"Apollo®"
INTERNATIONAL

Double Offset High Performance Butterfly Valve

INSTALLATION

OPERATION

MAINTENANCE

P.O. Box 125 /1418 S. Pearl Street Pageland SC 29728

I982100

ECN# M14803

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INTRODUCTION

FOR SPECIFIC DESIGN FEATURES FOR HIGH PERFORMANCE BUTTERFLY VALVE SEE CATALOG

PRODUCT STORAGE

- The valves should be stored with the disc in the closed position.
- The valves should be stored indoors in a clean, dry, well-ventilated place away from corrosive materials and protected from excessive dust and dirt.
- The valves should be stored on a rack or pallet and arranged to prevent damage during handling.
- Keeps valves in original shipping container with original protection prior to installation.
- Valves should be protected to prevent damage to the flange faces, disc sealing edge and operator.

PRODUCT MARKING

All APOLLO® International High Performance Butterfly Valves are equipped with an identification tag attached to the valve neck (Figure 1). This tag provides the model number, pressure class, size, max pressure rating, and date of manufacture.

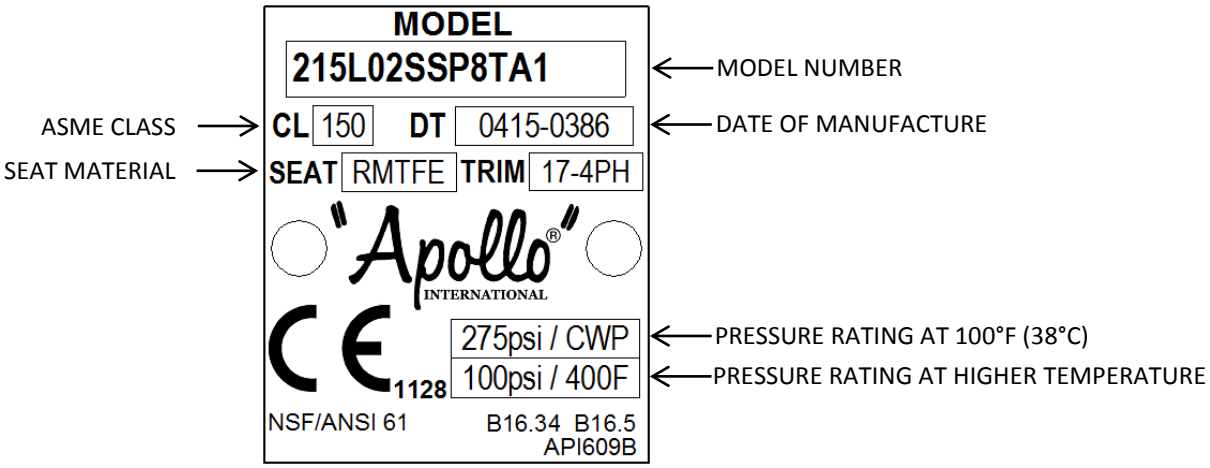


FIGURE 1. APOLLO® INTERNATIONAL HIGH PERFORMANCE BUTTERFLY VALVE IDENTIFICATION TAG EXAMPLE

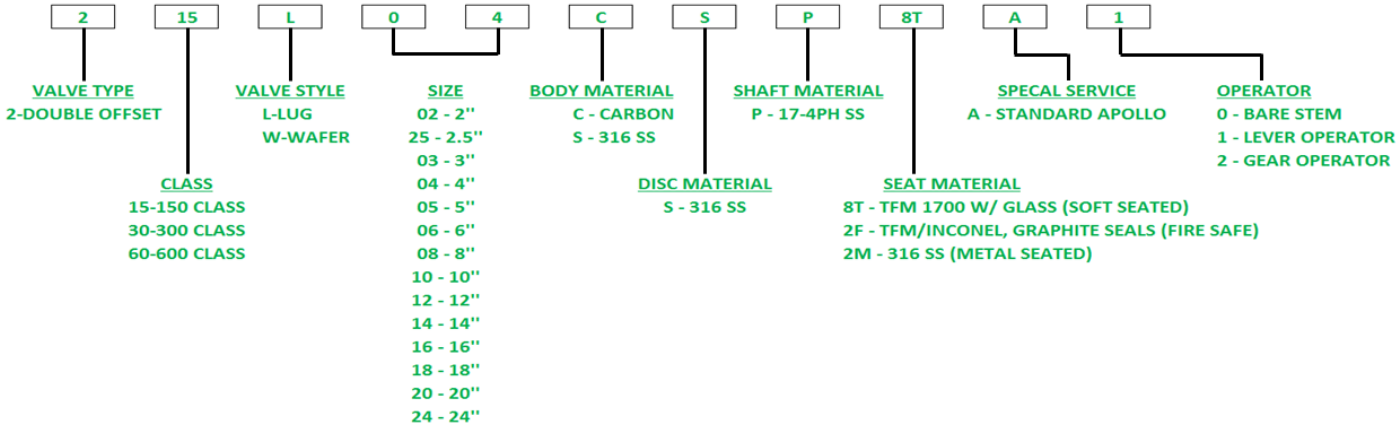


FIGURE 2. HOW TO SPECIFY HIGH PERFORMANCE, DOUBLE OFFSET, ASME BUTTERFLY VALVE

TABLE 1. OPERATING PRESSURES

CARBON STEEL BODY				
CLASS	PRESSURE		TEMPERATURE	
	IMPERIAL	METRIC	IMPERIAL	METRIC
150	285 PSI	19.6 BAR	-20°F to 100°F	-28°C to 37°C
	100 PSI	6.89 BAR	400°F	204°C
300	740 PSI	51.0 BAR	-20°F to 100°F	-28°C to 37°C
	100PSI	6.89 BAR	400°F	204°C
600	1480 PSI	102.0 BAR	-20°F to 100°F	-28°C to 37°C
	100 PSI	6.89 BAR	400°F	204°C

STAINLESS STEEL BODY				
CLASS	PRESSURE		TEMPERATURE	
	IMPERIAL	METRIC	IMPERIAL	METRIC
150	275 PSI	18.9 BAR	-20°F to 100°F	-28°C to 37°C
	100 PSI	6.89 BAR	400°F	204°C
300	720 PSI	49.6 BAR	-20°F to 100°F	-28°C to 37°C
	100PSI	6.89 BAR	400°F	204°C
600	1440 PSI	99.2 BAR	-20°F to 100°F	-28°C to 37°C
	100 PSI	6.89 BAR	400°F	204°C

Warning! – APOLLO® International High Performance Butterfly valves should never be installed where service conditions could exceed the valve ratings. Failure to heed warning may result in personal injury and/or property damage.

