VALVE SOLUTIONS

INSTALLATION, OPERATING, & MAINTENANCE INSTRUCTIONS

PBV® THREE-PIECE TRUNNION BALL VALVES

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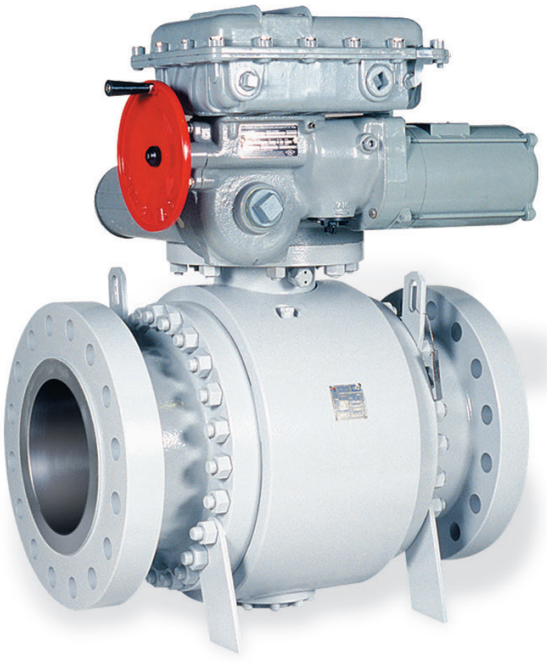

INSTALLATION, MAINTENANCE, & OPERATING INSTRUCTIONS

ANSI CLASS 150 / 300 / 600 / 900 / 1500 TRUNNION BALL VALVES

CAREFULLY READ THESE ENTIRE INSTRUCTIONS BEFORE INSTALLING OR SERVICING.

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FOR ANY QUESTIONS REGARDING THIS PRODUCT, PLEASE CONTACT FET

Phone: 281.637.2000 | 800.256.6193 Email: ForumVS.PBV@f-e-t.com

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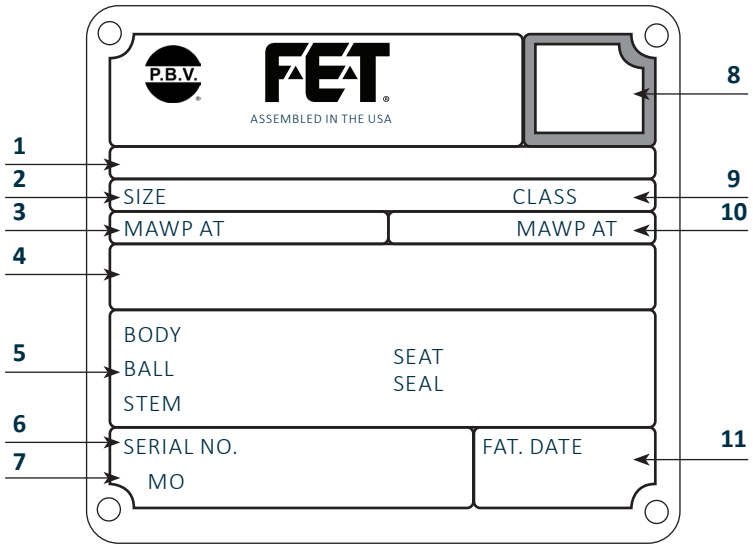


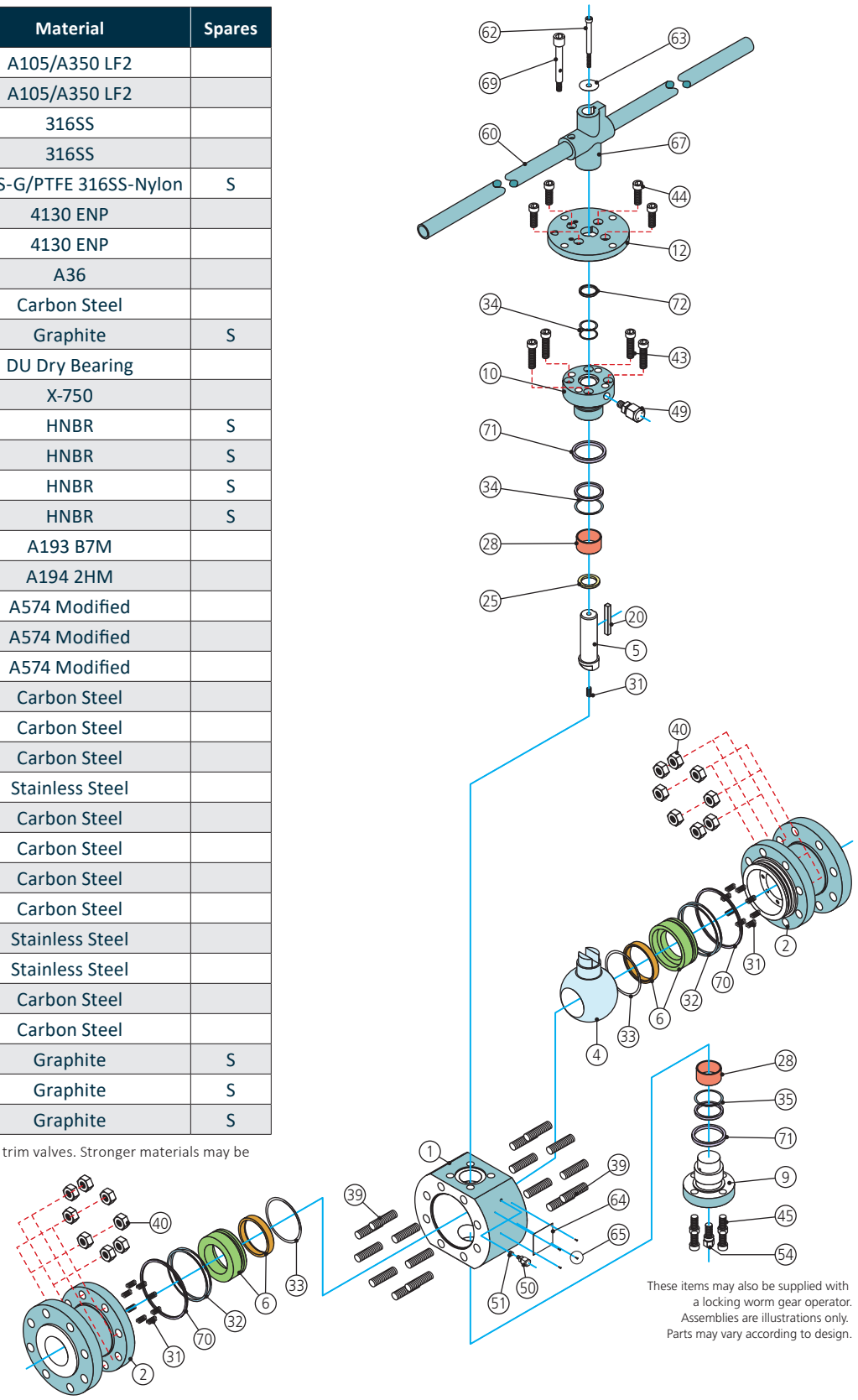
Item	Description
1	Figure #
2	Nominal pipe size of the valve
3	Maximum allowable working pressure at Min Rating Temperature
4	Special Service NACE Notes
5	Component Materials
6	Valve Serial Number
7	Manufacturing Order #
8	PBV License Number
9	API Pressure Class
10	Maximum allowable working pressure at Max Rating Temperature
11	Manufacture Date

