

# Installation, Operation and Maintenance Guide II

## NIBCO High Performance Butterfly Valves

### Series 6822 and 7822



#### Statements:

NIBCO High Performance Butterfly Valves, Series 6822 and 7822, have been designed and manufactured for fluid control handling in suitable mechanical systems. It is important to follow the instructions below to assure proper valve installation and safe trouble-free operation. Failure to follow these instructions may result in reduced valve performance and may cause loss of manufacturer's warranty.

#### 1. Application:

- 1.1 The selection of the valve design and materials of construction as related to the specific service application is the sole responsibility of the end user.
- 1.2 All NIBCO HPBFVs have an Identification Plate attached to the perimeter of the valve top flange. Important information including valve size, class, materials of construction, and pressure/temperature ratings are shown.
- 1.3 Review corrosive effects of the media to be used in the valve and assure it is compatible with the valve materials of construction.
- 1.4 Do not install the valve where the pressure/temperature ratings can be exceeded. As temperature increases, the safe working pressure decreases. The pressure/temperature ratings are based on API Standard 609 and can be found in the appropriate NIBCO Butterfly Valve catalog.
- 1.5 Valves should be regularly maintained; reference **Section 7**. Valves used in services where erosion or other detrimental situations can occur should be inspected on a regular basis.

#### 2. Storage:

- 2.1 Valves are shipped in the closed position with flange covers to protect the sealing surfaces and internal valve parts. These covers should remain on the valve until actual installation into piping.
- 2.2 The valves must be stored in a dry environment, protected from temperature extremes and possibility of damage. The valve body is made from carbon steel and rust can appear on inside surfaces, this will not affect valve performance. Special care should be taken to prevent damage to the disc edge and sealing surfaces.

#### 3. Installation:

- 3.1 Inspect the piping and remove all dirt, welding slag, rust, and scale from the piping and flange faces. It is advisable to install a strainer upstream of the valve to prevent contamination from entering the valve. It is very important for long trouble-free service to keep the valve free of all contamination that may damage the seal surfaces.
- 3.2 Remove the protective covers from valve faces and carefully check the valve for any damage that may have occurred during shipping and handling.
- 3.3 Fully open the valve and verify that sufficient diametrical clearance is available for the valve disc to extend into both mating pipe flanges and piping.
- 3.4 Cycle the valve from full open to full closed positions checking to assure the operator stops are set properly. **Stops must be properly set before the valve is installed into the piping.** See **Section 4** for proper stop adjustment procedure.

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- 3.5 Fully close the valve before installation into piping to prevent damage to disc.
- 3.6 Determine valve orientation. The valve can be installed in any position or direction; however it is preferred to install the valve so flow direction matches the direction arrow cast in valve body and with the stem in the horizontal ( $\pm 30^\circ$ ) position. This allows better protection for the seat from particles flowing in the media and from sediment build-up at stem base giving optimal valve service life. This is very important for steam service applications due to the high travel velocities.
- 3.7 Always check to assure seat retainer screws are securely tightened. Refer to Section 7.19 for procedure and proper torque specifications.
- 3.8 New flange gaskets are required between valve and flanges. Valves are designed to work with 1/16" thick fiber and metallic wound gaskets. Gaskets are customer supplied.
- 3.9 Align gasket with valve face and pipe flanges. Install proper size cap screws (bolts) thru the flange and loosely tighten into threaded valve mounting lugs. See **Section 5** for proper cap screw sizing.
- 3.10 Fully open and close the valve to verify proper operation and that the disc moves freely.
- 3.11 First, snug all caps screws using the "Cross-over" diagonal method. Second, evenly tighten all screws using the "cross-over" diagonal method to the proper torque for the Grade Designation of cap screw being used. Do not over tighten cap screws.
- 3.12 Again fully open and close the valve to verify proper operation and free disc movement.
- 3.13 While NIBCO HPBFVs are rated for dead-end service, NIBCO recommends that a down-stream flange be used.