INSTALLATION INFORMATION

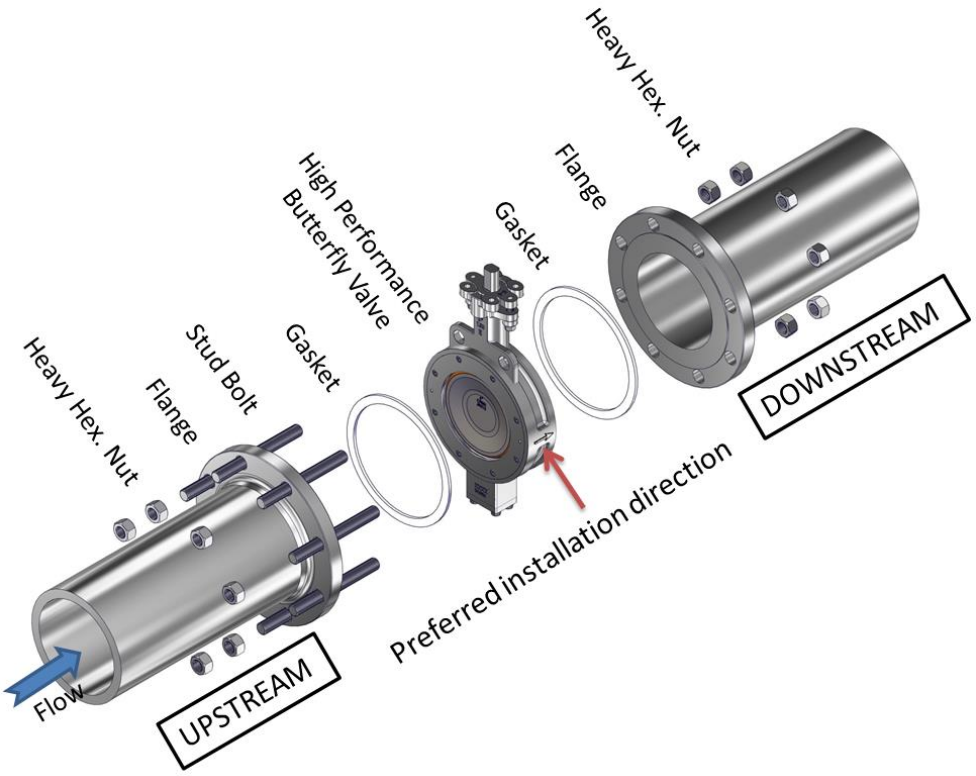
Flange gaskets must be used with APOLLO® International High Performance Butterfly valves and centered on the flange faces.

INSTALLATION INSTRUCTIONS

1. Refer to Figure 3 prior to installation for diagram.
2. Check to make sure that the pipe flange and valve sealing faces are clean and free from any debris (pipe scale, weld slag, etc.).
3. Check the valve nameplate to ensure that the pressure and valve materials are correct for the application. See Table 1 for operating pressures and temperatures.

Warning! – APOLLO® International High Performance Butterfly valves should never be installed where service conditions could exceed the valve ratings. Failure to heed warning may result in personal injury and/or property damage.

4. To prevent damage to the disc sealing edge during installation, position the disc in the "closed" position. Check the tightness of all the valve's bolts and nuts before installation begins. Do not over tighten the packing gland.
5. Spread the pipe flanges apart allowing the valve to be slipped easily in between the flanges.
6. Center the valve and flange gaskets between the flanges and loosely install all the flange bolts. On the wafer valve, the flange bolts that pass through the alignment lugs should be installed first. Consult Table 2, 3, and 4 for correct flange bolt size and quantity.
7. Slowly move the valve to the "full open" position and back to the closed position ensuring that the disc moves freely without any obstruction. If no obstruction is encountered, return the valve to the full open position and hand tighten all flange bolts using the bolt tightening sequence shown in Figure 4.
8. Rotate the disc from the full open position to the full closed position and make sure that the valve is properly centered and the disc edge does not contact the pipe I.D. Return the disc to the full open position and tighten the flange bolts incrementally following the bolt tightening sequence and suggested torque values provided in Tables 2, 3 and 4. After all flange bolts are fully tightened, cycle the valve from full open to full closed to ensure there is proper disc clearance.



Preferred installation direction is flow into the disc's face.
See arrow on side of valve for preferred flow direction.

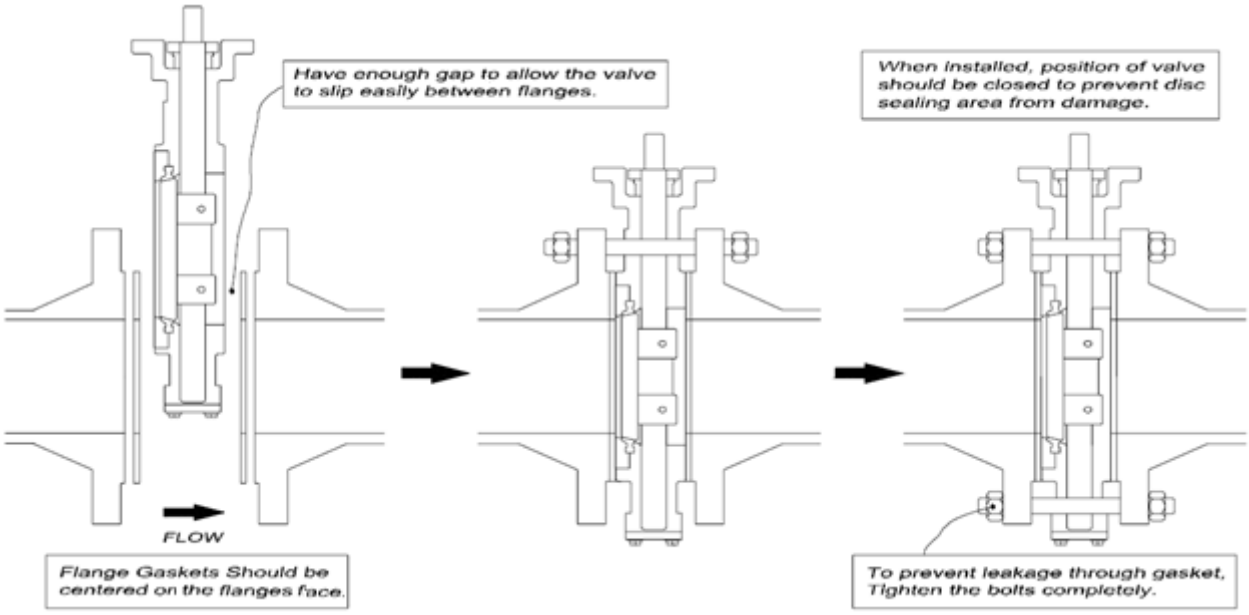


FIGURE 3. INSTALLATION DIAGRAM

TABLE 2. CLASS 150 STUD & BOLT SPECIFICATIONS

Valve Size		Diameter	TPI	Wafer Stud Min. Length	Quantity	Lug Bolt Length	Quantity	Torque
(in)	(dn)	(in)	(UNC-2B)	(in)	(total)	(in)	(total)	(ft-lb)
2	50	5/8″	11	5.50	4	1.50	8	90
2.5	65	5/8″	11	5.50	4	1.75	8	90
3	80	5/8″	11	5.50	4	1.75	8	90
4	100	5/8″	11	5.50	8	1.75	16	90
5	125	3/4″	10	6.50	8	2.00	16	150
6	150	3/4″	10	6.50	8	2.00	16	150
8	200	3/4″	10	6.50	8	2.25	16	150
10	250	7/8″	9	7.50	12	2.50	24	240
12	300	7/8″	9	7.50	12	2.50	24	240
14	350	1″	8	9.00	12	3.00	24	368
16	400	1″	8	9.00	16	3.00	32	368
18	450	1-1/8″	8	11.00	16	3.50	32	533
20*	500	1-1/8"	8	11.00	20	3.50	40	533
24*	600	1-1/4"	8	13.00	20	4.50	40	750

* Valves have blind holes adjacent to stem, requiring hex bolts in place of studs.