PARTS & MATERIALS

PBV 57/67 Three-Piece, 2” Full Port - 6” Reduced Port

No.	Description	Material	Spares
1	Body	A105/A350 LF2	
2	Closure/Flanged End	A105/A350 LF2	
4	Ball	316SS	
5	Stem	316SS	
6	Seat Ring Sub Assembly	316SS-G/PTFE 316SS-Nylon	S
9	Trunnion	4130 ENP	
10	Gland	4130 ENP	
12	Adapter Plate	A36	
20	Stem Key	Carbon Steel	
25	Stem Thrust Washer	Graphite	S
28	DU Bearing	DU Dry Bearing	
31	Seat/Stem Spring	X-750	
32	Body O-ring	HNBR	S
33	Seat O-ring	HNBR	S
34	Stem O-ring	HNBR	S
35	Gland & Trunnion O-ring	HNBR	S
39	Body Stud	A193 B7M	
40	Body Nut	A194 2HM	
43	Gland Cap Screw	A574 Modified	
44	Adapter Plate Cap Screw	A574 Modified	
45	Trunnion Cap Screw	A574 Modified	
46	Stem Key Cap Screw	Carbon Steel	
49	Stem Grease Fitting	Carbon Steel	
50	Body Grease Fitting	Carbon Steel	
51	Check Valve	Stainless Steel	
54	Drain Valve	Carbon Steel	
60	Handle/Lever	Carbon Steel	
62	Indicator Screw	Carbon Steel	
63	Retainer Washer	Carbon Steel	
64	Nameplate	Stainless Steel	
65	Drive Screw	Stainless Steel	
67	Handle Adapter	Carbon Steel	
69	Lock Screw	Carbon Steel	
70	Body Gasket	Graphite	S
71	Gland & Trunnion Gasket	Graphite	S
72	Stem Packing	Graphite	S

NOTE: Materials listed are typical for stainless steel trim valves. Stronger materials may be used to satisfy design requirements.

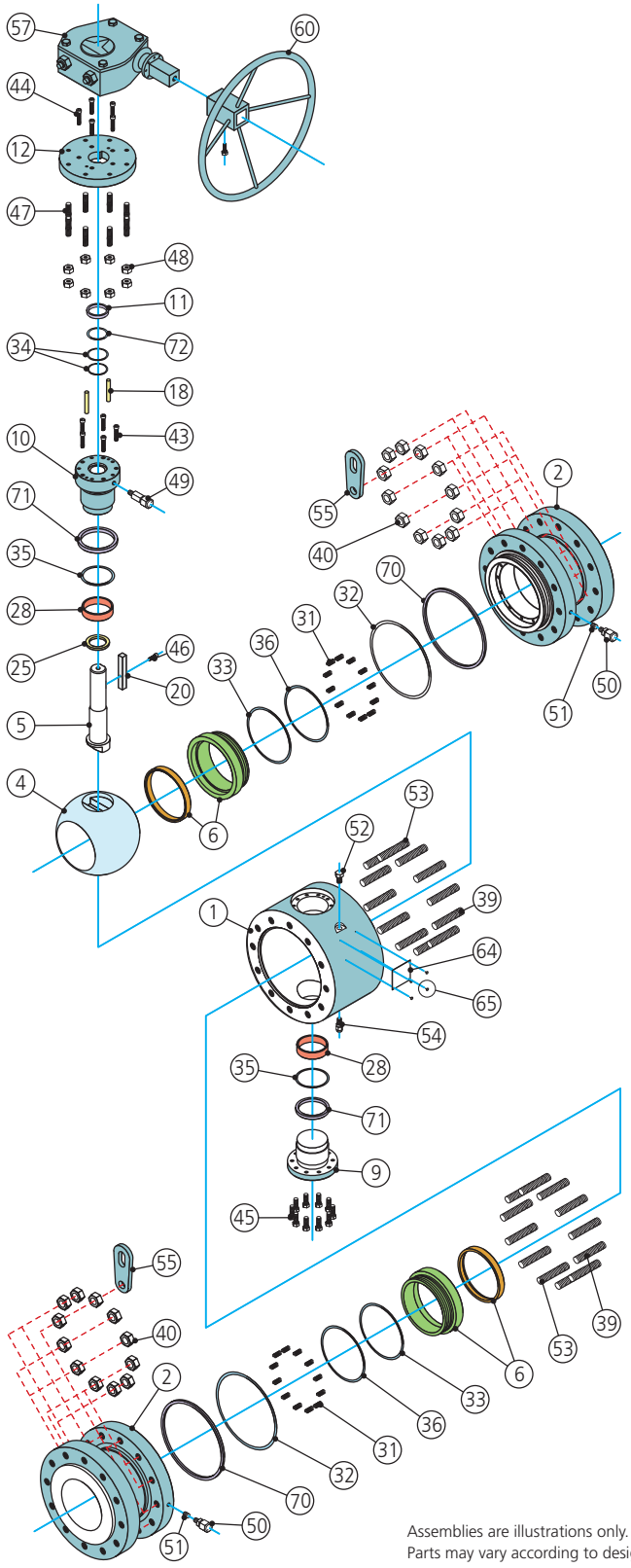


PARTS & MATERIALS

PBV 57/67 Three-Piece, 6” Full Port - 14” Reduced Port

No.	Description	Material	Spares
1	Body	A105/A350 LF2	
2	Closure/Flanged End	A105/A350 LF2	
4	Ball	A105/A350 LF2 ENP	
5	Stem	4130 ENP	
6	Seat Ring Sub Assembly	A105/A350 LF2 ENP G/ PTFE or Nylon	S
9	Trunnion	4130 ENP	
10	Gland	4130 ENP	
11	Bushing	Carbon Steel	
12	Adapter Plate	A36	
18	Gland Pin	Carbon Steel	
20	Stem Key	Carbon Steel	
25	Stem Thrust Washer	Graphite	S
28	DU Bearing	DU Dry Bearing	
31	Seat Spring	X-750	
32	Body O-ring	Viton	S
33	Seat O-ring	Viton	S
34	Stem O-ring	Viton	S
35	Gland & Trunnion O-ring	Viton	S
36	Emergency Sealant O-ring	Viton	S
39	Body Stud	A193 B7M	
40	Body Nut	A194 2HM	
43	Gland Cap Screw	A574 Modified	
44	Adapter Plate Cap Screw	A574 Modified	
45	Trunnion Cap Screw	A574 Modified	
46	Stem Key Cap Screw	Carbon Steel	
47	Gear Stud	A193 B7	
48	Gear/Adapter Plate Nut	A194 2H	
49	Stem Grease Fitting	Carbon Steel	
50	Seat Grease Fitting	Carbon Steel	
51	Check Valve	Stainless Steel	
52	Vent Plug	Carbon Steel	
53	Lifting Lug Stud	A193 B7M	
54	Drain Valve	Carbon Steel	
55	Lifting Lug	Carbon Steel	
57	Worm Gear Operator	Commercial	
60	Handwheel	Carbon Steel	
64	Nameplate	Stainless Steel	
65	Drive Screw	Stainless Steel	
70	Body Gasket	Graphite	S
71	Gland & Trunnion Gasket	Graphite	S
72	Stem Packing	Graphite	S

NOTE: Sizes 6" and 8" may be supplied with locking levers. Sizes 10" and 12" are supplied with support feet, not shown. Materials listed are typical for carbon steel valves. Ball, stem & seat rings will be 316, 17-4PH, or XM-19 for stainless steel trim depending on design requirements.



