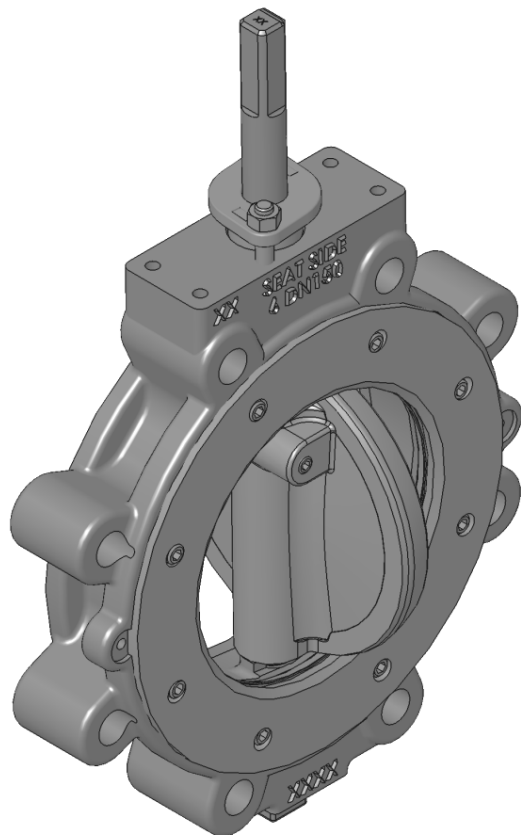


DEZURIK 2”-20” BHP HIGH PERFORMANCE BUTTERFLY VALVE WITH (FB) FYRE-BLOCK SEAT



Instruction D10496
November 2020

DeZURIK

2"-20" BHP High Performance Butterfly Valves

With (FB) Fyre-Block Seat

Instructions

These instructions provide information about the 2" – 20" DeZURIK BHP High Performance Butterfly Valve with (FB) Fyre-Block seat option. They are for use by personnel who are responsible for installation, operation and maintenance of BHP High Performance Butterfly Valves.

Safety Messages

All safety messages in the instructions are flagged with an exclamation symbol and the word Caution, Warning or Danger. These messages indicate procedures that must be followed exactly to avoid equipment damage, personal injury or death.

Safety label(s) on the product indicate hazards that can cause equipment damage, personal injury or death. If a safety label becomes difficult to see or read, or if a label has been removed, please contact DeZURIK for replacement label(s).



WARNING!

Personnel involved in the installation or maintenance of valves should be constantly alert to potential emission of pipeline material and take appropriate safety precautions. Always wear suitable protection when dealing with hazardous pipeline materials. Handle valves, which have been removed from service with suitable protection for any potential pipeline material in the valve.

Inspection

Your BHP High Performance Butterfly Valve has been packaged to provide protection during shipment; however, it can be damaged in transport. Carefully inspect the unit for damage upon arrival and file a claim with the carrier if damage is apparent.

Parts

Recommended spare parts are listed on the assembly drawing. These parts should be stocked to minimize downtime.

Order parts from your DeZURIK sales representative, or directly from DeZURIK. When ordering parts, please include the 7-digit part number and 4-digit revision number (example: **9999999R000**) located on the data plate attached to the valve assembly. Also include the part name, the assembly drawing number, the balloon number and the quantity stated on the assembly drawing.

DeZURIK Service

DeZURIK service personnel are available to install, maintain and repair all DeZURIK products. DeZURIK also offers customized training programs and consultation services.

For more information, contact your local DeZURIK sales representative or visit our website at www.dezurik.com.

**2"-20" BHP High Performance Butterfly Valves
With (FB) Fyre-Block Seat**

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Description

The BHP High Performance Butterfly Valve is designed for on-off and throttling applications in the chemical, power, paper, air conditioning, petroleum and refining industries.

A choice of body styles, ratings, RTS2 or TTS2 seat options and G1 packing, manual actuators and accessories is available in valve sizes from 2–20" (50–500mm). Pressure and temperature ratings are shown on the valve data plate.

Handling

Lifting the valve improperly may damage it. Do not fasten lifting devices to the actuator, disc or through the seat opening in the body. Lift the valve with slings, chains or cables fastened around the valve body, or fastened to bolts or rods through bolt holes in the flanges.

Installing Valve

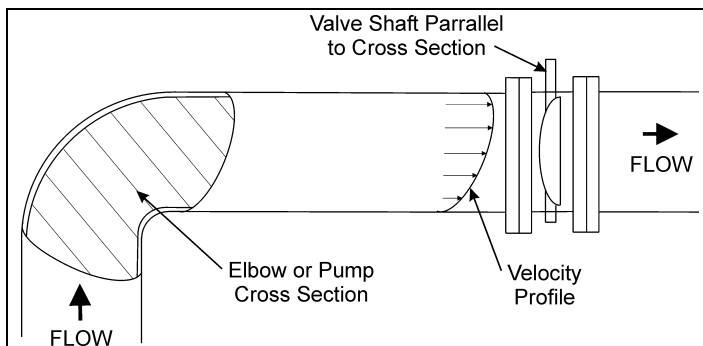
**WARNING!**

Metric fasteners should not be used with ASME Class 150/300 bolt holes and flange bolt patterns. If you use metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns, it may lead to product failure, injury, and loss of life. DeZURIK Inc. disclaims all liability associated with the use of metric fasteners with ASME Class 150/300 bolt holes and flange patterns, including but not limited to personal injury, loss of life, loss of product, production time, equipment, property damage, lost profits, consequential damages of any kind and environment damage and/or cleanup. Use of metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns is a misuse that voids all warranties and contractual assurances. If you use metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns, you do so at your sole risk and any liability associated with such use shall not be the responsibility of DeZURIK, Inc. In addition to the foregoing, DeZURIK's Manufacturer's Conditions apply.