TABLE 3. CLASS 300 STUD & BOLT SPECIFICATIONS

Valve Size		Diameter	TPI	Wafer Stud Min. Length	Quantity	Lug Bolt Length	Quantity	Torque
(in)	(dn)	(in)	(UNC-2B)	(in)	(total)	(in)	(total)	(ft-lb)
2	50	5/8″	11	5.50	8	1.750	16	90
2.5	65	3/4"	10	6.00	8	2.000	16	150
3	80	3/4"	10	6.00	8	2.000	16	150
4	100	3/4"	10	7.00	8	2.250	16	150
5	125	3/4″	10	7.00	8	2.500	16	150
6	150	3/4″	10	7.00	12	2.500	24	150
8	200	7/8"	9	8.00	12	3.000	24	240
10	250	1"	8	10.00	16	3.500	32	368
12	300	1-1/8"	8	10.50	16	3.750	32	533
14*	350	1-1/8"	8	11.50	20	3.750	40	533
16*	400	1-1/4"	8	12.50	20	4.000	40	750
18*	450	1-1/4"	8	14.00	24	5.000	48	750
20*	500	1-1/4"	8	14.00	24	5.000	48	750
24*	600	1-1/2"	8	16.00	24	6.000	48	1200

* Valves have blind holes adjacent to stem, requiring hex bolts in place of studs.

TABLE 4. CLASS 600 STUD & BOLT SPECIFICATIONS

Valve Size		Diameter	TPI	Wafer Stud Min. Length	Quantity	Lug Bolt Length	Quantity	Torque
(in)	(dn)	(in)	(UNC-2B)	(in)	(total)	(in)	(total)	(ft-lb)
3	50	3/4"	10	7.0	8	2.500	16	150
4	65	7/8"	9	8.5	8	3.000	16	240
6	80	1"	8	9.5	12	3.500	24	368
8	100	1-1/8"	8	11.5	12	4.500	24	533
10	125	1-1/8"	8	12.5	16	4.500	32	533
12	150	1-1/4"	8	14.0	20	5.500	40	750

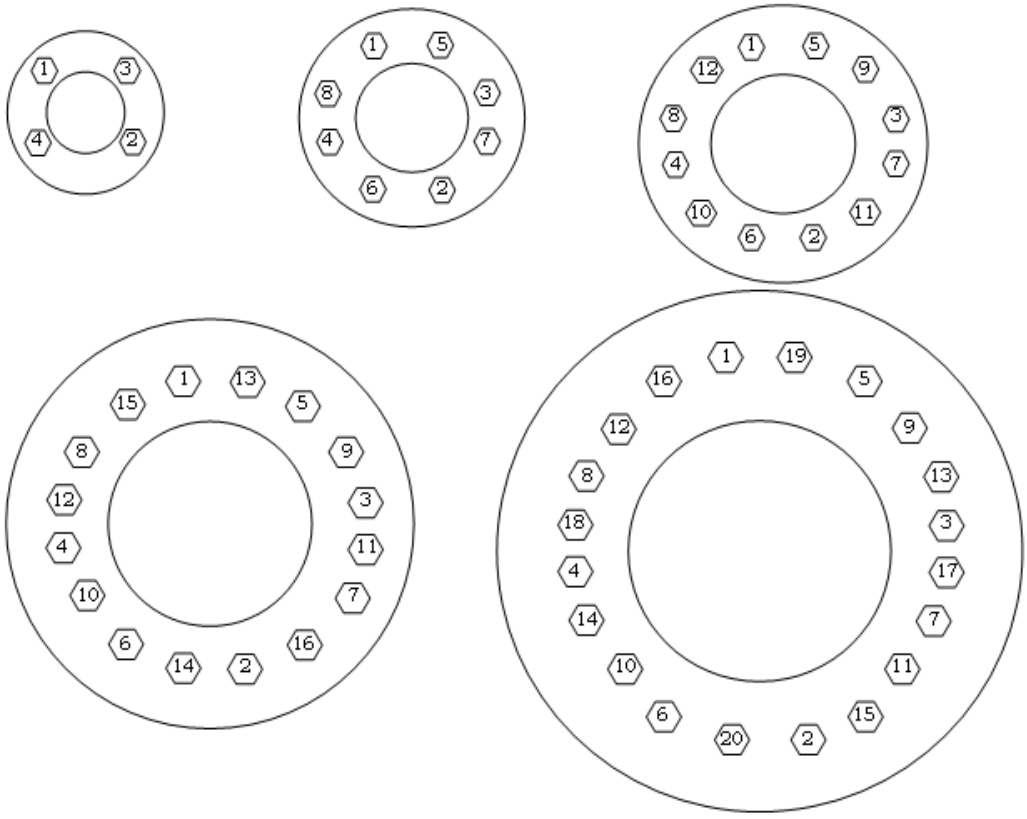


FIGURE 4. FLANGE BOLT TIGHTENING SEQUENCE

ASSEMBLY/DISASSEMBLY INSTRUCTIONS

MAINTENANCE AND REPAIR

APOLLO® International High Performance Butterfly valves are designed for extended service with minimal wear and servicing. No regular lubrication is required. Prior to any repair or replacement, the valve must be removed from the line following these precautions:

1. The pipeline on both side of the valve must be depressurized and drained.
2. Ensure that the disc is in the full closed position before removing the valve from the line
3. **DO NOT** remove an actuator or operator from the valve while the line is still pressurized.
4. If stem leakage is observed through the packing box, tighten the gland nuts.

Note: do not over-tighten packing box gland nuts. Over-tightening will increase the torque required to operate the valve. When tightening the gland nuts, use half-turn increments until leakage has stopped.

SOFT SEATED VALVE DISASSEMBLY

1. Refer to Figure 5 for soft seat disassembly.
2. Open valve disc to 10-15 degrees with operator or lever.
3. Remove all bolts on the seat retainer. Using the seat retainer bolts, insert them into the smaller tapped holes (Jacking taps). Remove the seat retainer taking care not to scratch or damage the sealing surfaces.

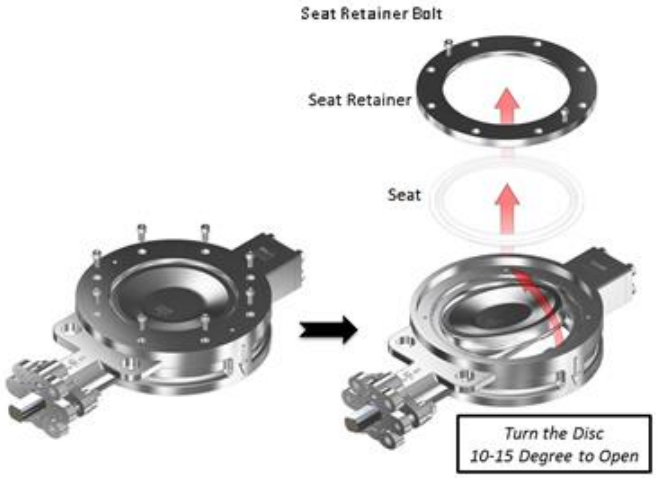


FIGURE 5. SOFT SEATED DISASSEMBLY DIAGRAM

SOFT SEATED RETAINER REPLACEMENT

1. Refer to Figure 6 for soft seated retainer replacement.
2. Using a clean cloth, wipe the seat assembly. Inspect seat and disc for scratches or damage on the disc sealing surface.
3. Install the new seat and reassemble the seat retainer by slightly tightening the retainer bolts and closing the valve.
4. Using the operating device, open and close the valve disc at least 3 times to adjust the seat and seat retainer to the proper position. Open the valve disc to 10-15 degrees and fully tighten the seat retainer bolts.
5. Valve is now ready to be reinstalled.

