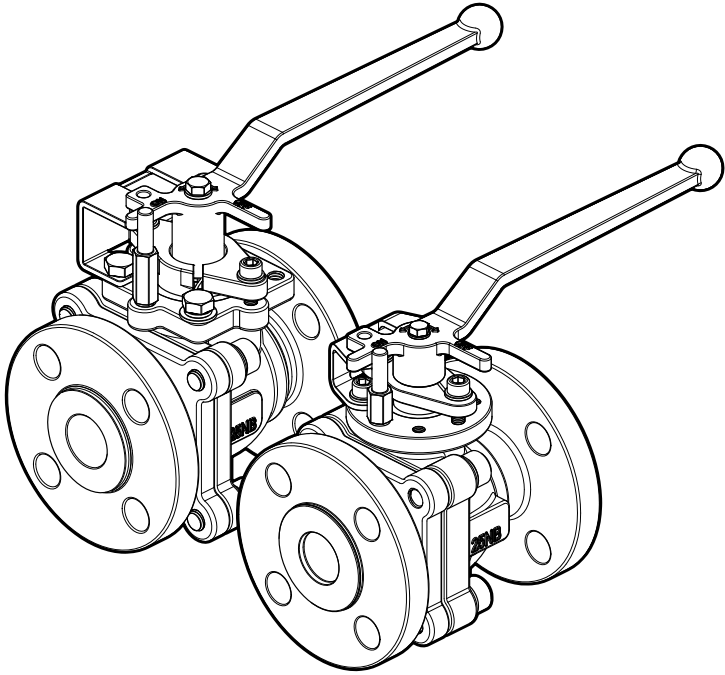


ACRIS

PFA LINED BALL VALVES

Installation, Operation and Maintenance Manual



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A  Bray Company



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Read and Follow These Instructions

Save These Instructions

Safety Instructions – Definition of Terms

 WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTICE	Used without the safety alert symbol indicates a potential situation which, if not avoided, may result in an undesirable result or state, including property damage.

Introduction

The Acris PFA lined standard and full port ball valves are engineered for zero leakage shutoff in demanding corrosive and ultra-pure industrial applications.

These fully lined ball valves offer unsurpassed resistance to corrosion, permeation and microbial contamination for maximum purity and reliability with minimal maintenance. Engineered for bi-directional zero leakage shutoff, Acris PFA lined ball valves are the high performance solution for critical applications. Available in standard and full port designs and with a vented ball for chlorine applications. Vented ball valves are uni-directional and must be installed in the preferred direction with the ball cavity venting to the upstream side.

Shipment Handling and Storage

1. Make sure that the valves are stored with their flange protectors in place. For areas with dust, sand or particulate matter in the air, it is advisable to wrap each individual valve in plastic to add a layer of protection for the PFA parts. The object is keep the valve in the as-manufactured condition prior to installation.
2. Preferably, valves should be positioned in the open position for shipment and storage. The handle should be parallel to the valve body (fully counter-clockwise) in the open position.
3. Preferably, valves should be stored indoors.
4. Ship and store the valves so that no heavy loads are applied to the valve bodies, handles, or actuators (if so equipped).

Installation

Acris PFA lined ball valves may be installed in any position in the pipeline flanges. When equipped with an actuator, it is recommended to avoid installing the valve/actuator upside down in the piping.

NOTICE

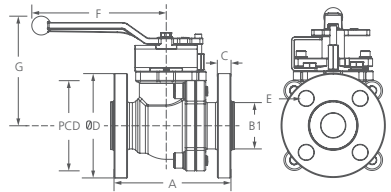
Before installing lined valves in newly fabricated piping, the piping system should be flushed of any solids, debris, welding residue, etc. or the seats and ball surface may be damaged.

NOTICE

If an actuator is to be field mounted, manually cycle the ball valve several times with the handle before installing the actuator. Manual cycling of the valve will reduce the "stiction" that can occur if valves have been stored for long periods of time.