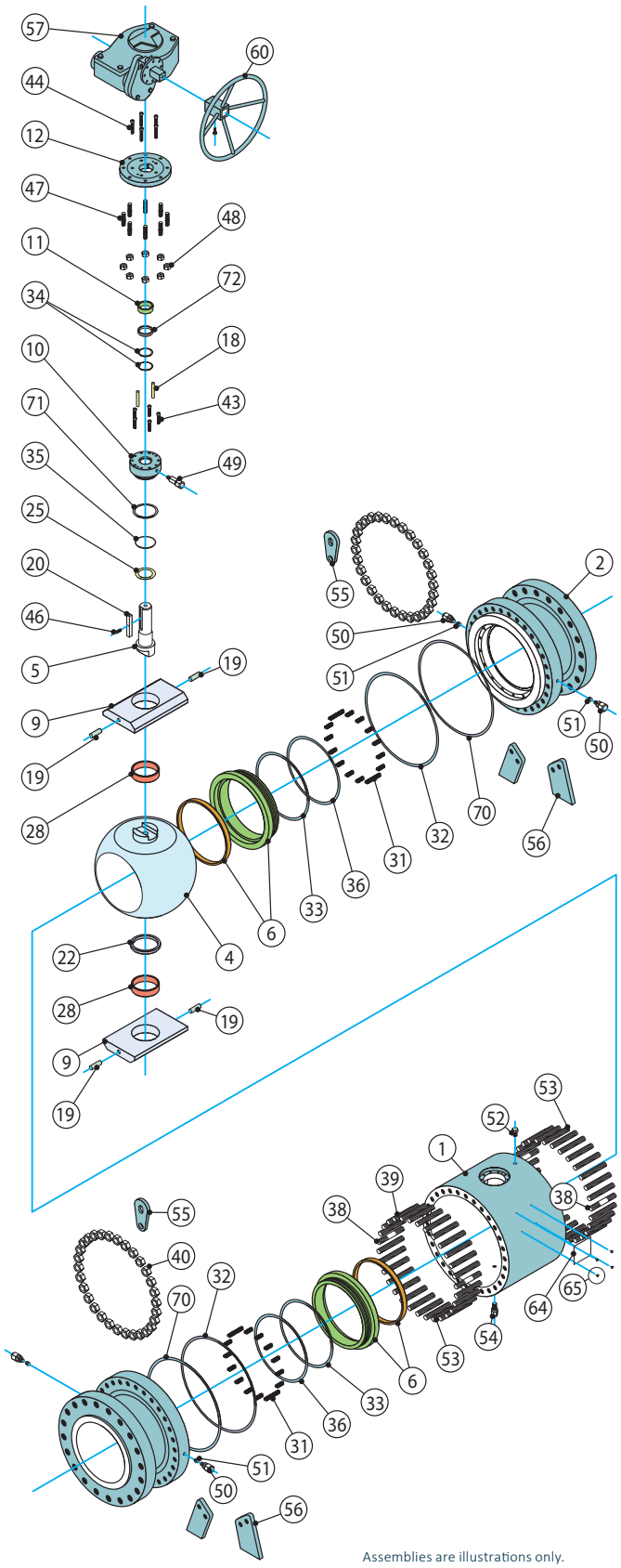
Assemblies are illustrations only.
Parts may vary according to design.

PARTS & MATERIALS

PBV 57/67 Three-Piece, 14” - 36” Full Port

No.	Description	Material	Spares
1	Body	A105/A350 LF2	
2	Closure/Flanged End	A105/A350 LF2	
4	Ball	A105/A350 LF2 ENP	
5	Stem	4130 ENP	
6	Seat Ring Sub Assembly	A105/A350 LF2 ENP G/ PTFE or Nylon	S
9	Bearing Retainer	Carbon Steel	
10	Gland	4130 ENP	
11	Bushing	Carbon Steel	
12	Adapter Plate	A36	
18	Gland Pin	Carbon Steel	
20	Stem Key	Carbon Steel	
22	Ball Thrust Washer	Phenolic	S
25	Stem Thrust Washer	Phenolic	S
28	DU Bearing	DU Dry Bearing	
31	Seat Spring	X-750	
32	Body O-ring	Viton	S
33	Seat O-ring	Viton	S
34	Stem O-ring	Viton	S
35	Gland O-ring	Viton	S
36	Emergency Sealant O-ring	Viton	S
38	Location Stud	A193 B7M	
39	Body Stud	A193 B7M	
40	Body Nut	A194 2HM	
43	Gland Cap Screw	A574 Modified	
44	Adapter Plate Cap Screw	A574 Modified	
46	Stem Key Cap Screw	Carbon Steel	
47	Gear Stud	A193 B7	
48	Gear/Adapter Plate Nut	A194 2H	
49	Stem Grease Fitting	Carbon Steel	
50	Seat Grease Fitting	Carbon Steel	
51	Check Valve	Stainless Steel	
52	Vent Plug	Carbon Steel	
53	Lifting Lug Stud	A193 B7M	
54	Drain Valve	Carbon Steel	
55	Lifting Lug	Carbon Steel	
56	Support Leg	Carbon Steel	
57	Worm Gear Operator	Commercial	
60	Handwheel	Carbon Steel	
64	Nameplate	Stainless Steel	
65	Drive Screw	Stainless Steel	
70	Body Gasket	Graphite	S
71	Gland & Trunnion Gasket	Graphite	S
72	Stem Packing	Graphite	S

NOTE: Materials listed are typical for carbon steel valves. Ball, stem & seat rings will be 316, 17-4PH, or XM-19 or stainless steel trim depending on design requirements.



Assemblies are illustrations only.

Parts may vary according to design.

GENERAL INFORMATION

DESIGN

PBV-USA series Reduced Port (5700) & Full Port (6700) trunnion mounted ball valves are a three-piece bolted body design. The valves are typically non-directional (except where noted) and can be installed with either end upstream. These valves are designed and manufactured in strict accordance with API 6D. Flanged end valves NPS 2" to 24" (except 22") have flange dimensions in accordance with ASME/ANSI B16.5. Face-to-face and end-to-end dimensions conform to API 6D.