#### 4. Stop Adjustment:

- 4.1 HPBFVs can be actuated by a manual lever, a manual gear operator, an electric actuator, or a pneumatic actuator. No matter what style of actuation is used, **it is critical that the actuator CLOSED travel limit stop is properly set to match valve disc/seat orientation for proper seal.** The OPEN stop adjustment is not critical;  $\pm 5^\circ$  travel is adequate.
- 4.2 The CLOSED actuator stop should be set before the valve is installed into piping so you can visually see that the disc is centered in the seat (disc front face is parallel with seat retainer face). Note that the valve has an "over-travel" stop at the disc edge. This "over-travel" stop is only to keep the disc from rotating too far thru the seat. When the disc is properly centered in the seat, the disc edge usually does not contact the "over-travel" stop.
- 4.3 There are several different manufactures of gear operators, electric and pneumatic actuators. While the adjustment procedure is not exactly the same for all manufacturers, they are all very similar to procedures described below.

#### Manual Lever Adjustment

- 4.4 Move the lever handle into the closed position and allow trigger to securely latch in the last notch of the throttle plate. Visually inspect the disc to assure it is centered in the seat. If not, slightly loosen the (2) cap screws that hold the throttle plate to the top flange of valve. With the trigger securely latched in last notch, rotate manual lever (and throttle plate) until disc is centered in seat. There is enough clearance in throttle plate mounting holes to allow for adjustment. Securely tighten throttle plate cap screws. Cycle valve from CLOSED position to OPEN position, then back to CLOSED. Verify disc is centered in seat when CLOSED. Adjustment of OPEN stop is not necessary, as it will automatically be set.

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#### Manual Gear Operator Adjustment

- 4.5 Verify cap screws attaching gear operator to the valve are securely tight. Rotate handwheel clockwise until it stops; disc should be visually centered in the seat. If not, adjustment is necessary. Locate gear operator CLOSED stop set screw. Unlock adjustment stop set screw by removing outer locking set screw or loosening locking nut. Rotate adjustment stop set screw counter-clockwise 2 turns. Rotate handwheel until disc is visually centered in the seat. Rotate adjustment stop set screw clockwise until it stops. Lock adjustment stop set screw by reinstalling outer locking set screw or tightening locking nut. Rotate handwheel counter-clockwise opening valve. Rotate handwheel clockwise until it stops and check disc to verify it is visually centered in the seat. If not, repeat adjustment procedure until it is.
- 4.6 Adjustment of OPEN stop can be achieved by similar adjustment of the OPEN stop set screw. The OPEN stop adjustment is not critical;  $\pm 5^\circ$  travel is adequate.

#### Electric Actuator Adjustment

- 4.7 Verify cap screws attaching the actuator to the valve are securely tight. Remove top cover of actuator exposing electrical limit switches and cams. **Use caution when working on this as electrical connections are exposed causing potential electric shock hazard.** Operate actuator to CLOSED position. Visually inspect the disc to assure it is centered in the seat. If not, determine if valve is not fully closed or past closed. Unloosen CLOSED stop position cam set screw and rotate slightly in the desired direction, then retighten set screw. Open valve, then operate valve to closed position. Visually inspect the disc to assure it is centered in the seat. If not, repeat process until disc is centered in seat.
- 4.8 Adjustment of OPEN stop can be achieved by similar adjustment of the OPEN stop cam. The OPEN stop adjustment is not critical;  $\pm 5^\circ$  travel is adequate.

#### Pneumatic Actuator Adjustment

- 4.9 Verify cap screws attaching the actuator to the valve are securely tight. Operate actuator to CLOSED position. Visually inspect the disc to assure it is centered in the seat. If not, adjustment is necessary. Locate actuator CLOSED stop set screw. Unlock adjustment stop set screw by removing outer locking set screw or loosening locking nut. Rotate adjustment stop set screw counter-clockwise 2 turns. Rotate valve until disc is visually centered in the seat. Rotate adjustment stop set screw clockwise until it stops. Lock adjustment stop set screw by reinstalling outer locking set screw or tightening locking nut. Operate actuator opening valve. Operate actuator CLOSED and check disc to verify it is visually centered in the seat. If not, repeat adjustment procedure until it is.
- 4.10 Adjustment of OPEN stop can be achieved by similar adjustment of the OPEN stop set screw. The OPEN stop adjustment is not critical;  $\pm 5^\circ$  travel is adequate.