Recommendations

Refer to the valve installation drawing for dimensional information.

- Installing the valve in the wrong location may cause excessive dynamic torque and damage the valve. When pipeline fluid velocities exceed 20 fps (6.0 m/s) for 12" (300mm) and smaller valves or 12 fps (3.6 m/s) for 14" (350mm) and larger valves, it is recommended to install the valve at least 8 diameters from the nearest upstream elbow or pump. For best performance results, install valve shaft parallel with elbow or pump cross section (see image below). For more specific installation recommendations, contact your local representative or DeZURIK for assistance.



2"-20" BHP High Performance Butterfly Valves With (FB) Fyre-Block Seat

Installing Valve (Cont'd)

- Valves with undrilled seat retainers are not suitable for dead-end service without a downstream flange.
- If possible, install the valve with the shaft horizontal to provide a self-cleaning action on the seat. Install the valve so that the side opposite the seat will be on the higher pressure side when the valve is closed. The seat side of the valve is marked "SEAT". Pipeline flow may be in either direction through the valve.
- **Valves with the (FB) Fyre-Block seat option must be installed with higher pressure on the side opposite the seat side.**
- Use self-centering flat ring flange gaskets.
- For 2–20" (50–500mm) Class 150 and Class 300 valves, use mating flanges that comply with the same class of ASME/ANSI B16.5.



CAUTION!

Lifting the valve incorrectly can damage it. Do not fasten lifting devices to the actuator or disc, or through the seat opening in the body. Lift the valve with slings fastened around the valve body or attach them to bolts or rods run through holes for the pipeline flanges.

1. If the valve does not have an actuator, mount the actuator on the valve. Refer as necessary to the actuator instructions and drawings.
2. Remove all foreign material such as weld spatter, oil, grease and dirt from the valve, flanges and pipeline.
3. Open the valve and clean the seat and the sealing edge of the disc.
4. Place the valve in the pipeline with the valve closed—handle the valve carefully so that the flange gasket sealing surfaces do not get damaged.

Note: Valves with the (FB) Fyre-Block seat option must be installed with higher pressure on the side opposite the seat side.

5. Ensure that the valve, the pipeline and the mating connections are aligned and centered before tightening the pipeline bolts.
6. Tighten the bolts evenly, in a crisscross pattern.

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2"-20" BHP High Performance Butterfly Valves

With (FB) Fyre-Block Seat

Operation

Clockwise rotation of the valve shaft closes the disc into the seat. A line on the top of the valve shaft indicates the position of the disc when the disc is not visible.

The valve is fully closed when the flat side of the disc is parallel with the flange sealing surface on the body. The valve is fully open when the disc is 90° counterclockwise from the closed position.

Note: The closed disc must not touch the stop lug in the body.

The actuator is connected to the valve shaft and positions the disc at the open, closed or intermediate positions. The position stops in the actuator are set to match the open and closed positions of the valve.

Note: Refer to the actuator instructions for stop adjustment information.

Required Tools

This valve is assembled using only SAE fasteners. To service this unit, you should have a full set of combination wrenches, Allen wrenches, a flat tipped screwdriver, a pin punch and a dead blow hammer.

Lubrication

The valve is lubricated at the factory and does not require lubrication except when it is being reassembled. Refer to the actuator instructions for actuator lubrication requirements.

Adjusting Packing

The shaft seal consists of packing that is contained and compressed by the packing gland (A12).

1. If the packing leaks, tighten the two adjustment nuts (A15) on top of the packing gland (A12).

Note: Tighten the nuts evenly and gently—just enough to stop the leak. Over tightening will cause excessive torque and decrease packing life.