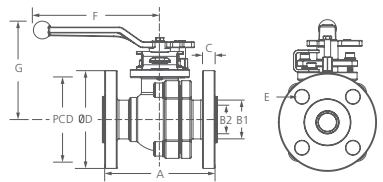
Full Port Dimensions (inches)

Size	A	B1	C	D	PCD	E	F	G
1/2	5.12	0.59	0.55	3.50	2.38	0.62	7.00	4.30
3/4	5.90	0.78	0.55	3.85	2.75	0.62	7.00	4.92
1	5.00	0.98	0.67	4.25	3.12	0.63	7.00	4.75
1 1/2	6.50	1.58	0.74	5.00	3.88	0.63	10.00	5.00
2	7.00	1.97	0.80	6.00	4.75	0.75	10.00	5.60
3	8.00	3.15	0.98	7.50	6.00	0.75	12.00	7.00
4	9.00	3.93	0.98	9.00	7.50	0.75	12.00	8.20
6	10.50	5.90	1.10	11.00	9.50	0.88	Gear	Gear



Standard Port Dimensions (inches)

Size	A	B1	B2	C	D	PCD	E	F	G
1	5.00	0.98	0.75	0.67	4.25	3.12	0.63	7.00	4.30
1 1/2	6.50	1.58	0.98	0.74	5.00	3.88	0.63	10.00	5.00
2	7.00	1.97	1.58	0.80	6.00	4.75	0.75	10.00	5.60
3	8.00	3.15	2.56	0.98	7.50	6.00	0.75	12.00	7.00
4	9.00	3.93	3.15	0.98	9.00	7.50	0.75	12.00	8.20



Operation

Operation of the valve is done by turning the handle a 1/4 turn (90 degree turn). Clockwise to close, counter clockwise to open.

Valve In Open Position

The handle is parallel with the pipeline.

Valve In Closed Position

The handle is perpendicular to the pipeline. Valves with actuators should be checked for actuator-valve alignment. Misalignment will result in high operational torque and damage to stem and seals.

Mounting

1. Verify that the pipeline flanges are in proper alignment and are parallel.
2. Gaskets are optional in installations where the maximum flange bolt torque can be achieved (Steel and Alloy flanges for example). If the maximum bolt torque cannot be achieved due to flange type or material limits (FRP & PVC for example), gaskets may be required for proper flange sealing.
3. Spread pipe flanges to allow valve to freely slide between the two flanges. If the valve is equipped with a vented ball (Option VB), remove the desiccant bag from the valve. A valve with a Vented Ball is uni-directional and can only be installed in the pipeline with flow in one direction. Match the flow arrows on the valve with the media flow direction.
4. Install stud bolts and nuts.
5. Tighten the nuts progressively in an acceptable rotational pattern to a torque within the limits listed in the table below.
6. Cycle the valve several times to verify proper operation.

Size inches	Bolt (nut) Torque in.-lb.	
	Min	Max
1/2	60	85
3/4	80	110
1	90	132
1 1/2	150	222
2	345	531
3	595	885
4	435	664
6	685	1025

Disassembly and Reassembly



Pipeline must be depressurized before disassembly of the packing gland or removal of the valve from the pipe. Valve should be cycled several times to assure there is no trapped pressure in the ball cavity. Flush the pipeline with the valve half open to remove any hazardous media. Cycle the valve several times during flushing.



DO NOT remove packing gland or any other valve parts while the pipeline is pressurized!



If the valve has been used to control hazardous media, it must be decontaminated before disassembly.

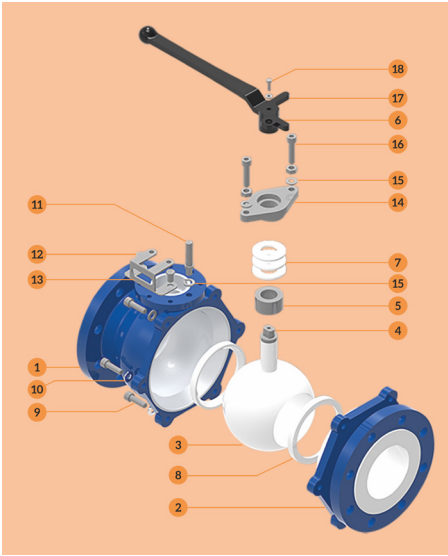
NOTICE

Stem seal leakage may be corrected without disassembly by tightening the packing gland bolts until such leakage stops. If stem leakage continues or valve operating torque becomes excessive, the stem packing is worn and needs replacement.