## Installation, Operation and Maintenance Instructions

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#### 5. Cap Screw Sizing Charts:

##### LCS-6822 CLASS 150 HPBFVs

FLANGE SPECIFICATION		ASME/ANSI B16.1 CLASS 125 CAST IRON		ASME/ANSI B16.5 / B16.47 CLASS 150 STEEL		MSS SP-106 CLASS 125 BRONZE		MSS SP-106 CLASS 150 BRONZE		CAP SCREW LENGTH ALLOWS FOR 1/16" THICK FLANGE GASKETS		
VALVE SIZE	VALVE BODY THICKNESS	FLANGE THICKNESS	RECOMMENDED CAP SCREW LENGTH	FLANGE THICKNESS	RECOMMENDED CAP SCREW LENGTH	FLANGE THICKNESS	RECOMMENDED CAP SCREW LENGTH	FLANGE THICKNESS	RECOMMENDED CAP SCREW LENGTH	QTY OF LONG CAP SCREWS REQD PER VALVE	QTY OF **SHORT CAP SCREWS REQD PER VALVE	CAP SCREW SIZE & THREAD PITCH
2"	1.69	0.62	1.25	0.75	1.50	0.31	1.00	0.50	1.25	8		5/8"-11 UNC
2½"	1.84	0.69	1.50	0.88	1.75	0.31	1.00	0.56	1.25	8		5/8"-11 UNC
3"	1.88	0.75	1.50	0.94	1.75	0.38	1.25	0.62	1.50	8		5/8"-11 UNC
4"	2.12	0.94	1.75	0.94	1.75	0.38	1.25	0.69	1.50	16		5/8"-11 UNC
5"	2.25	0.94	2.00	0.94	2.00	0.38	1.25	0.75	1.75	16		3/4"-10 UNC
6"	2.25	1.00	2.00	1.00	2.00	0.38	1.25	0.81	1.75	16		3/4"-10 UNC
8"	2.50	1.12	2.00	1.12	2.00	0.50	1.50	0.94	2.00	16		3/4"-10 UNC
10"	2.83	1.19	2.25	1.19	2.25	0.56	1.75	1.00	2.25	24		7/8"-9 UNC
12"	3.19	1.25	2.50	1.25	2.50	0.62	1.75	1.06	2.25	24		7/8"-9 UNC
14"	3.62	1.38	3.00	1.38	3.00					24		1"-8 UNC
16"	4.00	1.44	3.00	1.44	3.00					32		1"-8 UNC
18"	4.50	1.56	3.00	1.56	3.00					32		*1-1/8"-8 UN
20"	5.00	1.69	3.50	1.69	3.50					32		*1-1/8"-8 UN
			2.75		2.75						8	
24"	6.06	1.88	4.00	1.88	4.00					32		*1-1/4"-8 UN
			3.00		3.00						8	
30"	7.51	2.12	4.50	2.88	5.00					48		*1-1/4"-8 UN
			3.50		4.00						8	