2. If the leak cannot be stopped by tightening the packing, replace the packing. See "Replacing Packing" section.

**2"-20" BHP High Performance Butterfly Valves
With (FB) Fyre-Block Seat**

Drawings

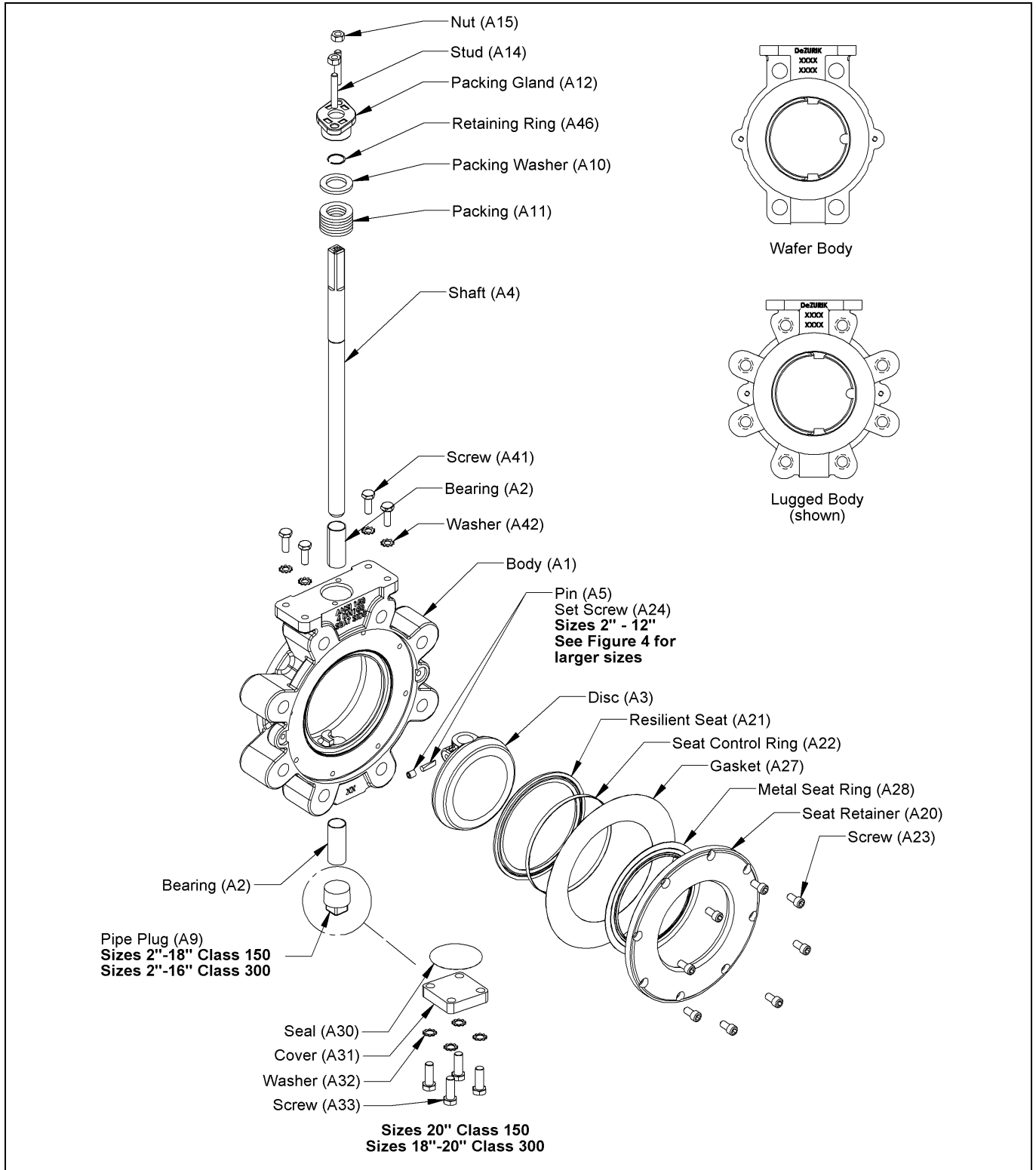


Figure 1 – Component Identification

Replacing Packing

See Figure 1 for parts identification.



WARNING!

Pipeline pressure can cause personal injury or equipment damage. Relieve the pressure in the pipeline before removing the packing gland.

1. Discontinue flow and relieve pipeline pressure.



WARNING!

Accidental operation of powered actuator can cause personal injury or equipment damage. Disconnect and lock out power to actuator before servicing.

2. If the actuator is powered, disconnect and lock out the power to the actuator.
3. Remove the actuator as described in the actuator instructions and remove the actuator bracket from the valve.
4. Remove the two gland nuts (A15) and remove the gland (A12).
5. Remove the retaining ring (A46) from the shaft (A4).
6. Remove the packing washer (A10) and all of the packing (A11).
7. Remove any packing fragments and ensure that all packing chamber sealing surfaces are clean.
8. Follow the procedure for the G1 packing option:
 - Carbon Graphite Packing Option (G1) —page 8

**2"-20" BHP High Performance Butterfly Valves
With (FB) Fyre-Block Seat****Replacing Packing (Continued)****Carbon Graphite Packing Option (G1)**

The new packing (A11) consists of one Graphoil ring and two carbon rings.

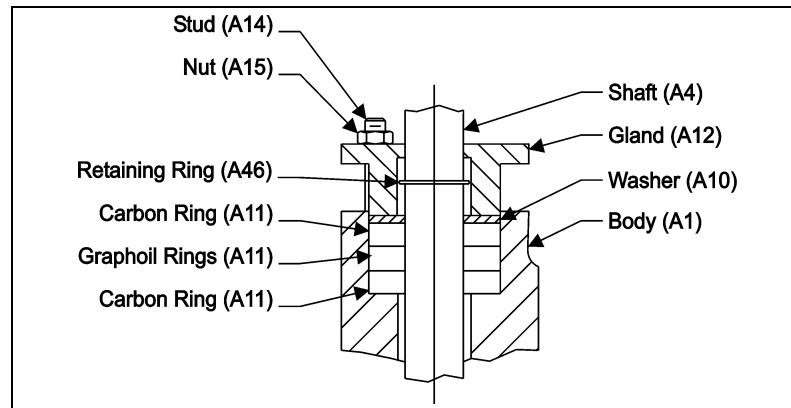


Figure 2 — Packing Option (G1)

- Place the packing in the body, one ring at a time, in the configuration shown in Figure 2 — do not lubricate.
- Place the packing washer (A10) into the packing chamber.
- Install the retaining ring (A46) into the groove in the shaft (A4).
- Replace the gland (A12) and the two gland nuts (A15).
- Tighten the nuts finger tight, plus $\frac{1}{2}$ turn.