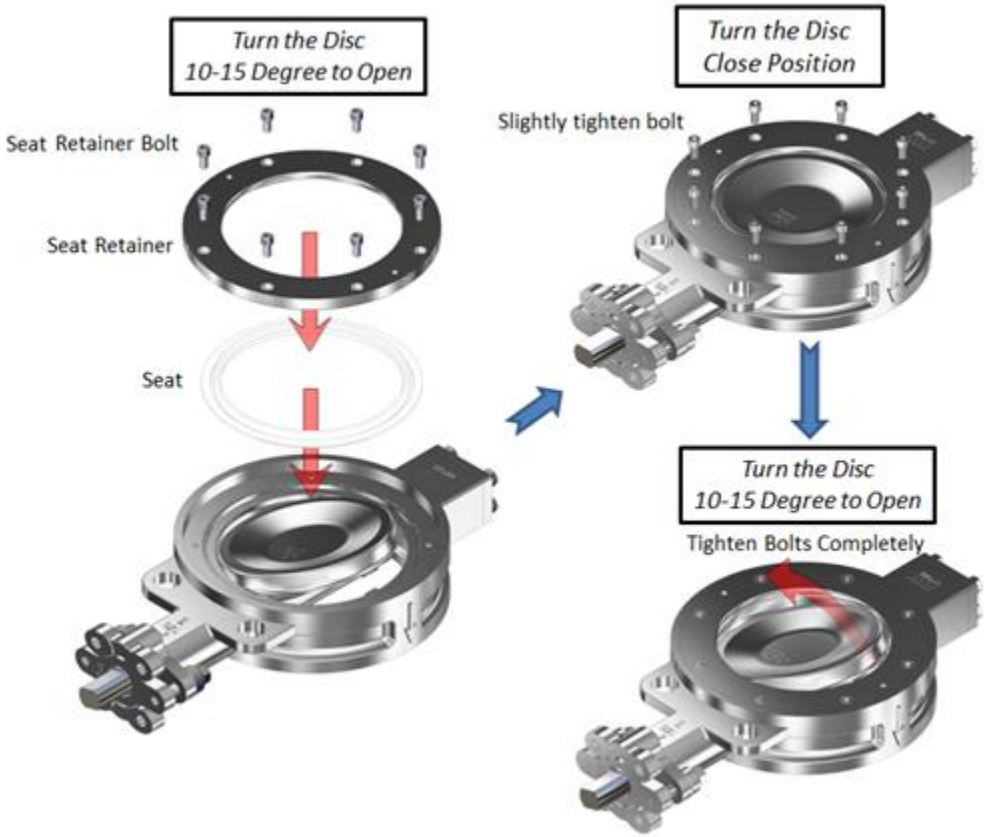


FIGURE 6. SOFT SEATED RETAINER REPLACEMENT DIAGRAM

FIRE SAFE SEATED VALVE DISASSEMBLY AND SEAT RING REPLACEMENT

1. Refer to Figure 7 for fire safe seat replacement.
2. Open valve disc to 10-15 degrees with operator or lever.
3. Remove all bolts on the seat retainer. Using the seat retainer bolts, insert them into the smaller tapped holes (Jacking taps). Remove the seat ring, metal seal, and body seal, taking care not to scratch or damage the seat.
4. Using a clean cloth, wipe the seat assembly. Inspect seat and disc for scratches or damage on the disc sealing surface.
5. Install the new seat, metal seal, and body seal. Then reassemble the seat retainer by slightly tightening the seat retainer bolts and closing the valve.
6. Using the operating device, open and close the valve disc at least 3 times to adjust the seat and seat retainer to the proper position. Open the valve disc to 10-15 degrees and fully tighten the seat retainer bolts.
7. Valve is now ready to be reinstalled.

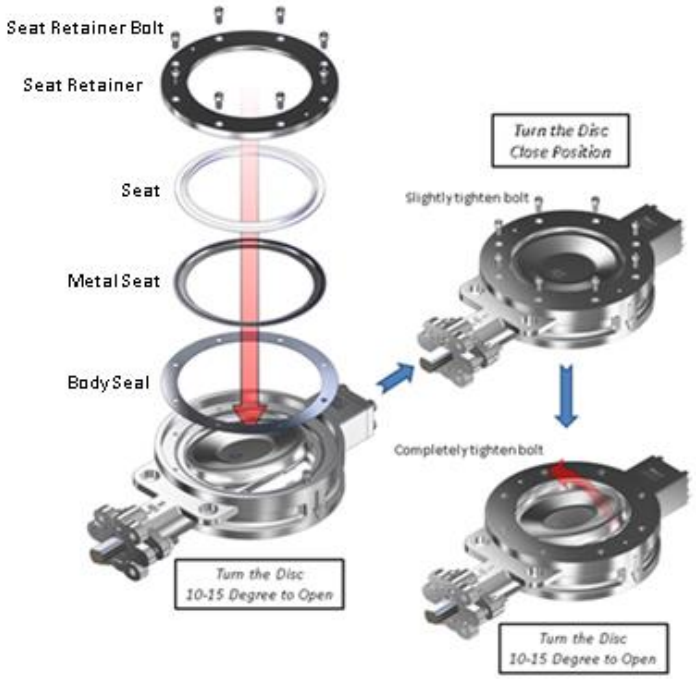


FIGURE 7. FIRE SAFE SEATED RETAINER REPLACEMENT DIAGRAM

STEM PACKING REPLACEMENT

1. Refer to Figure 8 for upper stem packing replacement.
2. Loosen gland plate nut and remove gland plate, then gently lift and remove packing gland. Using a tool such as a screw driver or pick, begin removing packing. Be careful not to damage or scratch the stem or stuffing box walls.
3. After carefully removing used packing, carefully clean the stuffing box and discard all used packing. Once clean, insert a new set of packing into the stuffing box.
4. Once new packing is installed, reassemble the packing gland and gland plate. Assemble the disc spring retainer, disc spring, washers, and nuts. Tighten the gland plate nuts sufficiently. Be careful not to over tighten. It may increase operating torque and decrease the life of the packing. Refer to Table 5 for recommended torque.

