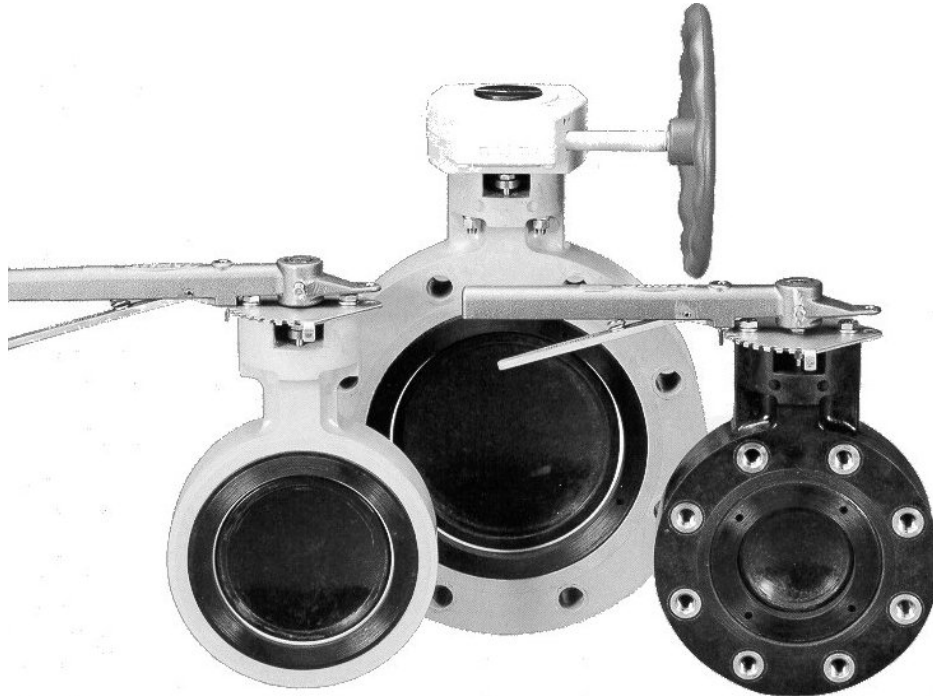




Nil-Cor Butterfly Valves

Installation, Maintenance and Operating Instructions
Series 300, 310 Wafer, Full Face & Lug



CAUTION: Refer to the Nil-Cor Corrosion Guide, Catalog 1000, to verify suitability for chemical applications. Contact factory for assistance for chemicals not listed.

Nil-Cor 300/310 Series Butterfly Valves are molded of Derakane 470 vinyl ester reinforced with either graphite or glass fiber matching the outstanding corrosion resistance, and other benefits and advantages of Nil-Cor 300/310 Series Ball Valves. The Flangeless wafer style offers a light-weight, economical installation while the Lug and Full-Face Nil-Cor 300/310 valves offer full flange support in FRP and light gauge metal piping systems.

The heavy cross section of 300/310 series Full-Faced and Lug Nil-Cor valve also provide complete support for FRP pipe flanges, which eliminates the problem of piping flange breakage at installation. The Lug style valves have molded-in 316 stainless steel lugs which will not rotate or pull out during installation under high torque loading. Nil-Cor 300/310 Series Butterfly Valves are available in 3" - 12" standard sizes.

Installation

Nil-Cor 300 series valves are available in wafer style for installation between standard 125 lb. or 150 lb. ANSI flanges, or DIN PN10 or 16 flanges per special order.

Nil-Cor butterfly valves should be installed with the seat downstream using the directional arrow on the side of the valve as a guide.

Caution: The arrow indicates the direction of pressure drop at shutoff, i.e., the direction from high pressure to low pressure. This may not always be the same direction as the normal fluid flow direction, such as in the case of a pump isolation application. Contact your Nil-Cor representative if unsure.

Valve shaft can be either horizontal or vertical with operator either above or below. Horizontal valve shaft installation is preferable, as it aids "self-cleaning" action of the valve.

Caution: Because of the double offset disc, the valve must only be opened in the counter-clockwise direction.