Torque Specification**Table A: Fastener Torques, Actuator Bracket-to-Valve**

Valve			Fastener			
Class	Size		Size (Ref)	Grade (Ref)	Torque	
	in	mm			ft lbs	Nm
150	2-4	50-100	1/4-20	8	13±1	18±1
	5-8	125-200	5/16-18		27±4	37±5
	10	250	3/8-16	5	41±5	56±10
	12-16	300-400	1/2-13		99±13	135±18
	18 & 20	450-500	5/8-11		200±20	272±27
300	2-3	50-150	1/4-20	8	13±1	18±1
	4-6	100-150	5/16-18		27±4	37±5
	8	200	3/8-16	5	41±5	56±10
	10 & 12	250 & 300	1/2-13		99±13	135±18
	14	350	5/8-11		200±20	272±27
	16-20	400-600	5/8-11		180±20	244±27

2"-20" BHP High Performance Butterfly Valves With (FB) Fyre-Block Seat

Seat Replacement

Removing Valve From Pipeline

**WARNING!**

Pipeline pressure can cause personal injury or equipment damage. Relieve the pressure in the pipeline before removing flange bolts and flanges.

1. Relieve pressure in the pipeline and drain the pipeline.
 2. Close the valve.
-

**WARNING!**

Accidental operation of powered actuator can cause personal injury or equipment damage. Disconnect and lock out power to actuator before servicing.

3. If the actuator is powered, disconnect and lock out the power to the actuator.
4. Support the valve, remove the flange bolts and remove the valve from the pipeline.
Note: Lifting the valve incorrectly can damage it. Do not fasten lifting devices to the actuator or disc, or through the seat opening in the body. Lift the valve with slings fastened around the valve body, or attach them to bolts or rods run through holes for the pipeline flanges.

Replacing the Seat

1. Place the valve in a horizontal position, with the seat side up.
2. Refer to Figure 1 (page 6) for component identification.
3. Remove the seat retainer screws (A23), the seat retainer (A20) and all of the seat components.
Note: The seat retainer on valve sizes 14" (350mm) and larger has two tapped holes. Screws may be threaded into these holes to remove the seat retainer.
4. Clean the seat cavity in the body and the seat cavity in the seat retainer.
5. Close the valve.
6. Refer to the appropriate seat option:
 - (FB) Fyre-Block Seat Options (RTS2 and TTS2)—see Figure 3 on page 11

Seat Replacement (Continued)

(FB) Fyre-Block Seat Options (RTS2 and TTS2)

- a. If the actuator is connected to the valve shaft, loosen the connection so that the valve shaft can rotate.
- b. Loosen the packing gland nuts (A15).
- c. Place the seat control ring (A22) in the groove in the new PTFE seat (A21).
- d. Center the PTFE seat (A21), the gasket (A27) and the metal seat (A28) on the closed disc.
- e. Apply a media compatible rust inhibitor to the threads of the seat retainer screws (A23).
- f. With all components centered, mount the seat retainer (A20) to the body with the seat retainer screws. Tighten the screws as shown in Table B.
- g. If the valve actuator connection was loosened in step a, tighten the connection.
- h. Adjust the packing gland nuts (A15) as described in the *Packing Adjustment* section.
- i. Continue with step 5 on page 12.

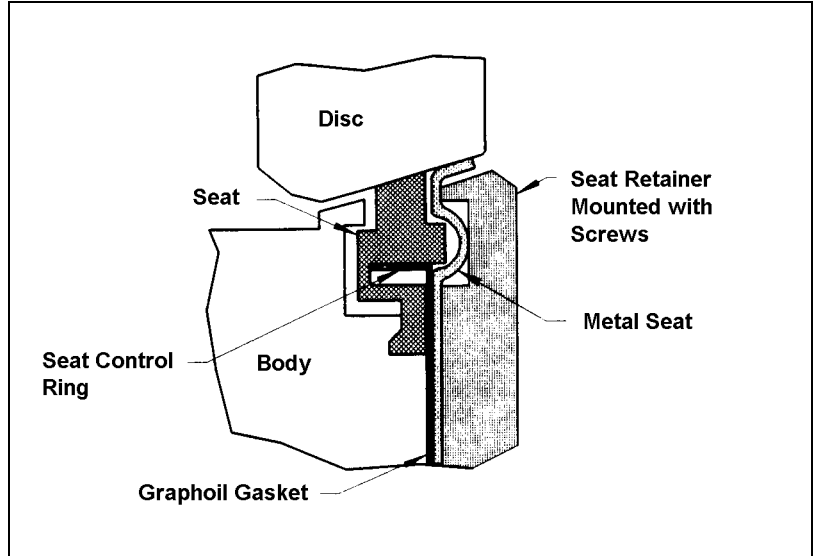


Figure 3 — (FB) Fyre-Block Seat Options (RTS2 and TTS2)

Table B: Seat Retainer Screw Torques

Screw Size	Torque	
	ft lbs	Nm
8-32	1.5 ± 0.5	2.03 ± 0.69
10-24	2.5 ± 0.5	3.39 ± 0.69
1/4-20	5.5 ± 1.5	7.46 ± 2.03
5/16-18	12.0 ± 3.0	16.27 ± 4.07
3/8-16	21.5 ± 5.5	29.15 ± 7.46

2"-20" BHP High Performance Butterfly Valves With (FB) Fyre-Block Seat

Valve Disassembly

Refer to Figure 1 (page 6) for component identification.