\*SPECIAL PITCH CAP SCREW THREAD REQUIRED PER MSS SP-68 SPECIFICATIONS

\*\*SHORT SCREWS REQUIRED FOR BLIND TAPPED HOLES NEAREST TO STEM FOR 20" & LARGER SIZE VALVES

# Installation, Operation and Maintenance Instructions NIBCO 6822 and 7822 Series High Performance Butterfly Valves

## LCS-7822 CLASS 300 HPBFVs

FLANGE SPECIFICATION		ASME/ANSI B16.1 CLASS 250 CAST IRON		ASME/ANSI B16.5 CLASS 300 STEEL		CAP SCREW LENGTHS ALLOWS FOR 1/16" THICK FLANGE GASKETS		
VALVE SIZE	VALVE BODY THICKNESS	FLANGE THICKNESS	RECOMMENDED CAP SCREW LENGTH	FLANGE THICKNESS	RECOMMENDED CAP SCREW LENGTH	QUANTITY OF LONG CAP SCREWS REQUIRED PER VALVE	QUANTITY OF **SHORT CAP SCREWS REQUIRED PER VALVE	CAP SCREW SIZE & THREAD PITCH
2"	1.69	0.88	1.50	0.94	1.75	16		5/8" - 11 UNC
2½"	1.84	1.00	1.75	1.06	1.75	16		3/4" - 10 UNC
3"	1.88	1.13	2.00	1.19	2.00	16		3/4" - 10 UNC
4"	2.12	1.25	2.00	1.31	2.25	16		3/4" - 10 UNC
5"	2.31	1.38	2.50	1.44	2.50	16		3/4" - 10 UNC
6"	2.31	1.44	2.50	1.50	2.50	24		3/4" - 10 UNC
8"	2.88	1.63	3.00	1.69	3.00	24		7/8" - 9 UNC
10"	3.25	1.88	3.25	1.94	3.25	32		1" - 8 UNC
12"	3.62	2.00	3.50	2.06	3.50	24		*1-1/8" - 8 UN
			3.00		3.00		8	
14"	4.62	2.12	4.00	2.19	4.00	32		*1-1/8" - 8 UN
			3.00		3.00		8	
16"	5.25	2.25	4.50	2.38	4.50	32		*1-1/4" - 8 UN
			3.25		3.25		8	
18"	5.88	2.38	4.50	2.44	4.50	40		*1-1/4" - 8 UN
			3.25		3.25		8	
20"	6.30	2.50	4.50	2.56	4.50	40		*1-1/4" - 8 UN
			3.50		3.50		8	
24"	7.12	2.75	5.00	2.81	5.00	40		*1-1/2" - 8 UN
			4.00		4.00		8	

\*SPECIAL PITCH CAP SCREW THREAD REQUIRED PER MSS SP-68 SPECIFICATIONS

\*\*SHORT SCREWS REQUIRED FOR BLIND TAPPED HOLES NEAREST TO STEM FOR 12" & LARGER SIZE VALVES

## 6. Operation:

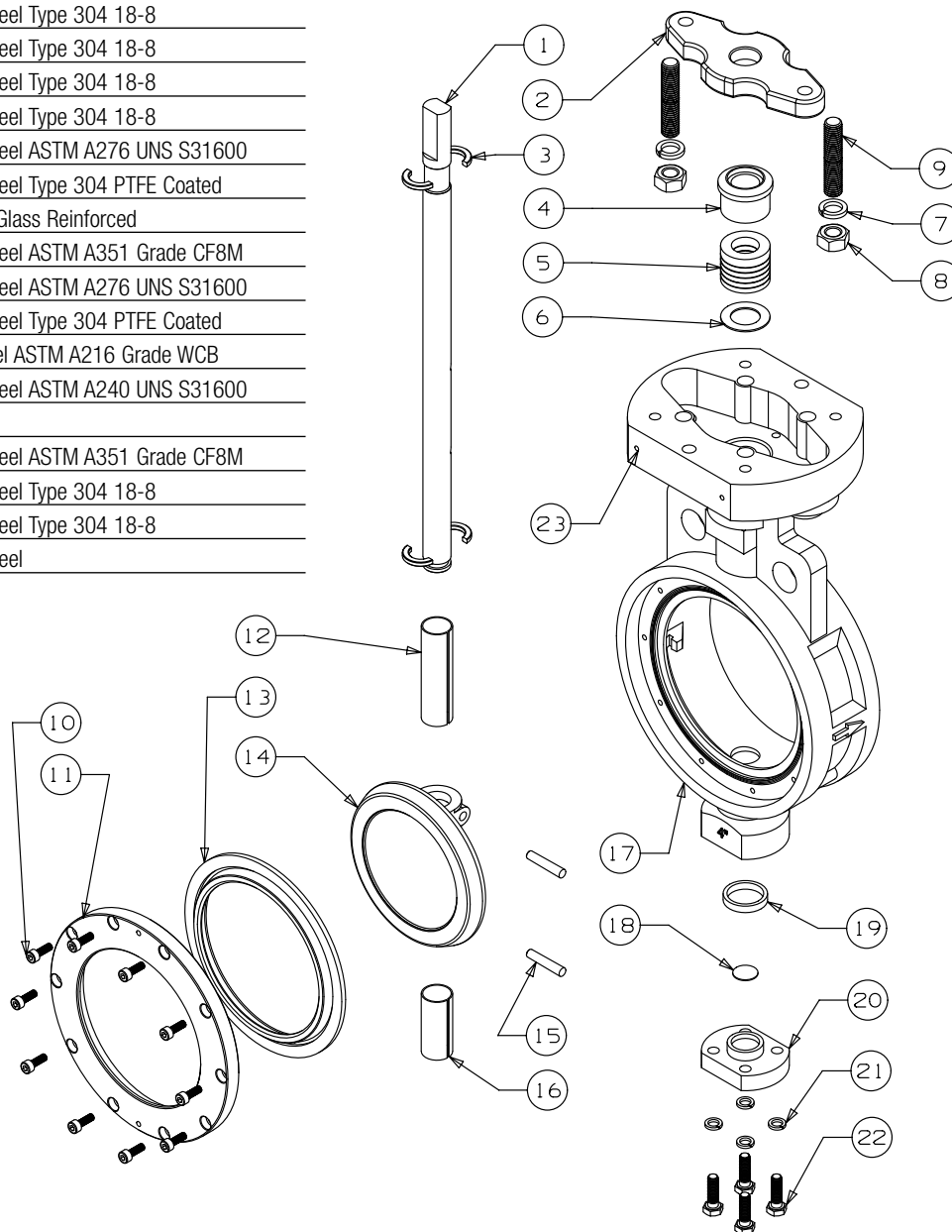
- 6.1 The valve can be actuated by a manual lever, a manual gear operator, an electric actuator, or a pneumatic actuator. Turning the valve (as viewed from top) clockwise closes the valve; counter-clockwise opens the valve.
- 6.2 Due to the double offset design of HPBFVs, the differential pressure over the disc can cause sufficient torque to open the valve spontaneously. For this reason, it is important not to remove lever or actuator from a valve that is or will be pressurized.
- 6.3 Lever operated valves should always be locked securely in desired throttle plate notch to prevent unexpected disc movement.