The Series 5700/6700 ball valves are API monogrammed per API 6D.

DOUBLE BLOCK & BLEED

PBV-USA valves 5700/6700 series are designed for double block & bleed service. Each valve is equipped with a drain valve in the lower portion of the body. Valves 6" and larger also include a vent in the upper quadrant of the body.

DOUBLE ISOLATION AND BLEED SEATS (Double Piston Effect)

If requested, valves can be supplied with 2-way double isolation seats; sometimes called double piston effect seats. These valves can be configured with either one or two double isolation seats and will have a special tag on the valve noting this condition.

Valves with two double isolation seats will be supplied with a pressure relief valve in the upper end of body, unless specified otherwise during order. This valve relieves pressure in cases of thermal pressure buildup in the closed position. See Body Pressure Relief section for pressure relief settings on the valve.

EMERGENCY SEALANT SYSTEM

CAUTION: PBV BALL VALVES ARE POSITION SEALING, NOT TORQUE SEALING VALVES. IF A VALVE IS LEAKING, DO NOT APPLY MORE TORQUE TO THE HANDWHEEL OR LEVER. INCREASING TORQUE WILL NOT INCREASE THE VALVE'S SEALING CAPABILITES.

All Series 5700/6700 valves have fittings at the stem which can be used to inject a sealant (Sealweld 5050 or Chameleon Sealant) in the unlikely event of leakage in the stem area. This is for emergency situations only. It is recommended that the seals be replaced as soon as possible.

Valves NPS 6" and larger have provisions for emergency sealant injection in the seating areas through 1/2" NPT giant buttonhead fittings at the midpoint of the end closures.

Valves NPS 6" through 12" have two emergency Ball/Seat sealant fittings on the front of the valve; Valves 14" and larger have four fittings, two in front and two in back. Each injection port has an internal check valve installed as an added safety precaution. See maintenance section for more details.

FIELD WELDABILITY - WELDING END VALVES

PBV-USA series 5700/6700 ball valves with ASME B16.25 welding end connection(s) are readily field weld-able. Installation welding should be done by qualified personnel using approved welding procedures in accordance with applicable codes and jurisdictional regulations.

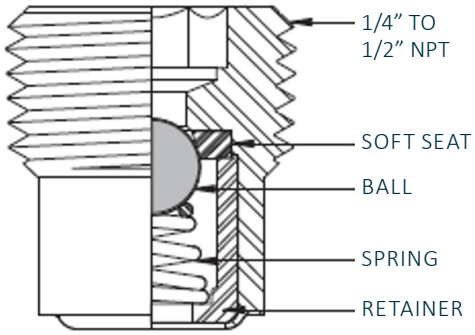
See Installation section for welding recommendations.

BODY PRESSURE RELIEF

In PBV-USA 5700/6700 series, independent spring-loaded seat design eliminates excess pressure build-up in the body cavity by automatic pressure release through the downstream seat.

A ½" NPT body relief valve is furnished as a standard for valves with two Double Isolation and Bleed seats to protect the body from thermal over-pressuring. The relief valve is an option for standard seat designs to further protect the body from thermal over-pressuring when the valve is in the fully closed position. A relief valve is recommended when the line pressure is expected to be very close to the valve maximum rated operating pressure.

Valve Pressure Class	Relief Valve Pressure - PSIG
150	335
300	865
600	1750
900	2600
1500	4325
2500	7200



When two double isolation seats are used in a valve an additional pressure relief valve will be installed in the upper side of the body. The valve is used to relieve thermally induced trapped pressure in the body. The relief valve setting is based on the working pressure of the valve (see chart above)

If a relief valve is installed, an appropriate relief drain system should be considered for safety and environmental purposes.

STORAGE

End protectors are placed on the valve for protection from damage and deterioration and to prevent entrance of dirt or debris. Do not remove the end protectors except for inspection or installation. As construction and storage sites are usually dusty, DO NOT REMOVE the end protectors before your valves are ready for installation. Inspect and clean any dirt or foreign material in the valve.

NEVER store the valve in the partially open position. The soft seat can be damaged if the valve is left partially open for long periods.

Valves shipped from stock are painted with 2-4 mils of polyurethane primer and top coat. This paint is intended to prevent exterior corrosion. It is intended for indoor storage and/or mild temperatures. For outdoor installations, the valve should be painted with the same coating used on corresponding piping.

Color: RAL 5018 Turquoise Blue

LONG TERM STORAGE

1. Remove tape over gaps at ball & seat
2. Open drain valve at bottom, remove vent plug at top; blow shop air with soft nozzle in vent opening to blow out any residual water/condensation in body cavity
3. Close drain valve and replace vent plug using approved thread sealant
4. Inspect valve bore and ball surface for dirt or debris and clean with clean, soft cloth
5. Partially close the valve approximately 30% and liberally spray WD-40 in body cavity around ball. Cycle ball back to full open position. Do not leave the valve partially open for longer than 15 minutes.
6. Cycle the valve open and closed 5 times for 2” to 12”. Larger valves can be cycled open and close two times due to the larger number of turns required to cycle the valve. Verify the number of turns to open and close match the gear specification. Normal backlash in the gear train must be factored in for the larger WG308 & WG408 gears. Impact devices to operate the gears are not allowed. Any powered device must be approved by PBV.
7. At the full open position, verify the ball bore is aligned with the end closure.
8. 6” and larger only: Inject synthetic lubricant Val-Tex 2000 or equal into the giant button head seat injection fittings until it is visible at the gaps between the ball and seat. Wipe off excess grease.
9. Apply non-hardening rust preventative MP-56 or equal over all bare steel surfaces in bore and end flange raised face. Do not apply rust preventative in the gaps between the ball/seat or seat/end closure.
10. Flanged end valves will have 1/2” plywood end flange with hard plastic sheet (.04” min) or rubber sheet glued to one side. Wood flange protector must be the same OD as th valve flange, secure with minimum (4) SS bolts, washers and nuts
11. Weld end valves will need special end flange protection. 2”-8” can use a molded plastic flange cover that fits in the bore. A plywood disc with a hard plastic sheet or rubber sheet glued to the valve side should be larger than the 37.5 degree weld prep surface. The plywood end flanges should be connected with a threaded rod and nut. The exposed portion of the threaded rod and nut should be painted with zinc primer.