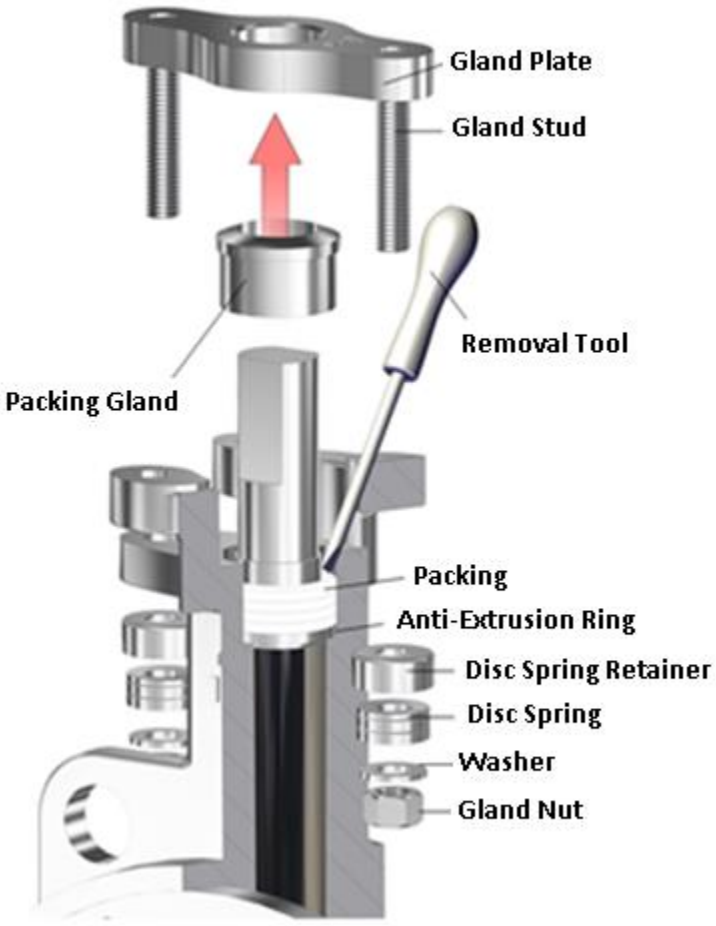


FIGURE 8. UPPER STEM PACKING REPLACEMENT

CLASS 150		
SIZE	HEX NUT	TORQUE (IN-LBS)
2"-4"	5/16-18UNC	115
5"-6"	3/8-16UNC	133
8"-12"	1/2-13UNC	266
14"	5/8-11UNC	284
16"-20"	3/4-10UNC	354
24"	7/8-9UNC	388

CLASS 300		
SIZE	HEX NUT	TORQUE (IN-LBS)
2"-4"	5/16-18UNC	115
5"-6"	3/8-16UNC	222
8"-10"	1/2-13UNC	292
12"	5/8-11UNC	328
14"-18"	3/4-10UNC	399
20"-24"	7/8-9UNC	461

CLASS 150		
SIZE	HEX NUT	TORQUE (IN-LBS)
3"-4"	3/8-16UNC	177
6"	1/2-13UNC	284
8"-10"	5/8-11UNC	337
12"	3/4-10UNC	372

TABLE 5. GLAND PLATE TORQUE

END CAP SEAL REPLACEMENT

1. Refer to Figure 9 for end cap seal and spacer replacement.
2. Remove bolts and end cap from the bottom of the valve. Using a tool such as a screw driver or pick, begin removing packing. Be careful not to damage or scratch the stem or stuffing box walls. Then remove the spacer from the end cap.
3. After carefully removing used packing, carefully clean the stuffing box and discard all used packing. Once clean, insert a new set of packing into the stuffing box and a new spacer in the end cap.
4. Once new packing is installed, reassemble the end cap, spring washers and tighten the end cap bolts to the correct torque value listed in Table 6.
5. Valve is now ready to be reinstalled.

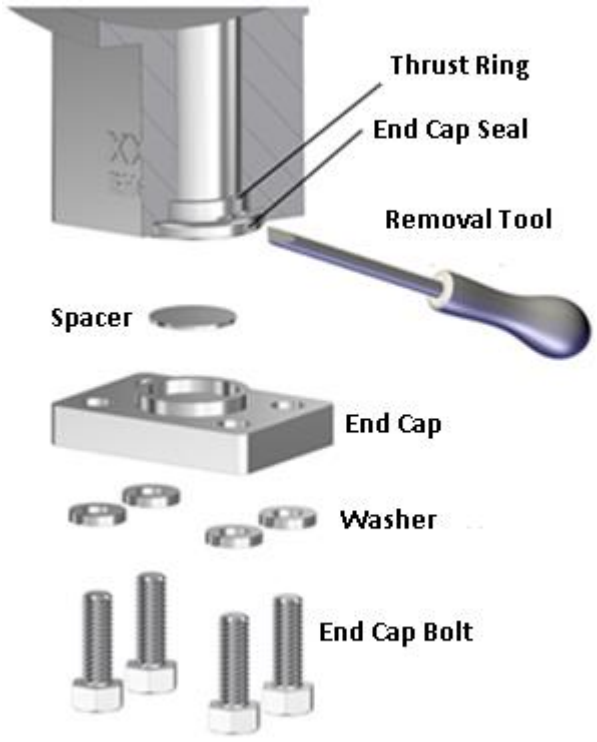


FIGURE 9. END CAP SEAL REPLACEMENT

CLASS 150		
SIZE	HEX SCREW	TORQUE (IN-LBS)
2"-4"	1/4-20UNC	115
5"-10"	5/16-18UNC	230
12"-14"	3/8-16UNC	354
16"-24"	1/2-13UNC	753

CLASS 300		
SIZE	HEX SCREW	TORQUE (IN-LBS)
2"-4"	1/4-20UNC	115
5"-8"	5/16-18UNC	230
10"-12"	3/8-16UNC	399
14"-24"	1/2-13UNC	957

CLASS 600		
SIZE	HEX SCREW	TORQUE (IN-LBS)
3"-4"	3/8-16UNC	115
6"	1/2-13UNC	230
8"-10"	5/8-11UNC	354
12"	3/4-10UNC	753

TABLE 6. END CAP BOLT TORQUE

LEVER MOUNTING PROCEDURE

1. Start by loosely assembling the notch plate on the valve top plate. The notch plate should be installed with the notches in the third quadrant of the valve top plate with the stop tabs at the 6 o'clock and 9 o'clock position. The notch plate should be installed with the stop tabs pointing downwards.

2. Next, install the lever so that the lever fully engages in the notches when the lever is released and tighten the notch plate screws

3. Compress the lever and position the disc so that the valve is in the full closed position. Align the last notch on the notch plate at the 9 o'clock position with the lever and tighten the notch plate screws.

4. Compress the lever and position the disc so that the valve is in the full open position and release the lever. The lever should line-up with the last notch on the notch plate at the 6 o'clock position.

GEAR OPERATOR MOUNTING/SETTING PROCEDURE

(Refer to Illustration 1)

1. Mount gear operator (Item 1) on top of butterfly valve with bolts and washers provided with each assembly.
2. Loosen the stop screws and locking nuts (Item 2, 3 & 4) approximately three to four turns on both sides of the gear operator.
3. Rotate hand wheel to the full open position and tighten the "open" stop screw (Item 4). Now tighten the locking nut (Item 2).
4. Rotate hand wheel to the full closed position and tighten the "Closed" stop screw (Item 3). Now tighten the locking nut (Item 2).
5. Open disc to 20% then back to closed position. Re-adjust stop screw and nut (Item 3) if necessary. You have now properly adjusted both the "Open" and "Closed" stop positions.