Full Port Disassembly

To avoid damage to the PFA liner and internal parts, it is recommended to perform disassembly on a soft covered work bench (rubber or equivalent material).

1. Place the valve in the closed position.
2. Remove the handle bolt (18) with washer (17).
3. Remove handle (6) by pulling upward off the valve top shaft.
4. Loosen and remove the packing gland cover bolts and washers (16 and 15) and grounding spring. Remove the packing gland cover (14).
5. Remove Lock Out / Tag Out (LOTO) bracket (13) by loosening and removing bolts (12).
6. Loosen and remove body bolts and washers (9 and 10). Separate the body halves (1 and 2).
7. Remove the stem packing (7) and the PTFE stem bushing (5) from the packing gland bore. A special packing removal tool may be required to pick out the packing rings.



8. With the ball in the closed position, tilt the one-piece ball/stem (3 and 4) carefully out of the valve body. Care should be taken no to damage the PFA liner in the body or the PFA over-molding on the ball.
9. Remove PTFE seats (8) from both body halves (1 and 2).
10. The handle stop (11) can be removed if required.

Full Port Reassembly

11. Verify that all parts are clean and free from contaminants, lubricants, etc. prior to assembly.
12. Insert the PTFE seats (8) into both body halves (1 and 2).
13. Insert the one piece ball/stem (3 and 4) in the closed position into the larger body half (1) by tilting it in such a way that the stem enters and comes out the packing gland bore.

Care should be taken not to damage the PFA liner in the body and the PFA over-molding on the ball.

14. Insert the PTFE stem bushing (5) into the packing gland to align and center the stem in the packing gland of the body half (1).
15. Place body half (2) on body half (1) and align the body bolt holes.

16. Install the body bolts and washers (9 and 10) to attach both body halves. Tighten in an acceptable rotational pattern to the recommended torque making sure the gap between the body halves remains equal as the body bolts are tightened.

Size inches	Body Bolt Torque in.-lb.	Packing Gland Bolt Torque in.-lb.
1/2	75	25
3/4	75	25
1	135	35
1 1/2	150	45
2	220	45
3	265	53
4	310	53
6	355	89

17. Insert PTFE packing (7) into the packing gland bore.
18. Install the packing gland cover (14), grounding spring, and packing gland cover bolts and washers (16 and 15). Tighten to the recommended torque as shown in Item 16, above.
19. Install the LOTO bracket (13) and bolts (12).
20. Install the handle (6) on the valve stem (4). Install the handle bolt (18) and washer (17) on the handle (6) and tighten.
21. If the handle stop (11) was removed, reinstall in the valve top plate.
22. Check for proper operation by slowly cycling the valve, with a gentle back and forth motion, building up to a full 90° rotation. By cycling slowly, the PTFE seats will more easily conform to the profile of the ball.

