanseal®	1

SECTION 12.0

REFERENCE DRAWINGS

SECTION 13.0

CUSTOMER CERTIFIED ASSEMBLY DRAWINGS (S)

FIGURE 1

1878# SWING CHECK VALVE PRESSURE SEAL DESIGN

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