Flange Bolting Requirements

The following chart shows the number and size of bolts required for installation. (Flange-to-flange through-bolting)

| Valve Size | No. Bolts | Diameter | Length |
|------------|-------------|----------|--------|
| 3" | 4 (w/nuts) | 5/8" | 4 1/2" |
| 4" | 8 (w/nuts) | 5/8" | 5" |
| 6" | 8 (w/nuts) | 3/4" | 5 1/2" |
| 8" | 8 (w/nuts) | 3/4" | 6 1/2" |
| 10" | 12 (w/nuts) | 7/8" | 6 1/2" |
| 12" | 12 (w/nuts) | 7/8" | 7" |

FLANGE BOLT TORQUES

| | |
|---------------------------------|-----------|
| MINIMUM | 15 ft-lbs |
| MAXIMUM on dry bolt threads | 50 ft-lbs |
| MAXIMUM lubricated bolt threads | 35 ft-lbs |

Seat Removal

Wafer Style: partially open the disc and support valve in horizontal or vertical position. The seat will be free to pull out. It may be necessary at first to carefully pry under edge of seat with a screwdriver and work around the diameter to release it.

Full-Face and Lug: Secure the valve with the retainer side up on a flat surface. Using the special spanner tool, unthread the seat retainer with the disc in the closed position by turning the retainer counter-clockwise. Lift the seat out.

Valve Disassembly -see Fig. 1

1. For disassembly of valve, remove operator (hand lever and hand lever positioning lock plate, gear drive, or actuator assembly and bracket.)
2. Remove two stainless steel hex head cap screws (5) holding gland (6), and remove the gland.
3. Remove threaded pin (13). Then pull stem assembly (8) out, holding disc (11) to prevent it from falling. When the stem assembly comes out, it brings with it the gland packing (7).
4. Then rotate disc (11) down from top slowly, so that it rotates on it's spherical bottom shaft, and lift out from downstream side of valve.

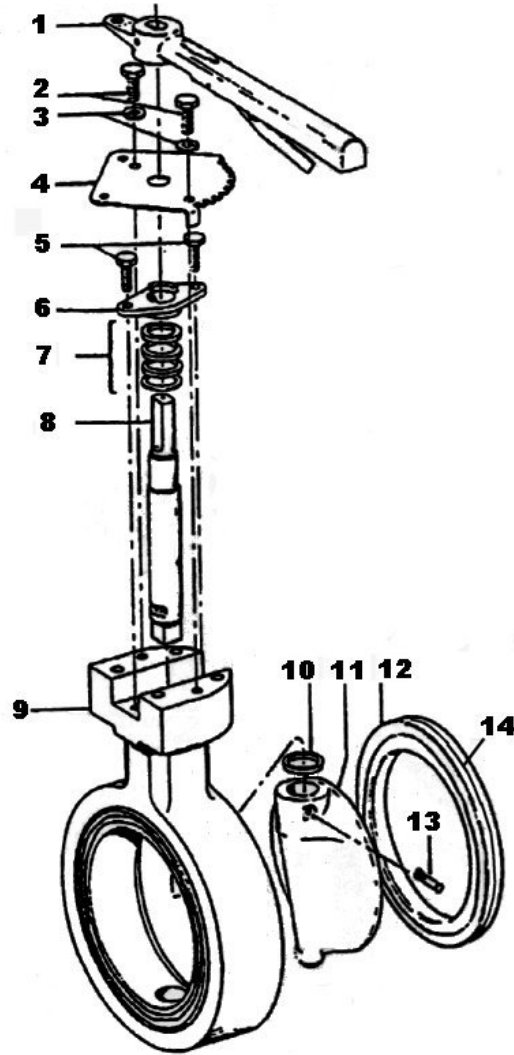
Assembly

1. Inspect all parts to make sure they are free of dust, grit or other foreign material. A new seat should be used each time the valve is reassembled, installed as described below.
2. A good lubricant, compatible with the fluid service, such as a silicone grease, should be applied lightly to seats, stem assembly and disc.
3. Then install disc (11) with the concave side up by inserting it's spherical shaft bottom into it's socket cavity in base of valve body (9) and rotate concave side of disc upward into valve body opening. Insert spacer (10) between body and disc.
4. Insert stem assembly (8), and push down, rotating it to engage with cavity in top of disc (11). Be sure stem assembly is fully engaged with disc.
5. Insert and tighten thread pin (13). Then place gland packing (7) over stem assembly and push thru into valve body cavity at upper end of stem. (See Table 1 for correct number of compression rings and adaptor rings by valve size.)