Full Port Testing

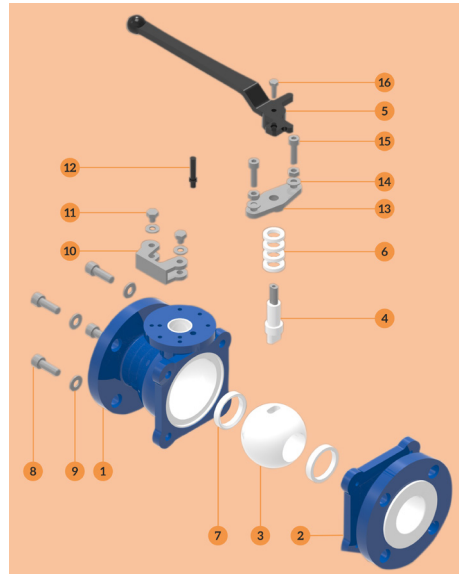
23. If a test flange or flanges and a gas pressure source are available (Air or Nitrogen), pressure test the valve prior to reinstallation. It is advisable to have a 3-way ball valve on the pressure inlet line or other means of relieving the internal test pressure.
24. If testing with 1 test flange, the valve will need to be in the vertical or near vertical position once installed. Be sure to install the test flange with full bolting and a gasket.
25. Once the valve body is secure in the vertical or near vertical position, slowly pressurize the valve with 80 psig Air or Nitrogen. Partially cycle the valve, under pressure, and then slowly close the valve to make sure the ball cavity is pressurized.
26. Pour clean and filtered water in the opposite side of the ball valve and look for bubbles.
27. If bubbles appear, shut off the air or nitrogen source and relieve the pressure inside the valve. Evacuate the water and cycle the valve several times and repeat the pressure test until satisfactory. Once complete, testing of the opposite ball/seat interface can be done by removing and installing the test flange on the other body flange and repeating the process. NOTE – If valve is equipped with a vented ball (Option VB) for Chlorine service, the valve can only be tested in one direction. Apply pressure in the flow direction indicated by the arrows on the valve body tag.
28. Check the tightness of the packing gland by spraying soapy water or a leak detection liquid in and on the packing gland area. If bubbles appear, slowly tighten the packing gland bolts (16) just until the leakage stops.
29. If 2 test flanges are available, install the second flange on the other body flange. Using 2 test flanges will require the use of 2mm to 4mm ID flexible tubing and fittings secured to the 2nd test flange NPT port. The tubing end would then be placed in a beaker or jar of water to a depth of 3mm to 6mm. This is per API-598 (2016) standard. Slowly pressurize the ball valve with 80 psig gas. Partially cycle the valve, under pressure, and then slowly close the valve to make sure the ball cavity is pressurized. Look for bubbles exiting the tube in the water.
30. If bubbles appear, shut off the air or nitrogen source and relieve the pressure inside the valve.

Cycle the valve several times and repeat the pressure test until satisfactory. Once complete, testing of the opposite ball/seat interface can be done by removing and installing the test flanges on the opposite body flanges and repeating the process.

NOTE – If valve is equipped with a vented ball (Option VB) for Chlorine service, the valve can only be tested in one direction. Apply pressure in the flow direction indicated by the arrows on the valve body tag.

31. Check the tightness of the packing gland by spraying soapy water or a leak detection liquid in and on the packing gland area. If bubbles appear, slowly tighten the packing gland bolts (16) just until the leakage stops.

Standard Port Disassembly



To avoid damage to the PFA liner and internal parts, it is recommended to perform disassembly on a soft covered work bench (rubber or equivalent material).

1. Place the valve in the closed position.
2. Remove the handle bolt (16) with washer.
3. Remove handle (5) by pulling upward off the valve top shaft.

4. Loosen and remove the packing gland cover bolts and washers (15 and 14) and grounding spring. Remove the packing gland cover (13).
5. Remove Lock Out / Tag Out (LOTO) bracket (10) by loosening and removing bolts (11).
6. Loosen and remove body bolts and washers (8 and 9). Separate the body halves (1 and 2).
7. With the ball in the closed position, carefully pull and tilt ball (3) outward out of the body. Care should be taken not to damage the PFA liner in the body or the PFA over-molding on the ball.
8. Remove the Stem (4) by pushing it down through the packing gland. Care must be taken not to damage the PFA body lining or the PFA stem over-molding.
9. Remove PTFE seats (7) from both body halves (1 and 2).
10. Remove the stem packing (6) from the packing gland bore. A special packing removal tool may be required to pick out the packing rings.
11. The handle stop (12) can be removed if required.