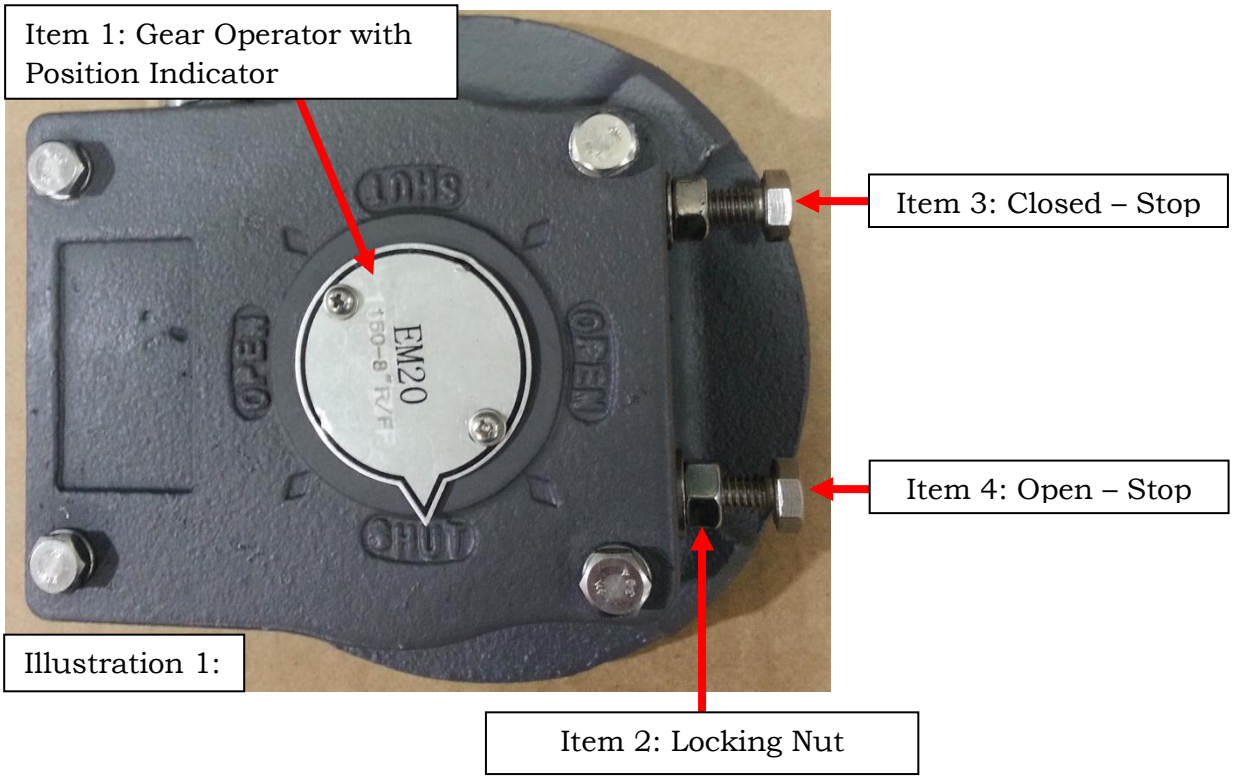


Illustration 1:

HIGH PERFORMANCE BUTTERFLY VALVE EXPLODED VIEWS

#	PART	MATERIAL
1	Body	A351-CF8M or A216-WCB
2	Disc	A351-CF8M
3	Seat	Glass Filled TFM 1700
4	Seat Retainer	A351-CF8M or A216-WCB
5	Seat Retainer Bolt	Stainless Steel 316
6	Stem	17-4PH
7	Disc Pin	17-4PH
8	End Cap Bolt	Stainless Steel 316
9	Washer	Stainless Steel 316
10	End Cap	A351-CF8M or A216-WCB
11	Spacer	PTFE
12	End Cap Seal	PTFE
13	Thrust Ring	Stainless Steel 316
14	Lower Bearing	stainless Steel 316/ PTFE
15	Upper Bearing	Stainless Steel 316/ PTFE
16	Aint-Extrusion Ring	Stainless Steel 316
17	Stem Packing	PTFE
18	Packing Gland	Stainless Steel 316
19	Gland Nut	Stainless Steel 316
20	Washer	Stainless Steel 316
21	Disc Spring	Stainless Steel 304
22	Disc Spring Retainer	Stainless Steel 316
23	Gland Studs	Stainless Steel 316
24	Gland Plate	A351-CF8M or A216-WCB