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## BILL OF MATERIALS

### MATERIAL LIST

PART	SPECIFICATION
1. Stem	Stainless Steel UNS ASTM A564 UNS S17400
2. Flange, Gland	Stainless Steel ASTM A351 Grade CF8M
3. Retainer, Stem (2)	Stainless Steel ASTM A276 UNS S31600
4. Gland, Packing	Stainless Steel ASTM A276 UNS S31600
5. Packing	PTFE
6. Retainer, Packing	Stainless Steel ASTM A276 UNS S31600
7. Lockwasher (2)	Stainless Steel Type 304 18-8
8. Nut (2)	Stainless Steel Type 304 18-8
9. Stud (2)	Stainless Steel Type 304 18-8
10. Screw, SHCS	Stainless Steel Type 304 18-8
11. Retainer, Seat	Stainless Steel ASTM A276 UNS S31600
12. Bushing, Upper	Stainless Steel Type 304 PTFE Coated
13. Seat	PTFE 15% Glass Reinforced
14. Disc	Stainless Steel ASTM A351 Grade CF8M
15. Pin, Disc (2)	Stainless Steel ASTM A276 UNS S31600
16. Bushing, Lower	Stainless Steel Type 304 PTFE Coated
17. Body	Carbon Steel ASTM A216 Grade WCB
18. Disc, Spacer	Stainless Steel ASTM A240 UNS S31600
19. Seal, Lower	PTFE
20. Cap, Body	Stainless Steel ASTM A351 Grade CF8M
21. Lockwasher (4)	Stainless Steel Type 304 18-8
22. Screw, Hex (4)	Stainless Steel Type 304 18-8
23. ID Plate	Stainless Steel



## **Installation, Operation and Maintenance Instructions**

### **NIBCO 6822 and 7822 Series High Performance Butterfly Valves**

#### **7. Maintenance:**

- 7.1 Typical maintenance consists of periodic inspection and exercising (cycling) of the valve to assure proper function.
- 7.2 Fluid leakage at weep hole near top of valve neck below flange is an indication that the stem packing needs tightened. Evenly tighten both nuts (8) below valve top flange ¼ turn each until leakage stops. It is important to adjust nuts evenly and not to over-tighten or premature stem packing wear will occur.
- 7.3 If repair parts or service information is required, please locate valve Identification Plate (23) and supply following information:
- Valve Figure Number
  - Valve Size
  - Valve Class
  - Manufacture Date Year
  - Valve Serial Number
  - Type of Actuator
- 7.4 Three individual repair kits are available for each size valve.
- Stem seal kit including Packing Set (5), Packing Retainer (6), and Lower Seal (19).
  - Standard RPTFE Seat (13) 15% glass reinforced PTFE
  - Special 25% carbon filled Seat (13) for severe steam service.
- 7.5 Some individual component parts can be ordered. Contact NIBCO for availability.