**WARNING!**

Pipeline pressure can cause personal injury or equipment damage. Relieve the pressure in the pipeline before removing flange bolts and flanges.

1. Relieve the pressure in the pipeline, drain the pipeline and close the valve.
-

**WARNING!**

Accidental operation of powered actuator can cause personal injury or equipment damage. Disconnect and lock out power to actuator before servicing.

2. If the actuator is powered, disconnect and lock out the power to the actuator.
3. Support the valve, remove the flange bolts and remove the valve from the pipeline.
Note: Lifting the valve incorrectly can damage it. Do not fasten lifting devices to the actuator or disc, or through the seat opening in the body. Lift the valve with slings fastened around the valve body, or attach them to bolts or rods run through holes for the pipeline flanges.
4. Remove the actuator and the actuator bracket from the valve.
5. Remove the two gland nuts (A15) and remove the gland (A12).
6. Remove the retaining ring (A46) from the shaft (A4).
7. Remove the packing washer (A10) and all of the packing (A11).
8. Remove all packing fragments, dirt and other contaminants from all packing sealing surfaces.
9. Remove the seat retainer screws (A23), the seat retainer (A20) and all of the seat components.
Note: The seat retainer on valve sizes 14" and larger has two tapped holes. Screws may be threaded into these holes to remove the seat retainer.
10. On Class 150 valve sizes 2–18" (50–450mm) and Class 300 valve sizes 2–16" (50–400mm), remove the pipe plug (A9) from the bottom of the body.

Valve Disassembly *(Continued)*

11. On larger sizes, remove the cover screws (A33), lockwashers (A32), cover (A31) and seal (A30) from the bottom of the body.
12. Remove the disc pin—see Figure 4 (page 16):
 - On valve sizes 2–12" (50–400mm), remove the disc pin set screw (A24) and drive the disc pin (A5) from the disc with a small punch. Do not damage the shaft with the punch.
 - On larger sizes, remove the two disc pins (A5) with a large screw driver.
13. Place the valve in a horizontal position with the seat side down.
14. While supporting the disc (A3), carefully pull the shaft (A4) from the body and remove the disc.

Bearing Replacement

Bearing Removal

1. Remove the upper bearing (A2) from the body through the packing chamber.
2. Remove the lower bearing (A2) from the body through the pipe plug/cover access located on the bottom of the valve.

Bearing Replacement

1. Apply a light coat of media compatible grease to the inside diameter of the bearings (A2).
2. Insert the new upper bearing (A2) through the packing chamber and into position in the body.
3. Insert the lower bearing (A2) through the pipe plug/cover access located on the bottom of the valve and into position in the body.

2"-20" BHP High Performance Butterfly Valves With (FB) Fyre-Block Seat

Valve Reassembly

Clean and inspect all parts, and replace worn parts before reassembly. Refer to Figure 1 for component identification. The valve requires lubrication only when it is being assembled. Refer to the Actuator Instructions for lubrication requirements for the actuator.

1. Apply a light coat of media compatible grease around the shaft hole on each end of the disc (area that contacts the disc locating surfaces in the body).
2. With the valve horizontal and the seat side down, insert the disc (A3) into body (A1) and align the shaft hole in the disc with the bearing in the body.
3. Insert the bottom end of the shaft (the end without an actuator connection) into the top of the body and push the shaft into position.
4. Rotate the shaft so that the line on the top end of the shaft is towards and parallel with the flat (or concave) side of the disc.

On valve sizes 2–12" (50–400mm)

- a. Slide the shaft so that the top end of the shaft protrudes from the body to the dimension in Table C.
- b. Place the disc pin (A5) in the hole in the disc (A3) as shown in Figure 4 on page 16 and tap the end of the pin lightly to seat the pin against the flat on the shaft (A4). A new set screw (A24) is required.
- c. Apply Loctite 271 to the set screw threads.
- d. Turn the set screw into the end of the pin and tighten the set screw as shown in Table F (page 15).
- e. As shown in Figure 4 (page 16), stake the end of the set screw threads once with a pointed punch to secure the set screw in position.

Table C: Dimension from Top-of-Body to Top-of-Shaft

Valve Size		Class 150		Class 300	
in	mm	in	mm	in	mm
2–3	25–75	3.75	95	3.75	95
4	100	3.75	95	4.25	105
5 & 6	125&150	4.25	108	4.25	108
8	200	4.25	108	4.63	118
10	250	4.63	118	4.75	120
12	300	4.75	120	4.75	120

On valve sizes 14" (350mm) and larger,

- a. Slide the shaft so that the disc pin slots in the shaft are aligned with the disc pin holes in the disc.
 - b. Apply a media compatible rust inhibitor to the threads of the disc pins (A5).
 - c. Use two new pins and turn the pins into the threaded holes in the disc (A3) and against the slots in the shaft (A4) as shown in Figure 4 (page 16).
 - d. Adjust the pins so that both pins protrude the same distance above the disc surface and tighten the pins as shown in Table F (page 15).
 - e. As shown in Figure 4 (page 16), stake the screw threads on each disc pin once with a pointed punch to secure the pins in position.
5. Replace the seat and the seat retainer as described in steps 4, 5 and 6 in the *Seat Replacement* section on page 10.