OUTDOOR STORAGE

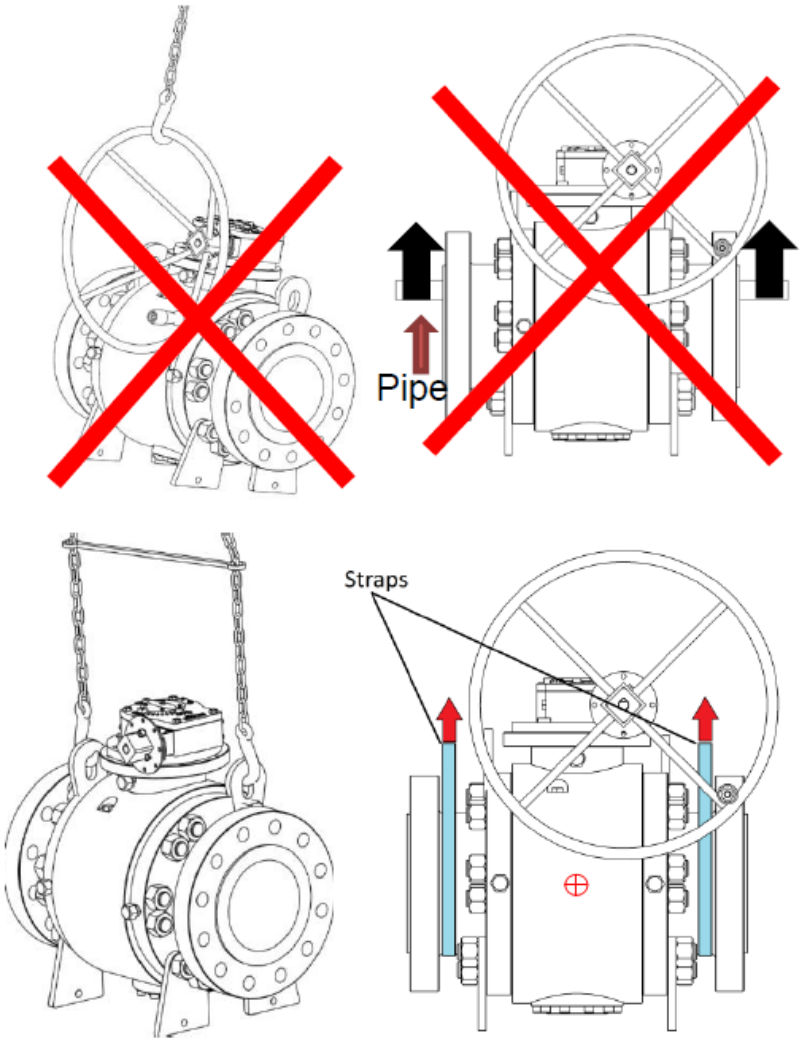
If valves are stored outdoors, support them off the ground or pavement and provide a watertight cover. The end flange raised face surface should be visually inspected and extra grease or corrosion inhibitor should be applied. The flange protectors must be sealed to prevent dirt and debris from entering the valve.

For tropical storage conditions, an extra heavy coating of grease with a corrosion inhibitor should be applied to all internal surfaces of the bore and the raised face of the flange.

For severe climate conditions, special coatings can be applied at the factory.

HANDLING

PBV Ball valves can be lifted via straps around the neck of the end connection or by the lifting lugs as shown below. The safe working limit (SWL) of each lifting strap is 2500 lbs. Center of gravity of the valve is marked on the image below.



When lifting lugs are supplied, they should be the preferred method of lifting via hook and chain. Always inspect hooks, chains, and straps for serviceability and lifting capacity before attempting to lift the valve. The safe working limit (SWL) of each lifting lugs are per the tables on the next page.

CAUTION: DO NOT USE OTHER PARTS OF THE VALVE OR VALVE ASSEMBLY TO LIFT THE VALVE. SUPPLIED LIFTING LUGS/EYES OR SLINGING THE CLOSURES ARE THE ONLY APPROVED METHODS OF LIFTING A VALVE. NEVER USE ANY PART OF THE GEAR OR HANDWHEEL TO LIFT THE VALVE.

Size	6”	8”	8”	8”	8”	10”	10”
Class	2500	300	600-900	1500	2500	150-600	900
SWL (lbf)	8537	2668	9903	5293	8537	4002	4226

Size	10”	12”	12”	12”	12”	12”
Class	1500-2500	150-300	600	900	1500	2500
SWL (lbf)	10671	2669	10671	12806	10245	43347

Size	14”	14”	14”	14”	16”	16”	16”	16”	16”
Class	150-300	600	900	1500	150-300	600	900	1500	2500
SWL (lbf)	9148	14820	8498	12037	9084	14820	13233	13062	21343

Size	18”-24”	18”	18”	20”	24”	24”	26”	26”	28”
Class	150-600	900	1500	900	900	1500	150-300	600	600
SWL (lbf)	14926	11098	21343	12806	21343	29880	16007	21343	17074

Size	30”	30”	30”	34”-36”	36”	40”	50”
Class	150	300	600	600	150-300	300	150
SWL (lbf)	28856	27831	21343	29880	21343	29880	128057

INSTALLATION

Ball valves are always shipped in the open position except when assembled with a “fail closed” actuator.

PBV Ball 5700 and 6700 series ball valves are bi-directional and may be installed in either direction, with either end serving as the upstream end. The exception is valves that are labeled as SPE x DPE.

The valve is assembled with the operator and access to the emergency injection fittings on the same side. The gear operator has (2) keyways and can be rotated 180 degrees to suit operating conditions.

The ball should be fully open during installation to prevent damage to the sealing surface of the ball.

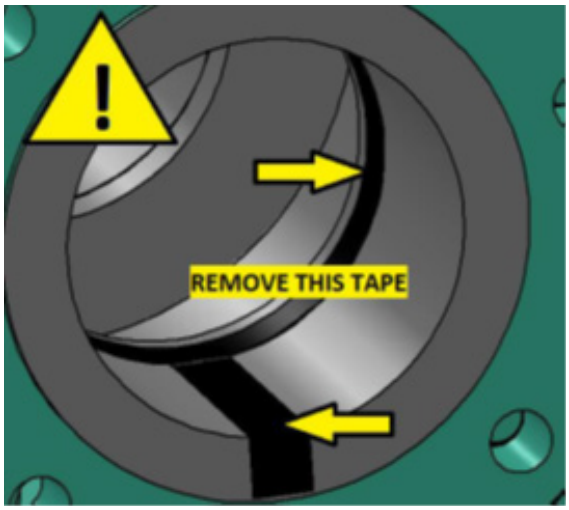
Always make sure the valve is clean before operating. Failure to do so may result in damage to the valve soft seats, which may cause the seats to leak under pressure.

WARNING

TAPE IS INSTALLED TO KEEP DEBRIS FROM FALLING INTO THE GAPS BETWEEN THE SEAT AND BALL. REMOVE TAPE FROM THE BORE OF THE VALVE BEFORE PERFORMING ANY INSTALLATION OR VALVE OPERATION STEPS. FAILURE TO DO SO MAY RESULT IN SEVERE DAMAGE TO THE VALVE SOFT SEATS. See the image below.

DO NOT LEAVE THE VALVE PARTIALLY OPEN FOR MORE THAN WHAT IS REQUIRED FOR TESTING (ideally less than 12 hours) AS DAMAGE TO THE SEAT MAY OCCUR.