#### **Precautions Prior to Valve Removal from Piping or Repair**

- 7.6 Turn off supply pressure to piping in which valve is located. Lock-out & Tag-out per established safety procedure.
- 7.7 Identify media in piping and determine how to safely drain piping. Use proper personal protection clothing and supplies as needed.

#### **Removal of Valve from Piping**

- 7.8 Check to confirm piping has been depressurized and drained.
- 7.9 Actuate valve until in full CLOSED Position.
- 7.10 Attach appropriate lifting strap or sling to valve neck. Attach other end of strap or sling to secure point capable of supporting valve weight.
- 7.11 Disconnect any supply lines (air and electric) to actuator if applicable. Lock-out & Tag-out per established safety procedure.
- 7.12 Unloosen and remove all cap screws from mating pipe flanges.
- 7.13 Remove valve from between flanges. Remove old gaskets and clean piping flange seal surfaces of old gasket residue.
- 7.14 Note that any time the valve is removed from between flanges, it is necessary to re-torque seat retainer cap screws (10).

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#### Seat Replacement Procedure

- 7.15 Remove valve from piping per procedure above.
- 7.16 Place valve on bench with seat retainer (11) facing up. Remove cap screws (10) from retainer. Thread 2 of the removed cap screws (10) into the 2 threaded holes in retainer (11) at 12 o'clock and 6 o'clock. This will assist in pushing the retainer (11) from valve body (17).
- 7.17 Remove old seat (13) and discard.
- 7.18 Clean seat cavity and retainer (11). Clean, and inspect seal surfaces on disc (14). Polish disc edge to remove any small scratches that may interfere with disc / seat seal.
- 7.19 With valve disc in partial OPEN position, install new seat (13) into valve body (17). Install retainer (11) onto seat and align screw holes. Install cap screws (10) and snug. Position valve disc to CLOSED position. Torque cap screws using the "Cross-over" diagonal method. Torque screws as follows:

SCREW SIZE	TORQUE FT-LBS
4 mm	4 ft-lbs
6 mm	8 ft-lbs

SCREW SIZE	TORQUE FT-LBS
8 mm	11 ft-lbs
10 mm	15 ft-lbs

- 7.20 With disc in CLOSED position, visually inspect the disc to assure it is centered in the seat. If not, refer to **Section 4** for proper stop adjustment.
- 7.21 Open and close valve several times and check for proper operation before placing valve back in service.

#### Lower Seal Replacement Procedure

- 7.22 Remove valve from piping per procedure above.
- 7.23 Remove 4 caps screws (22) and lockwashers (21). Remove body cap (20) being careful not to lose disc spacer (18).
- 7.24 Being careful not to damage any seal surfaces, remove lower seal (19) from valve body (17) and discard.
- 7.25 Clean seal cavity and cap (20). Inspect for any damage.
- 7.26 Install new seal (19) into valve body (17). Install spacer (18), cap (20), cap screws (22), and lockwashers (21). Torque cap screws evenly using the "Cross-over" diagonal method.



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### Stem Packing Replacement Procedure

- 7.27 Remove valve from piping per procedure above.
- 7.28 Mark orientation of actuator in relation to valve body.
- 7.29 Remove actuator and all hardware from top of valve to expose gland flange (2).
- 7.30 Remove nuts (8) and lockwashers (7). Push upward on studs (9) and remove gland flange (2) from top of valve. Remove stem retainer clips (3) and gland (4) from stem (1).
- 7.31 Being careful not to damage any seal surfaces, remove PTFE packings (5) from valve body (17) and discard.
- 7.32 Clean packing cavity and gland (4). Inspect for damage.
- 7.33 Install new packing assembly (5) into valve body (17). Slide gland (4) over stem with flat side towards packing. Install two retainer clips (3) into stem above gland (4).
- 7.34 Slide gland flange (2) with studs (9) over stem and into cavity. Install lockwashers (7) and nuts (8). Tighten nuts evenly to torque as follows:

VALVE SIZE	NUT TORQUE FT·LBS
2" - 6"	4 ft·lbs
8" - 14"	8 ft·lbs
16" - 30"	11 ft·lbs

- 7.35 Install actuator and hardware to top of valve in original orientation as marked. Tighten all fasteners securely.
- 7.36 Cycle actuator several times, then to CLOSED position. Visually inspect the disc to assure it is centered in the seat. If not, refer to **Section 4** for proper stop adjustment.
- 7.37 Open and close valve several times and check for proper operation before placing valve back in service.

## NIBCO 6822 Series High Performance Butterfly Valve Replacement Parts

LCS6822 SERIES CLASS 150	GEAR OPERATOR KIT		HANDWHEEL		HANDWHEEL PIN		STEM BUSHING / KEY		LEVER HANDLE KIT	LEVER BUSHING	STEM SEAL KIT	RPTFE SEAT ONLY	CARBON SEAT (only)
	RATIO	PART NUMBER	SIZE	PART NUMBER	SIZE	PART NUMBER	SIZE	PART NUMBER	PART NUMBER	PART NUMBER	PART NUMBER	PART NUMBER	PART NUMBER
2"	24:1	RG70001	8" OD X .625" BORE	RG70014	Ø.190" X 1.63" LONG	RG700130	Ø.500 X .375 FLATS	DIRECT	RG70031	RG70034	RG700110	RG700080	RG70054
2½"	24:1	RG70002	8" OD X .625" BORE		Ø.190" X 1.63" LONG		Ø.625 X .438 FLATS	RG70022	RG70032	DIRECT	RG700111	RG700081	RG70055
3"	24:1		8" OD X .625" BORE		Ø.190" X 1.63" LONG		Ø.625 X .438 FLATS					RG700082	RG70056
4"	24:1		8" OD X .625" BORE		Ø.190" X 1.63" LONG		Ø.625 X .438 FLATS					RG700083	RG70057
5"	24:1	RG70003	8" OD X .625" BORE		Ø.190" X 1.63" LONG		Ø.750 X .500 FLATS	RG70023	RG70033	DIRECT	RG700112	RG700084	RG70058
6"	24:1		8" OD X .625" BORE		Ø.190" X 1.63" LONG		Ø.750 X .500 FLATS				RG700113	RG700085	RG70059
8"	30:1	RG70004	12" OD X .750" BORE	RG70015	Ø.190" X 1.63" LONG	RG700131	Ø.875 X .625 FLATS	RG70024			RG700114	RG700086	RG70060
10"	30:1	RG70006	12" OD X .750" BORE		Ø.190" X 1.63" LONG		.250" X .250" X 2" LG.	RG70025			RG700115	RG700087	RG70061
12"	50:1	RG70007	16" OD X .750" BORE	RG70016	Ø.190" X 1.63" LONG		.250" X .250" X 2" LG.				RG700116	RG700088	RG70062
14"	50:1	RG70008	16" OD X .750" BORE		Ø.190" X 1.63" LONG		.312" X .312" X 2-1/4" LG.	RG70026			RG700117	RG700089	RG70063
16"	80:1	RG70010	16" OD X 1.00" BORE	RG70017	Ø.380" X 1.81" LONG		.500" X .375" X 3" LG.	RG70028			RG700118	RG700090	RG70064
18"	80:1	RG70011	20" OD X 1.00" BORE	RG70018	Ø.380" X 2.50" LONG		.500" X .375" X 3" LG.					RG700091	RG70065
20"	320:1	RG70012	20" OD X 1.19" BORE	RG70019	Ø.380" X 2.50" LONG		.500" X .500" X 3" LG.	RG70029			RG700119	RG700092	RG70066
24"	320:1	RG70013	20" OD X 1.19" BORE		Ø.380" X 2.50" LONG		.750" X .500" X 4" LG.	RG70030			RG700120	RG700093	RG70067
30"	320:1	RG70021	20" OD X 1.19" BORE		Ø.380" X 2.50" LONG		.866" X .790" X 5" LG.	RG700032			RG700121	RG700094	RG70068

1. Replacement Gear Operators includes Handwheel, Handwheel Pin, 4 Cap Screws, 4 Lock Washers, Key and Stem Bushing (if required) for mounting to BFV.
2. Stem Seal Kit includes Upper Packing Set, Packing Retainer, and Lower Body Cap Seal.
3. Lever Handle Kit includes Handle, Throttle Plate, Lockwashers, Bolts, and Bushing (if required).