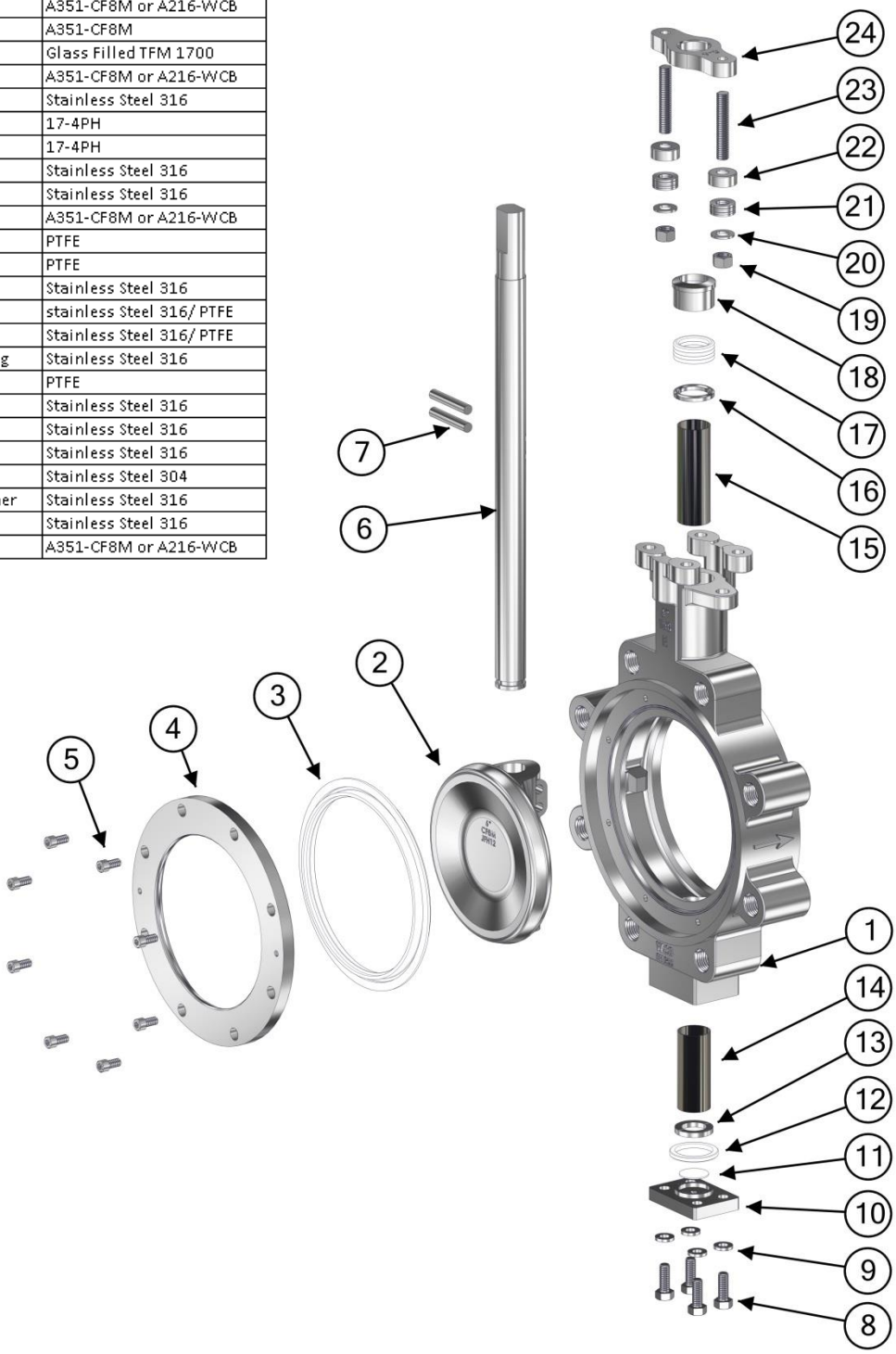


FIGURE 10. SOFT SEATED EXPLODED VIEW

#	PART	MATERIAL
1	Body	A351-CF8M or A216-WCB
2	Disc	A351-CF8M
3	Body Seal	Graphite
4	Metal Seat	Inconel 625
5	Seat	Glass Filled TFM 1700
6	Seat Retainer	A351-CF8M or A216-WCB
7	Seat Retainer Bolt	Stainless Steel 316
8	Stem	17-4PH
9	Disc Pin	17-4PH
10	End Cap Bolt	Stainless Steel 316
11	Washer	Stainless Steel 316
12	End Cap	A351-CF8M or A216-WCB
13	Spacer	PTFE
14	End Cap Seal	PTFE
15	Thrust Ring	Stainless Steel 316
16	Lower Bearing	stainless Steel 316/ PTFE
17	Upper Bearing	Stainless Steel 316/ PTFE
18	Aint-Extrusion Ring	Stainless Steel 316
19	Stem Packing	Graphite
20	Packing Gland	Stainless Steel 316
21	Gland Nut	Stainless Steel 316
22	Washer	Stainless Steel 316
23	Disc Spring	Stainless Steel 304
24	Disc Spring Retainer	Stainless Steel 316
25	Gland Studs	Stainless Steel 316
26	Gland Plate	A351-CF8M or A216-WCB

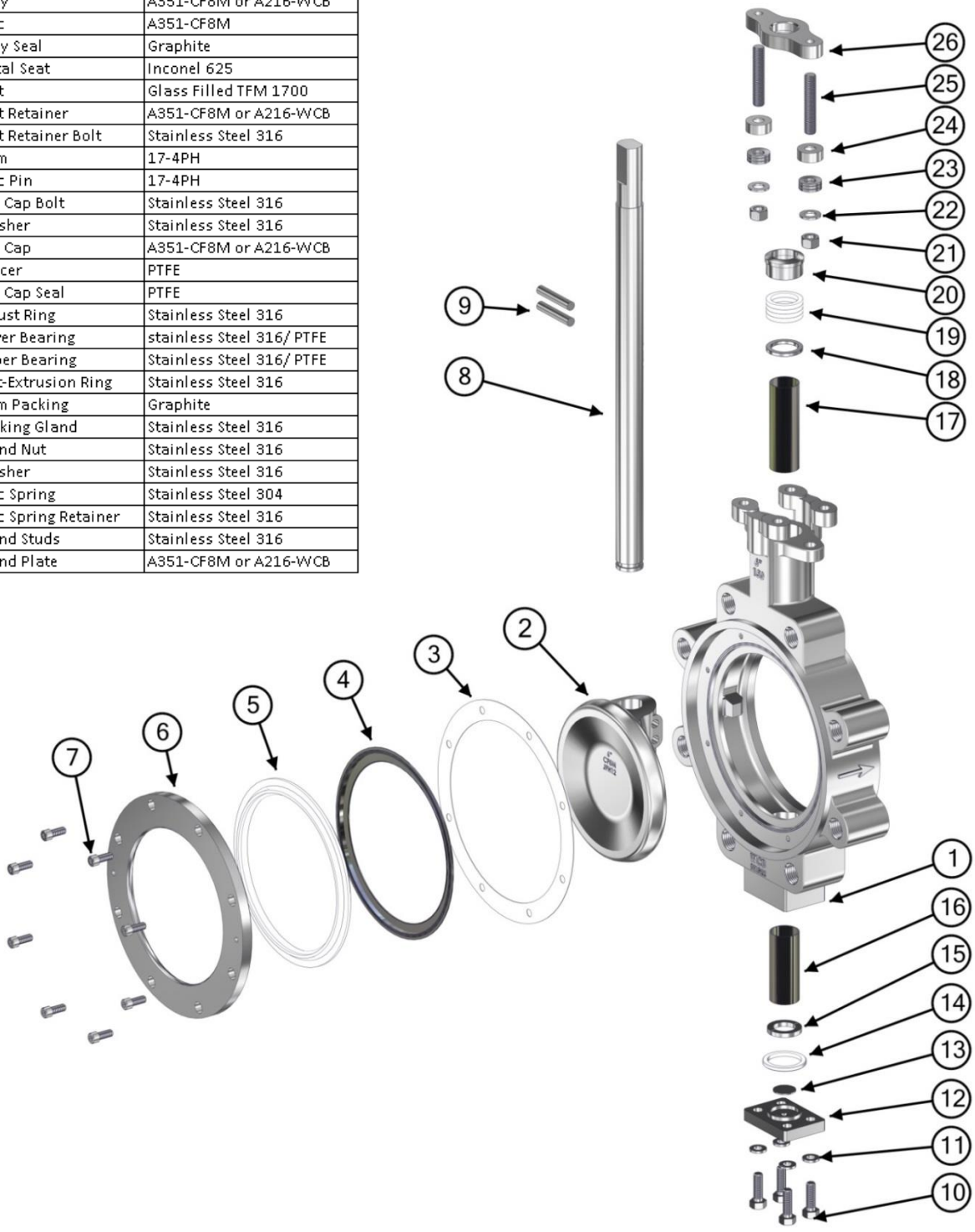


FIGURE 11. FIRE SAFE SEATED EXPLODED VIEW

TABLE 7. SOFT SEATED REPAIR KIT PART NUMBER LIST

Size	ANSI Class	Conbraco Part Number	Description
2"	150/300	215028TRK	KIT,SERVICE,GLASS FILLED TFM 1700,2",215/230,8T
2.5"	150/300	215258TRK	KIT,SERVICE,GLASS FILLED TFM 1700,2.5",215/230,8T
3"	150/300	215038TRK	KIT,SERVICE,GLASS FILLED TFM 1700,3",215/230,8T
4"	150/300	215048TRK	KIT,SERVICE,GLASS FILLED TFM 1700,4",215/230,8T
5"	150/300	215058TRK	KIT,SERVICE,GLASS FILLED TFM 1700,5",215/230,8T
6"	150	215068TRK	KIT,SERVICE,GLASS FILLED TFM 1700,6",215,8T
	300	230068TRK	KIT,SERVICE,GLASS FILLED TFM 1700,6",230,8T
8"	150	215088TRK	KIT,SERVICE,GLASS FILLED TFM 1700,8",215,8T
	300	230088TRK	KIT,SERVICE,GLASS FILLED TFM 1700,8",230,8T
10"	150	215108TRK	KIT,SERVICE,GLASS FILLED TFM 1700,10",215,8T
	300	230108TRK	KIT,SERVICE,GLASS FILLED TFM 1700,10",230,8T
12"	150	215128TRK	KIT,SERVICE,GLASS FILLED TFM 1700,12",215,8T
	300	230128TRK	KIT,SERVICE,GLASS FILLED TFM 1700,12",230,8T
14"	150	215148TRK	KIT,SERVICE,GLASS FILLED TFM 1700,14",215,8T
	300	230148TRK	KIT,SERVICE,GLASS FILLED TFM 1700,14",230,8T
16"	150	215168TRK	KIT,SERVICE,GLASS FILLED TFM 1700,16",215,8T
	300	230168TRK	KIT,SERVICE,GLASS FILLED TFM 1700,16",230,8T
18"	150	215188TRK	KIT,SERVICE,GLASS FILLED TFM 1700,18",215,8T
	300	230188TRK	KIT,SERVICE,GLASS FILLED TFM 1700,18",230,8T
20"	150	215208TRK	KIT,SERVICE,GLASS FILLED TFM 1700,20",215,8T
	300	230208TRK	KIT,SERVICE,GLASS FILLED TFM 1700,20",230,8T
24"	150	215248TRK	KIT,SERVICE,GLASS FILLED TFM 1700,24",215,8T
	300	230248TRK	KIT,SERVICE,GLASS FILLED TFM 1700,24",230,8T
3"	600	260038TRK	KIT,SERVICE,GLASS FILLED TFM 1700,3",260,8T
4"	600	260048TRK	KIT,SERVICE,GLASS FILLED TFM 1700,4",260,8T
6"	600	260068TRK	KIT,SERVICE,GLASS FILLED TFM 1700,6",260,8T
8"	600	260088TRK	KIT,SERVICE,GLASS FILLED TFM 1700,8",260,8T
10"	600	260108TRK	KIT,SERVICE,GLASS FILLED TFM 1700,10",260,8T
12"	600	260128TRK	KIT,SERVICE,GLASS FILLED TFM 1700,12",260,8T