Valve Reassembly (Continued)

6. Replace the packing, the packing gland and the gland adjustment nuts as shown in steps 7 and 8 of the *Replacing Packing* section on page 7.
7. On Class 150 valve sizes 2–18" (50–450mm) and Class 300 valve sizes 2–16" (50–400mm), replace and tighten the pipe plug (A9) in the bottom of the body.

Note: With (FB) Fyre-Block seat option, seal the threads of the pipe plug with Sepco SG630805AN-25 UCAR Graphoil Tape; Wind the tape three turns counterclockwise, as viewed from the threaded end and spiral the tape approximately one thread for each turn.

8. On larger sizes:
 - a. Mount the cover (A31) and seal (A30) to the bottom of the body with the washers (A32) and cover screws (A33).
 - b. Lubricate the threads of the screw with a rust inhibitor.
 - c. Tighten the screws as follows: 1/2-13 screws to 38±5 ft lbs. (52±6 Nm), 5/8-11 screws to 77±10 ft lbs. (104±14 Nm) and 3/4-10 screws to 140±18 ft lbs. (190±24 Nm).
9. Mount the actuator bracket on the valve and tighten the screws as shown in Table A (page 9).
10. Re-mount the actuator on the valve (see actuator instructions).
11. Actuate the valve. If necessary, adjust the actuator position stops.
12. Install the valve in the pipeline as described in the *Installing Valve* section.
13. If the actuator is a powered actuator, reconnect the power to the actuator.
14. Pressurize the valve.
15. If packing leaks, tighten the gland nuts evenly and slowly – just enough to stop the leak.

Table F: Disc Pin Torques

Fastener Type	Fastener Size	Torque	
		ft lbs.	Nm
2–12" (50-300mm) Disc Pin Set Screw (A24)	1/4-20	3±1/2	4±1
	5/16-18	7±1	10±1
	3/8-16	13±2	18±2
	1/2-13	30±4	40±5
	5/8-11	63±8	85±10
14–20" (350-500mm) Disc Pin (A5)	3/4-10	115±15	160±20
	7/8-9	180±23	245±30
	1-8	270±35	370±50
	1 1/8-7	380±50	520±70
	1 1/4-7	540±70	730±95
	1 3/4-5	1600±200	2200±300
	2-8	2100±300	2900±400

**2"-20" BHP High Performance Butterfly Valves
With (FB) Fyre-Block Seat**

Valve Reassembly (Continued)