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LCS7822 SERIES CLASS 300	GEAR OPERATOR KIT		HANDWHEEL		HANDWHEEL PIN		STEM BUSHING / KEY		LEVER HANDLE KIT	LEVER BUSHING	STEM SEAL KIT	RPTFE SEAT ONLY	CARBON SEAT (only)
	RATIO	PART NUMBER	SIZE	PART NUMBER	SIZE	PART NUMBER	SIZE	PART NUMBER	PART NUMBER	PART NUMBER	PART NUMBER	PART NUMBER	PART NUMBER
2"	24:1	RG70001	8" OD X .625" BORE	RG70014	Ø.190" X 1.63" LONG	RG700130	Ø.500 X .375 FLATS	DIRECT	RG70031	RG70034	RG700110	RG700080	RG70054
2½"	24:1	RG70002	8" OD X .625" BORE		Ø.190" X 1.63" LONG		Ø.625 X .438 FLATS	RG70022	RG70032	DIRECT	RG700111	RG700081	RG70068
3"	24:1		8" OD X .625" BORE		Ø.190" X 1.63" LONG		Ø.625 X .438 FLATS					RG700082	RG70056
4"	24:1		8" OD X .625" BORE		Ø.190" X 1.63" LONG		Ø.625 X .438 FLATS					RG700083	RG70057
5"	24:1	RG70003	8" OD X .625" BORE		Ø.190" X 1.63" LONG		Ø.750 X .500 FLATS	RG70023	RG70033	DIRECT	RG700112	RG700084	RG70069
6"	24:1		8" OD X .625" BORE		Ø.190" X 1.63" LONG		Ø.750 X .500 FLATS				RG700122	RG700085	RG70059
8"	30:1	RG70005	12" OD X .750" BORE	RG70015	Ø.190" X 1.63" LONG	RG700131	.250" X .250" X 2" LG.	RG70025			RG700123	RG700095	RG70070
10"	50:1	RG70008	16" OD X .750" BORE	RG70016	Ø.190" X 1.63" LONG		.312" X .312" X 2-1/4" LG.	RG70026			RG700124	RG700096	RG70071
12"	80:1	RG70009	16" OD X 1.00" BORE	RG70017	Ø.380" X 1.81" LONG		.375" X .375" X 3" LG.	RG70027			RG700125	RG700097	RG70072
14"	80:1	RG70010	16" OD X 1.00" BORE		Ø.380" X 1.81" LONG		.500" X .375" X 3" LG.	RG70028			RG700126	RG700098	RG70073
16"	320:1	RG70020	20" OD X 1.19" BORE	RG70019	Ø.380" X 2.50" LONG		.500" X .375" X 3" LG.	RG70030			RG700127	RG700099	RG70074
18"	320:1	RG70013	20" OD X 1.19" BORE		Ø.380" X 2.50" LONG		.750" X .500" X 4" LG.				RG700128	RG700100	RG70075
20"	320:1		20" OD X 1.19" BORE		Ø.380" X 2.50" LONG		.750" X .500" X 4" LG.					RG700101	RG70076
24"	320:1		20" OD X 1.19" BORE		Ø.380" X 2.50" LONG		.750" X .500" X 4" LG.				RG700129	RG700102	RG70077

1. Replacement Gear Operators includes Handwheel, Handwheel Pin, 4 Cap Screws, 4 Lock Washers, Key and Stem Bushing (if required) for mounting to BFV.

2. Stem Seal Kit includes Upper Packing Set, Packing Retainer, and Lower Body Cap Seal.

3. Lever Handle Kit includes Handle, Throttle Plate, Lockwashers, Bolts, and Bushing (if required).