SUPPORT LEGS ARE FOR STABILITY DURING SHIPPING ONLY. THEY ARE NOT INTENDED TO SUPPORT PIPING LOADS IN SERVICE.



INSTALLATION PROCESS

1. Verify the valve is correct as shown on the piping arrangement. Look at the identification plate, tags, and markings on the valve for size, pressure class, maximum operating pressure and temperature, and materials.
2. Remove end protectors when ready for installation.
3. Remove the ball sealing tape from the bore of the valve.
4. Check the valve interior and connecting pipe to ensure they are clean and free of foreign material.
5. Install in line with either end upstream and with operator and fittings in the most convenient orientation. For two way double acting seats, confirm if a specific valve orientation is needed.
6. On valves with extensions, check all extension piping and fittings to ensure that all are tight prior to placing valve in service.
7. On valves with external drains, check that all connections are still tight.
8. Do not inject sealant into the stem or seat grease fittings. These are for emergency only.
9. Be sure that flange end gasket surfaces are free from dirt or irregularities, which may affect sealing performance. Confirm gasket materials and bolting material, size and length. Series 5700/6700 ball valves Sizes 2” through 4” Class 150/300 require threaded studs.
10. Align bolt holes of valve flanges and pipe flanges. Insert gasket and bolts. Alignment must be accurate to prevent unbalanced tightening and subsequent excessive stress on bolting. The valve legs (if installed) are not intended to support the weight of the piping.
11. Use suitable lubricants on bolt threads. Tighten the bolts gradually and uniformly in a crosswise pattern in accordance with standard piping practices. The ends of the studs should extend equally beyond the nuts. See chart on right for proper bolt torques.
12. After installing the valve, be sure to check the studs and nuts of the Body-Closure flanges and retighten if necessary.

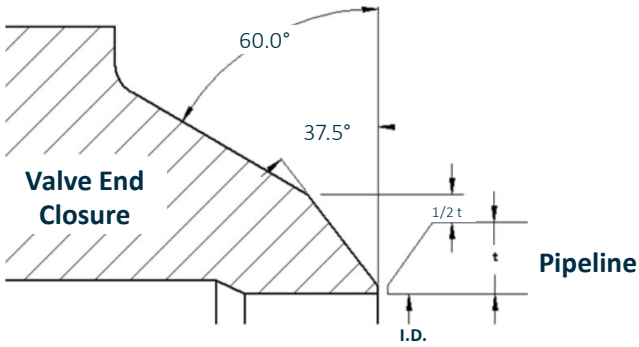
Recommended Thread Torques (Material Dependent)			
Nom. Size	**# Thread/ in**	**Torque (ft-lb)** B8	**Torque (ft-lb)** B7, B7M, L7, L7M
1/2	13	15	40
5/8	11	30	80
3/4	10	50	133
7/8	9	80	213
1	8	123	327
1 1/8	8	178	473
1 1/4	8	250	667
1 3/8	8	340	907
1 1/2	8	400	1067
1 5/8	8	550	1467
1 3/4	8	750	2000
1 7/8	8	1000	2667
2	8	1100	2933
2 1/4	8	1590	4240
2 1/2	8	2200	5867
2 3/4	8	2960	7893
3	8	3860	10293
3 1/4	8	4951	13203

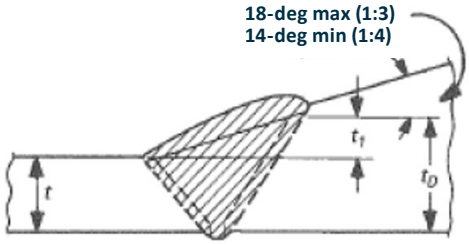
WELD END REQUIREMENTS

Weld end ball valves shall always be installed with the ball open.

When possible, use of a weld barrier or taping of the ball-to-seat area and seat-to-end connection area is recommended to prevent debris from lodging into these crevices.

Pigging the system is recommended to ensure no debris remains in the system prior to operation.





Welding Ends
(Welding Neck Flanges)
Additional Thickness for Welding to
Higher Strength Pipe

PBV weld ends are machined with additional thickness for welding to high strength pipe. The 37.5-degree bevel is 1.5 times the pipe wall thickness per Fig 1 in ASME B16.5.

NOTE: Carbon Steel end connections are made from dual certified A105/LF2 steel with a minimum yield strength of 46 ksi and may be welded to X69 pipe.

Ball valves with A105/A350 LF2 carbon steel weld end connections are field weldable. Welding must be performed by a qualified welder using qualified welding procedures. If weld spatter grease is applied inside the valve, it should be applied sparingly. Excessive grease will trap debris such as sand, weld spatter, etc. If it is not cleaned from the valve after welding, it will be wiped across the soft seats when the ball is operated and create a leak path.

When pre-heating or welding, the valve body temperature must not exceed the maximum temperature rating on the nameplate at any point 3” from the weld. Tempil sticks should be used to monitor the temperature. Keeping the pipe interior clean must be the highest priority for successfully welding a valve into a piping system. TIG welding the root pass to prevent weld spatter is recommended.

INSTALLATION OF WORM GEAR OPERATORS

Caution: If the operator fits tightly over the stem, do not force it down using bolts. This will lock up the ball resulting in excessive torque. The valve external stop is designed as a visual indicator of the ball open and closed position only. The gear operator stops must be set as the actual valve stop position to prevent damage to the key and adapter plate slot.

Installation procedure:

1. Before mounting the worm gear operator on the valve, apply grease to the valve stem.
2. Check the key to assure it is the correct length and fits the key slot without excessive play.
3. Check for burrs and scratches and polish to provide smooth sliding surfaces.
4. Match position of valve to position of operator 68: (either full open or close). If valve is “OPEN” then operator must in “OPEN” position.
5. Lower the operator over the stem and bolt down to the adapter plate.
6. Tighten bolts securely.
7. After the operator has been installed the operator stops can be set as follows:

Setting stops procedure:

1. Back off lock nuts and stop screws on both sides of the operator.
2. Turn the operator handwheel counter- clockwise until the bore of the ball lines up visually with the bore of the seat.
3. Turn the OPEN operator stop screw until it can go no further. Tighten the lock nut.
4. Back off the stops and recheck to ensure alignment in case the external stops are overtightened.
5. Turn the operator handwheel clockwise until the ball is about half closed.
6. From the table below, find the distance “B” for the size of the ball. Measure this distance from the ball bore at the horizontal centerline. Mark both sides at this point.
7. Continue to turn valve towards the closed position until the marks are flush with the bore of the seat.
8. Turn the CLOSED operator stop screw until it can go no further. Tighten the lock nut.
9. Back off the stops and recheck to ensure alignment in case the external stops are overtightened.

B” Distance (in inches)				
Valve Bore	**150# - 600#**	**900#**	**1500#**	**2500#**
6”	7/8	7/8	1-3/16	2-1/4
8”	15/16	15/16	1-3/8	2-9/16
10”	15/16	15/16	1-5/8	2-3/8
12”	1-1/8	1-1/8	1-15/16	3

FIELD TESTING

After installation of the valve into a piping system, hydrostatic testing of the piping system is normally required. The recommendations listed below will minimize the potential for damage to the valve during these procedures.