TABLE 8. FIRE SAFE SEATED REPAIR KIT PART NUMBER LIST

Size	ANSI Class	Style	Conbraco Part Number	Description
2"	150/300	Wafer	215W022FRK	KIT,SERVICE,2",GLASS FILLED TFM 1700,GRPHT,215W/230W,2F
	150	Lug	215L022FRK	KIT,SERVICE,2",GLASS FILLED TFM 1700,GRPHT,215L,2F
	300	Lug	230L022FRK	KIT,SERVICE,2",GLASS FILLED TFM 1700,GRPHT,230L,2F
2.5"	150/300	Wafer	215W252FRK	KIT,SERVICE,2.5",GLASS FILLED TFM 1700,GRPHT,215W/230W,2F
	150	Lug	215L252FRK	KIT,SERVICE,2.5",GLASS FILLED TFM 1700,GRPHT,215L,2F
	300	Lug	230L252FRK	KIT,SERVICE,2.5",GLASS FILLED TFM 1700,GRPHT,230L,2F
3"	150/300	Wafer	215W032FRK	KIT,SERVICE,3",GLASS FILLED TFM 1700,GRPHT,215W/230W,2F
	150	Lug	215L032FRK	KIT,SERVICE,3",GLASS FILLED TFM 1700,GRPHT,215L,2F
	300	Lug	230L032FRK	KIT,SERVICE,3",GLASS FILLED TFM 1700,GRPHT,230L,2F
4"	150/300	Wafer	215W042FRK	KIT,SERVICE,4",GLASS FILLED TFM 1700,GRPHT,215W/230W,2F
	150	Lug	215L042FRK	KIT,SERVICE,4",GLASS FILLED TFM 1700,GRPHT,215L,2F
	300	Lug	230L042FRK	KIT,SERVICE,4",GLASS FILLED TFM 1700,GRPHT,230L,2F
5"	150/300	Wafer	215W052FRK	KIT,SERVICE,5",GLASS FILLED TFM 1700,GRPHT,215W/230W,2F
	150	Lug	215L052FRK	KIT,SERVICE,5",GLASS FILLED TFM 1700,GRPHT,215L,2F
	300	Lug	230L052FRK	KIT,SERVICE,5",GLASS FILLED TFM 1700,GRPHT,230L,2F
6"	150	Wafer	215W062FRK	KIT,SERVICE,6",GLASS FILLED TFM 1700,GRPHT,215W,2F
		Lug	215L062FRK	KIT,SERVICE,6",GLASS FILLED TFM 1700,GRPHT,215L,2F
	300	Wafer	230W062FRK	KIT,SERVICE,6",GLASS FILLED TFM 1700,GRPHT,230W,2F
		Lug	230L062FRK	KIT,SERVICE,6",GLASS FILLED TFM 1700,GRPHT,230L,2F
8"	150	Wafer	215W082FRK	KIT,SERVICE,8",GLASS FILLED TFM 1700,GRPHT,215W,2F
		Lug	215L082FRK	KIT,SERVICE,8",GLASS FILLED TFM 1700,GRPHT,215L,2F
	300	Wafer	230W082FRK	KIT,SERVICE,8",GLASS FILLED TFM 1700,GRPHT,230W,2F
		Lug	230L082FRK	KIT,SERVICE,8",GLASS FILLED TFM 1700,GRPHT,230L,2F
10"	150	Wafer	215W102FRK	KIT,SERVICE,10",GLASS FILLED TFM 1700,GRPHT,215W,2F
		Lug	215L102FRK	KIT,SERVICE,10",GLASS FILLED TFM 1700,GRPHT,215L,2F
	300	Wafer	230W102FRK	KIT,SERVICE,10",GLASS FILLED TFM 1700,GRPHT,230W,2F
		Lug	230L102FRK	KIT,SERVICE,10",GLASS FILLED TFM 1700,GRPHT,230L,2F
12"	150	Wafer	215W122FRK	KIT,SERVICE,12",GLASS FILLED TFM 1700,GRPHT,215W,2F
		Lug	215L122FRK	KIT,SERVICE,12",GLASS FILLED TFM 1700,GRPHT,215L,2F
	300	Wafer	230W122FRK	KIT,SERVICE,12",GLASS FILLED TFM 1700,GRPHT,230W,2F
		Lug	230L122FRK	KIT,SERVICE,12",GLASS FILLED TFM 1700,GRPHT,230L,2F
3"	600	Wafer	260W032FRK	KIT,SERVICE,3",GLASS FILLED TFM 1700,GRPHT,260W,2F
		Lug	260L032FRK	KIT,SERVICE,3",GLASS FILLED TFM 1700,GRPHT,260L,2F
4"	600	Wafer	260W042FRK	KIT,SERVICE,4",GLASS FILLED TFM 1700,GRPHT,260W,2F
		Lug	260L042FRK	KIT,SERVICE,4",GLASS FILLED TFM 1700,GRPHT,260L,2F
6"	600	Wafer	260W062FRK	KIT,SERVICE,6",GLASS FILLED TFM 1700,GRPHT,260W,2F
		Lug	260L062FRK	KIT,SERVICE,6",GLASS FILLED TFM 1700,GRPHT,260L,2F
8"	600	Wafer	260W082FRK	KIT,SERVICE,8",GLASS FILLED TFM 1700,GRPHT,260W,2F
		Lug	260L082FRK	KIT,SERVICE,8",GLASS FILLED TFM 1700,GRPHT,260L,2F
10"	600	Wafer	260W102FRK	KIT,SERVICE,10",GLASS FILLED TFM 1700,GRPHT,260W,2F
		Lug	260L102FRK	KIT,SERVICE,10",GLASS FILLED TFM 1700,GRPHT,260L,2F
12"	600	Wafer	260W122FRK	KIT,SERVICE,12",GLASS FILLED TFM 1700,GRPHT,260W,2F
		Lug	260L122FRK	KIT,SERVICE,12",GLASS FILLED TFM 1700,GRPHT,260L,2F

AMENDMENT REGISTER

Date	ECN	Rev.	Page	Description	Initiator
6/17/2015	M14803	A	ALL	New Release	SAV