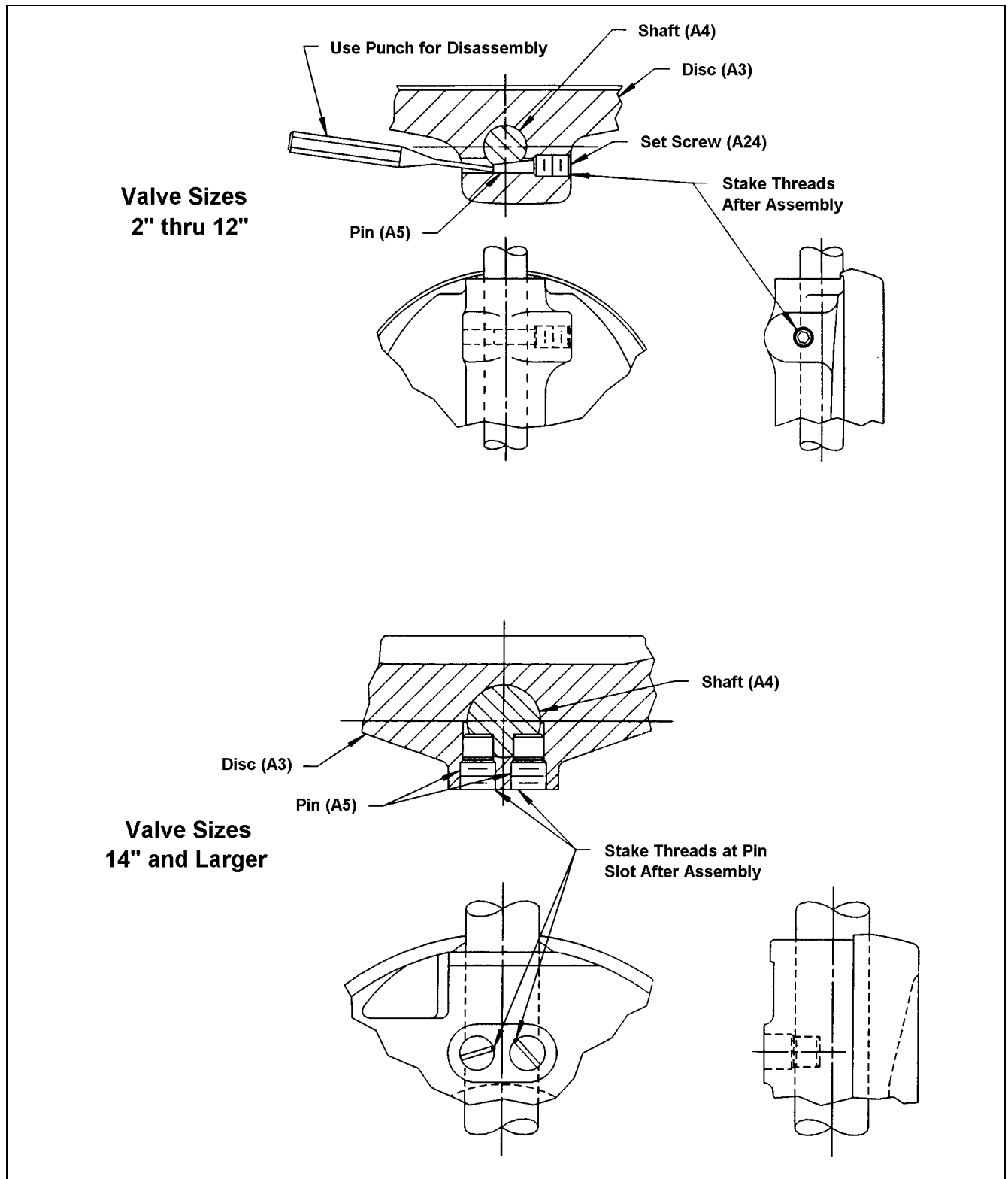
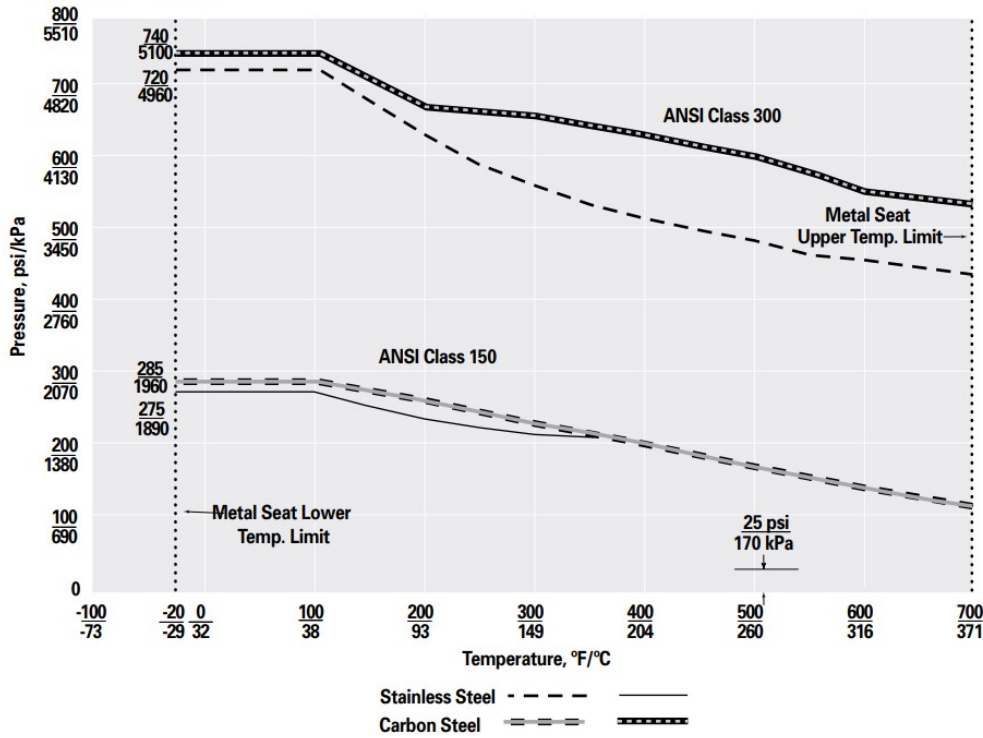