Caution: Minimize the time in the partial open position in order to prevent seat damage. If an intermediate ball position is needed for operations, place the ball in the 10% or 90% open positions. This minimizes the stress on the seat.

1. The valve should be fully open when the test fluids are introduced into the piping system. This will allow any debris in the system to flush through the valve and not into the body cavity.
2. The test fluid should include corrosion inhibitors to minimize future corrosion in the ball and seat areas. The inhibitors used should be compatible with the materials/elastomers used in the valve. Refer to the valve nameplate or PBV catalog for allowable test pressures.
3. Once all debris is flushed from the piping system, hydrostatic testing can be done in the fully open position, as there is a relief hole in the top of the ball which allows for pressure equalization to the body in the open position.
4. After testing, ensure that the ball is in the fully open position prior to removing test fluids from the system. Flush system well prior to cycling the valve.
5. Bleed fluids retained in the body cavity by opening the lower drain valve.
6. Close the drain valve and place the valve in the desire position (fully open or fully closed).

MAINTENANCE

REGULAR MAINTENANCE

Semi-Annual: Due to the spring-loaded seal system, the ball and seat will tend to form a “bond” over time. This can be eliminated by periodically cycling the valve to break the bond. It is recommended that the valve be fully cycled at least once every six months. In operations with debris, injection of a valve seat flush (Val-Tex Valve Flush or equivalent) prior to operation is recommended.

Annual: The double block and bleed feature of the valve allows the drain valve to be opened (under pressure conditions) with the ball in the closed position to drain debris/liquids from the valve body and to verify sealing integrity of the ball/seat.

In dirty/dusty environments, it is recommended that a valve seat flush (Val-Tex Valve Flush or equivalent) be injected into the valve to push out any debris that has built up around the seat.

ON STREAM MAINTENANCE

Caution: When performing any work on this valve, use normal safety precautions to protect yourself against any residual fluid or trapped pressure in the line.

1. Block and bleed: With the line under pressure, the valve body cavity can be vented to the atmosphere and completely drained down with the ball in CLOSED POSITION ONLY.
2. Inspection and cleaning: Wipe off metal parts with a soft cloth, using petroleum solvent. Re-mark parts if necessary. Inspect metal parts for damage or burrs on all moving surfaces.
3. Lubrication: Lubricate all moving surfaces with silicone lubricant Dow Corning 111 Valve Lubricant & Sealant.

TESTING FOR SEAT AND SHELL LEAKAGE

SEAT LEAKAGE TESTING PROCEDURE

1. CLOSE valve fully.
2. Admit 50 - 100 psi air pressure into body cavity through end flange. Open drain valve.
3. If body pressure falls steadily, apply soap solution to closure flange to body interface and to grease fitting in gland plate and around stem. Release pressure, disassemble and repair area of leakage.

SHELL LEAKAGE TESTING PROCEDURE

1. OPEN valve fully.
2. Pressurize line for shell testing (per latest revision of API 6D).
3. Observe any leakages present in the pressure envelope. If leakage occurs, release pressure, disassemble and repair area of leakage.

COLD CLIMATES

Under freezing conditions, fluids trapped in the valve can freeze and prohibit proper valve operation or potentially damage the valve. It is recommended that prior to freezing conditions, the seats be injected with valve sealant to push trapped fluids from the seat area and the valve body should be drained to remove trapped fluids.

SEALANT INJECTION

STANDARD SEALANT INJECTION

1. Confirm that the valve is in the closed position and safe for maintenance.
2. Remove the cap from the buttonhead connector and attach the coupler from the high-pressure lubrication gun
3. Inject the recommended valve flush into the valve to clean out old grease/sealant and debris. The volume required will vary with the size of the valve.
4. Cycle the valve as needed.
5. Repeat the process for the second seat.
6. If the valve shows indications of leakage in the closed position, inject the appropriate sealant into the seat area. If possible, cycle the ball slightly during injection to ensure sealant is evenly distributed over the seating surfaces of the seat ring and ball. The ball can be moved +/- 3 degrees and still maintain seat/ball sealing. As you cycle the ball, the position where the leak is the smallest should be the closed stop setting.

STEM EMERGENCY SEALANT INJECTION

If the stem seals are not damaged, there should be no line pressure buildup behind the stem emergency grease fitting. The emergency stem sealant injection fitting has an internal check valve to stop pressure from exiting the injection fitting.

No maintenance is recommended for the stem seals if there is no pressure buildup. Do not inject sealant into the stem grease fitting in this case.

CAUTION: Exercise extreme caution when unthreading the stem grease fitting. The check valve ball should be depressed with a special tool to unseat the ball and relief trapped pressure prior to disassembly.

In the unlikely event of leakage around the stem shaft seals, sealant can be injected into the stem cavity between the o-rings and the graphite packing. The recommended sealant is Val-Tex 80 or Sealweld 5050. Other sealants are available by contacting Val-Tex or Sealweld. See the chart on page 20 for recommendations.

Most manual high pressure sealant injection guns deliver 1 oz/15 strokes. The stem sealant cavity is relatively small so no more than 1- 2 oz should be required. If the leak has not stopped, cycle the stem 5-10 degrees back and forth while injecting sealant. If the leak persists, the valve must be isolated from line pressure, the body cavity pressure bleeds off, and field replacement of stem seals is required.

SEAT EMERGENCY SEALANT INJECTION

1/2” NPT steel fittings with giant buttonheads are installed in the mid-section of both end closures. A secondary check valve is installed in series with this fitting.

The seat emergency sealant injection ports are connected to passageways in the end closure and seat to deliver grease or sealant to the ball/seat interface. Flush, grease, or lubricant may be injected through the seat emergency injection fitting to lubricate the ball seat and reduce friction and operating torque.

First purge the sealant passages by injecting valve cleaner “Val- Tex Valve Flush” or Company approved flush. This operation purges old greases and process residual build-up in the sealant passageways. All passageways and grooves around the seat must be cleared of old grease and caked process fluid to evenly distribute sealant to all surfaces of the ball.

Ball Bore	6”	8”	10”	12”
Flush of Sealant per seat (fl oz)	4	4	5	6

If the valve is leaking because the seat is frozen in the valve by corrosion or debris, then flushing and installing sealant could be a permanent fix. Once the valve has been cycled a couple of times and continues to seal, a reasonable assumption can be made that the flush and sealant resolved the problem.

If the valve is leaking due to scratches on the ball/seat interface, the sealant will bridge the gaps and seal the damage. This is a temporary fix because the sealant will be washed away and they will have to be re-injected the next time the valve is cycled. If the ball is moved after stopping the leak, more sealant will need to be injected. In this situation, a permanent solution often requires the valve to be removed and dismantled for repairs.