Standard Port Reassembly

12. Verify that all parts are clean and free from contaminants, lubricants, etc. prior to assembly.
13. Insert the PTFE seats (7) into both body halves (1 and 2).
14. Insert the stem (4) into the valve body (1) by tilting it and guiding it up through the packing gland bore. The bare metal portion of the stem (4) should enter the valve body first. Once completely inserted, rotate the stem (4) so that the PFA flats (on the ball side) are in line with the valve body bore. Care should be taken to not damage the PFA liner in the body and the PFA over-molding on the stem.
15. Line up slot on top of the ball (3) with the PFA flats on the stem (4). Insert the ball (3) into the valve body (1) and onto the stem (4) by pushing the ball (3) with a slight downward motion into the valve body. Center the ball (3) on the PTFE seat (7) as much as possible.
16. Place body half (2) on body half (1) and align the body bolt holes.

17. Install the body bolts and washers (8 and 9) to attach both body halves. Tighten in an acceptable rotational pattern to the recommended torque making sure the gap between the body halves remains equal as the body bolts are tightened.

Size inches	Body Bolt Torque in.-lb.	Packing Gland Bolt Torque in.-lb.
1	135	27
1½	150	31
2	220	31
3	265	35
4	310	35

18. Insert PTFE packing (6) into the packing gland bore.
19. Install the packing gland cover (13), grounding spring, and packing gland cover bolts and washers (15 and 14). Tighten to the recommended torque as shown in Item 17, above.
20. Install the LOTO bracket (10) and bolts (11).
21. Install the handle (5) on the valve stem (4). Install the handle bolt (16) and washer on the handle (5) and tighten.
22. If the handle stop (12) was removed, reinstall in the valve top plate.
23. Check for proper operation by slowly cycling the valve, with a gentle back and forth motion, building up to a full 90° rotation. By cycling slowly, the PTFE seats will more easily conform to the profile of the ball.

Standard Port Testing

24. If a test flange or flanges and a gas pressure source are available (Air or Nitrogen), pressure test the valve prior to reinstallation. It is advisable to have a 3-way ball valve on the pressure inlet line or other means of relieving the internal test pressure.
25. If testing with 1 test flange, the valve will need to be in the vertical or near vertical position once installed. Be sure to install the test flange with full bolting and a gasket.
26. Once the valve body is secure in the vertical or near vertical position, slowly pressurize the valve with 80 psig Air or Nitrogen. Partially cycle the valve, under pressure, and then slowly close the valve to make sure the ball cavity is pressurized.
27. Pour clean and filtered water in the opposite side of the ball valve and look for bubbles.
28. If bubbles appear, shut off the air or nitrogen source and relieve the pressure inside the valve. Evacuate the water and cycle the valve several times and repeat the pressure test until satisfactory. Once complete, testing of the opposite ball/seat interface can be done by removing and installing the test flange on the other body flange and repeating the process. **NOTE** – If valve is equipped with a vented ball (Option VB) for Chlorine service, the valve can only be tested in one direction. Apply pressure in the flow direction indicated by the arrows on the valve body tag.
29. Check the tightness of the packing gland by spraying soapy water or a leak detection liquid in and on the packing gland area. If bubbles appear, slowly tighten the packing gland bolts (16) just until the leakage stops.
30. If 2 test flanges are available, install the second flange on the other body flange. Using 2 test flanges will require the use of 2mm to 4mm ID flexible tubing and fittings secured to the 2nd test flange NPT port. The tubing end would then be placed in a beaker or jar of water to a depth of 3mm to 6mm. This is per API-598 (2016) standard. Slowly pressurize the ball valve with 80 psig gas. Partially cycle the valve, under pressure, and then slowly close the valve to make sure the ball cavity is pressurized. Look for bubbles exiting the tube in the water.
31. If bubbles appear, shut off the air or nitrogen source and relieve the pressure inside the valve. Cycle the valve several times and repeat the pressure test until satisfactory. Once complete, testing of the opposite ball/seat interface can be done by removing and installing the test flanges on the opposite body flanges and repeating the process.

NOTE – If valve is equipped with a vented ball (Option VB) for Chlorine service, the valve can only be tested in one direction. Apply pressure in the flow direction indicated by the arrows on the valve body tag.
32. Check the tightness of the packing gland by spraying soapy water or a leak detection liquid in and on the packing gland area. If bubbles appear, slowly tighten the packing gland bolts (15) just until the leakage stops

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