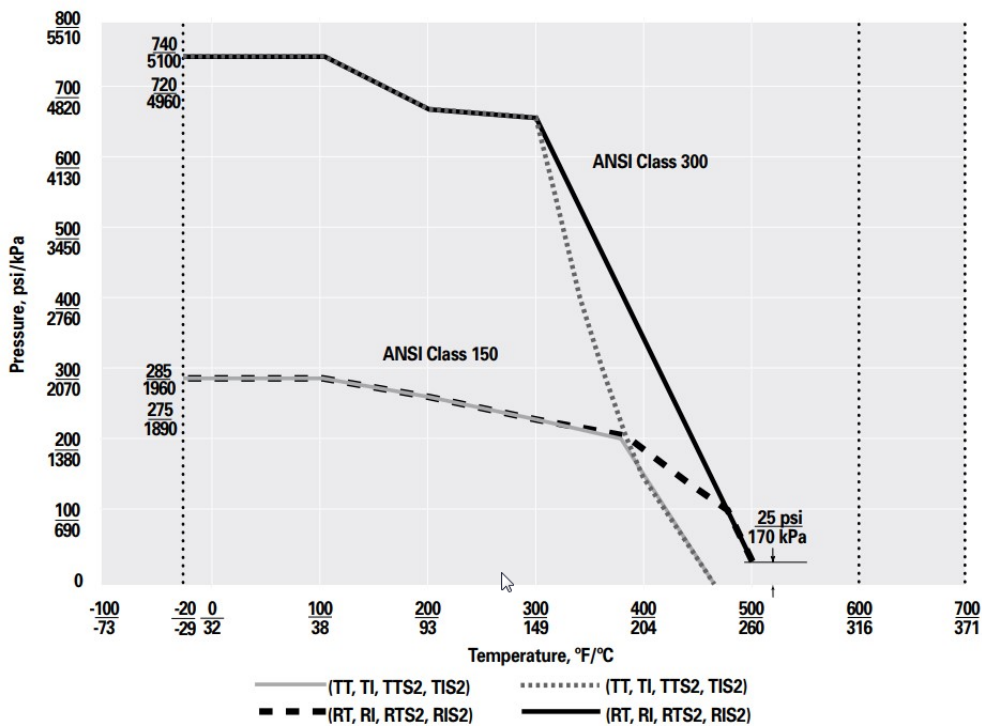
Figure 4 – Disc Pin Assembly

Pressure-Temperature Curves

Metal Seat



Resilient and Dual Seats



2"-20" BHP High Performance Butterfly Valves With (FB) Fyre-Block Seat

Troubleshooting

Condition	Possible Cause	Corrective Action
Packing Leaks	Packing is loose.	Adjust packing.
	Packing is worn.	Replace packing.
Valve leaks when closed.	Closed position stop is set incorrectly.	Adjust closed stop.
	Seat is worn or damaged.	Replace seat.
	Sealing edge of disc is worn or damaged.	Replace disc.
Valve body leaks from seat retainer area.	Pipeline flange bolting is loose.	Tighten pipeline flange bolts.
	Pipeline flanges are misaligned.	Align pipeline flanges.
	Pipeline flange gasket or seat retainer gasket is worn.	Replace gasket(s).
Valve does not fully close.	Object is wedged between disc and seat.	Open valve and allow flushing action to remove object.
	Closed position stop is not adjusted correctly.	Adjust closed stop.
	Disc-to-shaft connection has failed.	Replace disc pins and/or shaft.
Valve does not fully open.	Open position stop is not adjusted correctly.	Adjust open stop.
	Disc-to-shaft connection has failed.	Replace disc pins and/or shaft.
Opening or closing torque is excessive.	Bearings, shaft, disc and/or seat are dirty or worn.	Clean or replace dirty or worn components.
	Shaft is bent.	Replace shaft.
Seat leakage and/or damage to seat has occurred.	Media is abrasive.	Replace existing seat with a seat that is suitable for abrasive media.
Valve components are eroding.		Replace valve with materials suitable for abrasive media.
Valve leakage and/or damage to valve has occurred.	Valve encountered higher than rated pressure.	Reduce media pressure.
Seat leakage and/or damage to seat has occurred.	Valve encountered higher than rated temperature.	Reduce media temperature.
		Replace existing seat with a seat suitable for the required temperature.
Valve components are corroding.	Media is corrosive and incompatible with valve material.	Replace existing valve with a valve constructed of material compatible with the media.

Limited Warranty

DeZURIK, Inc. ("Seller") manufactured products, auxiliaries and parts for a period of twenty-four (24) months from date of shipment from Seller's factory, are warranted to the original purchaser only against defective workmanship and material, but only if properly stored, installed, operated, and serviced in accordance with Seller's recommendations and instructions.

For items proven to be defective within the warranty period, your exclusive remedy under this limited warranty is repair or replacement of the defective item, at Seller's option, FCA Incoterms 2020 Seller's facility with removal, transportation, and installation at your cost.

Products or parts manufactured by others but furnished by Seller are not covered by this limited warranty. Seller will provide repair or replacement for other's products or parts only to the extent provided in and honored by the original manufacturer's warranty to Seller, in each case subject to the limitations contained in the original manufacturer's warranty.

No claim for transportation, labor, or special or consequential damages or any other loss, cost or damage is being provided in this limited warranty. You shall be solely responsible for determining suitability for use and in no event shall Seller be liable in this respect.

This limited warranty does not warrant that any Seller product or part is resistant to corrosion, erosion, abrasion or other sources of failure, nor does Seller warrant a minimum length of service.

Your failure to give written notice to us of any alleged defect under this warranty within twenty (20) days of its discovery, or attempts by someone other than Seller or its authorized representatives to remedy the alleged defects therein, or failure to return product or parts for repair or replacement as herein provided, or failure to store, install, or operate said products and parts according to the recommendations and instructions furnished by Seller shall be a waiver by you of all rights under this limited warranty.

This limited warranty is voided by any misuse, modification, abuse or alteration of Seller's product, accident, fire, flood or other Act of God, or your failure to pay entire contract price when due.

The foregoing limited warranty shall be null and void if, after shipment from our factory, the item is modified in any way or a component of another manufacturer, such as but not limited to, an actuator is attached to the item by anyone other than a Seller factory authorized service personnel.

All orders accepted shall be deemed accepted subject to this limited warranty, which shall be exclusive of any other or previous Warranty, and this shall be the only effective guarantee or warranty binding on Seller, despite anything to the contrary contained in the purchase order or represented by any agent or employee of Seller in writing or otherwise, notwithstanding, including but not limited to implied warranties.

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