A typical method to monitor the leak is to CLOSE the valve, then open the drain valve at the bottom of the valve body. Extreme caution should be taken as the body cavity will have line pressure inside, and it will bleed contents of the pipeline to atmosphere. The pressure should bleed to zero in a few minutes if the ball/seat seal is not damaged. Company procedures should be followed to capture the pipeline fluid.

Note: PBV standard design has a pressure equalizing hole in the ball and a double block and bleed can only be performed in the closed position.

A full range of flushes and sealants are available by contacting:

Val-Tex at 1-800-627-977 or

Sealweld at 1-800-624-4301.

Application	Val-Tex	Sealweld
Flush	Valve Flush	Valve Cleaner
Lubricant	2000 bulk	Total Lube 911
Sealant	80 stick	Sealant 5050
Low Temp	750 bulk/stick	Winter-Lube 7030
Severe Leak Sealant	700+ FTFE bulk	Chameleon

TROUBLESHOOTING

CAUTION: PBV BALL VALVES ARE POSITION SEALING, NOT TORQUE SEALING VALVES. IF A VALVE IS LEAKING, DO NOT APPLY MORE TORQUE TO THE HANDWHEEL OR LEVER. INCREASING TORQUE WILL NOT INCREASE THE VALVE'S SEALING CAPABILITES.

Problem	Cause	Solution
Seat Leak – Prior	Gear Stops Not Set Correctly	1. Set or adjust the gear stops per the steps outlined in this section 2. Ball could have over travelled or under travelled. 3. Perform a Double Block and Bleed to ensure there are no leaks present.
	Seat assembly is not sealing	1. Flush seats with valve flush, then cycle valve open and closed 5 times. 2. With valve partially open, visually inspect bore and seat surfaces for dirt and debris that may have scratched the soft seat. 3. Call FET – Valve Solutions for additional assistance.
Seat Leak (valve installed in pipeline)	Gear Stops Not Set Correctly	1. Set or adjust the gear stops per the steps outlined in this section 2. Ball could have over travelled or under travelled. 3. Perform a Double Block and Bleed to ensure there are no leaks present.
	Seat assembly is not sealing	1. With the valve in the closed position, perform a Double Block and Bleed procedure per instructions in this section. 2. Inject with approved flush compound. 3. If stroking possible cycle the valve 4. Repeat a Double Block and Bleed procedure 5. Inject sealant(s) per instruction in this section 6. Call FET – Valve Solutions for additional assistance.

External Leak: Stem Leak	Stem seal is damaged	1. Inject sealant into the stem grease fitting. This is a temporary solution. Take care not to over-pressure these seals as this may make the leak more severe. 2. Refer to Stem o-ring replacement in the maintenance section 3. Call FET – Valve Solutions. PBV Trunnions do not have adjustable stem packing – teardown is required.
External Leak: Bolted Joint	Static seal is damaged	Call FET – Valve Solutions. Teardown is required.
Valve is difficult to operate (high torque)	Gear operator is binding	1. Remove the gear operator/actuator per Recommended Practice RP-PBV-001. Contact Forum-Valve Solution for a copy. 2. Cycle the operator to ensure there is no binding and it turns freely with minimal resistance 3. Inspect the stem and key for damage and wear. Inspect the adapter plate for deformation.
	Actuator undersized	Compare actuator torque curve to valve torque requirements.
	Seat assembly or ball damaged	1. If possible, look for scratching, marking, or cuts on the surface of the ball 2. While partially open, inspect the seat sealing surface for scratches, nicks, and any potential damage.
	Valve gets harder to operate every open/close cycle – may be stem galling	1. The valve will need to be isolated from service and the stem and gland will need to be replaced. 2. The root cause for the galling will need to be determined to eliminate the problem. 3. Call FET – Valve Solutions. PBV– teardown is required.
Handwheel turns but Valve does not operate	Mechanical Failure in the valve drivetrain	1. Remove the gear operator indicator plate and operate the handwheel. 2. Observe the stem and key for operation. 3. If stem and key remain stationary, gear may have mechanically failed. 4. Call FET – Valve Solutions. PBV
Valve will not fully close	Actuator limits not set correctly	Reset actuator limits to allow proper closure
	Sticking seat in closure	Lubricate seat with valve lubricant

WARRANTY & CONTACT INFORMATION

LIMITED PRODUCT WARRANTY:

1. VALVE PRODUCTS OFFERED BY COMPANY: Company warrants new valve products of its manufacture to be free from material defects in workmanship and material for a period of twelve (12) months from installation of the Goods by the end user or eighteen (18) months from the date of delivery per the Parties' agreed Incoterm of delivery, whichever is earlier;

2. ALL OTHER PRODUCTION AND INFRASTRUCTURE PRODUCTS OFFERED BY COMPANY: Company warrants all other production and infrastructure Products not included in (A) above of its manufacture to be free from material defects in workmanship and material for a period of twelve (12) months from the date of delivery per the Parties' agreed Incoterm of delivery.

These warranties and remedies are conditioned upon:

(a) the proper storage, installation, operation, and maintenance of the product, in accordance with the manuals and information provided by or available from Company or its suppliers or vendors (any such manuals or information are available upon request, and it is Customer's sole responsibility to request, review, and comply with same)

(b) Customer keeping accurate records of the operation and maintenance of the product during the warranty period and providing such records to Company on request

(c) Modification or repair of any product only as authorized by Company in writing

(d) Customer promptly notifying the Company of any defect in writing within ten (10) days of Customer discovery of any defects during the warranty period

(e) Customer keeping such goods or the results of services in a condition that can be examined by Company and, upon request by Company, returning the Product to a facility designated by Company for testing and inspection. Any repair, replacement or performance by Company shall not extend the warranty period.

These warranties shall not apply to the following:

(i) the product or result of service had been subject to misuse, negligence, modification, or use other than as specified by Company

(ii) Customer uses the goods with components which are not manufactured or approved by Company

(iii) requires replacement due to normal wear and tear

(iv) the design or any part of it was provided by Customer or Customer's behalf to Company or designs were made Company but subject to Customer approval

(v) to any Service work

(vi) to used equipment

(vii) to painting, coating, or lining of the Product.

Company does not warrant components manufactured by others but will use its best efforts to assign any component manufacturer's warranty or guarantee to Customer.

This section provides the exclusive remedy for all claims based upon a failure of or defects in Products or Services, whether the failure or defect occurs during the warranty period, and whether a claim is based upon contract, warranty, indemnity, tort, extra-contractual liability (including negligence), strict liability, or otherwise.

CONTACT INFORMATION

For any questions or comments regarding this product, please contact PBV-USA, Inc.

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OUR CORE VALUES

No One Gets Hurt

The safety of our employees and customers is our first priority coupled with a healthy respect for the environment.

Integrity

In everything we do, in every interaction, both internally and externally, we strive to operate with the utmost integrity and mutual respect.

Customer Focused

Our products enhance our customer's performance and we listen to their needs and work with them to solve their challenges.

Good Place To Work

We are committed to creating a workplace that fosters innovation, teamwork and pride. Every team member is integral to our success and is treated equally and fairly.

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