6. Install gland with two stainless steel hex cap head cap screws. Use the gland to press packing into place and slightly draw up the packing by tightening the gland bolts.
7. Gland bolts should be torqued as indicated in Table 1. If leakage should occur, additional adjustment may be necessary to set packing to maximum torque.
8. Replace locking plate (4), and remount operator (1).

Table 1
Gland Packing Set and Gland Bolt
Torque

| Valve Size (in.) | Comp./ Adapter Rings | Torque (in-lb) | |
|------------------|----------------------|----------------|------|
| | | Recom. | Max. |
| 3" | 2 /2 | 20 | 40 |
| 4" | 2 /2 | 20 | 40 |
| 6" | 2 /2 | 35 | 70 |
| 8" | 2 /2 | 35 | 70 |
| 10" | 3 /2 | 50 | 100 |
| 12" | 3 /2 | 50 | 100 |



Seat Replacement

For wafer valves, place retainer ring O-ring on OD of retainer. Drop seat ring into recess of retainer. With disc in closed position, place seat and retainer into place, making sure the seat's tapered ID surface is next to the disc. Push retainer down until almost flush with valve body. For full-face lug valves with Viton seats-with disc in the closed position, use same procedure as for wafer valve omitting O-ring on retainer OD. Screw retainer (using special tool) until flush with valve body.

For full-face lug valves with TFE seat-with disc in the closed position, place seat ring with tapered ID surface next to the disc. Lay O-ring in position around OD of the seat ring. Screw retainer (using special tool) until flush with valve body.

The valve body subassembly is now completely assembled.

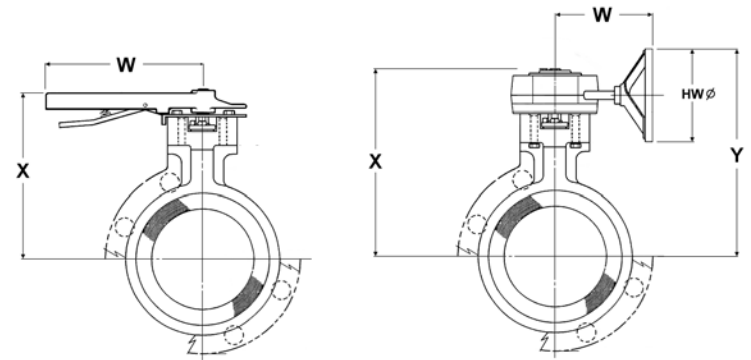
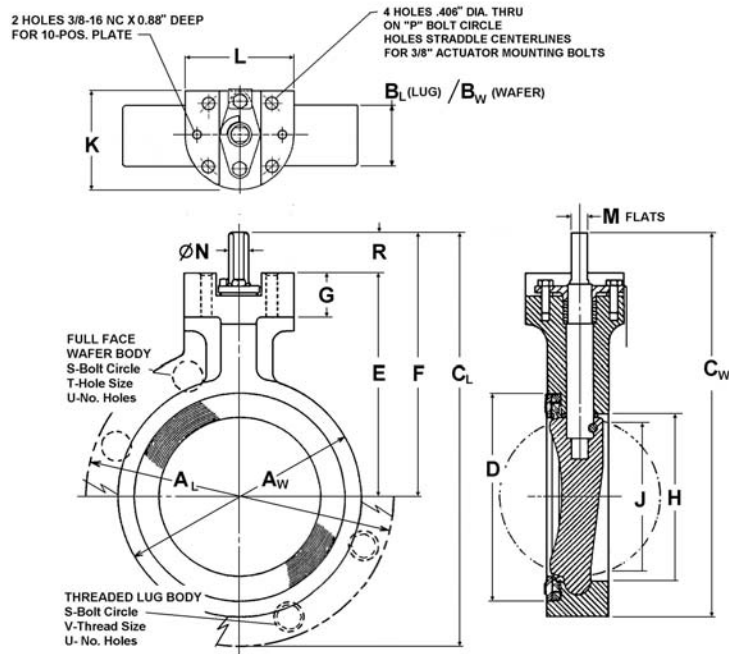
Maintenance

Periodic observation is recommended to ensure that the valve is functioning normally. The frequency of observation depends on the application. Adjustment to stem gland packing should be made periodically to compensate for wear caused by the stem turning against the TFE packing.

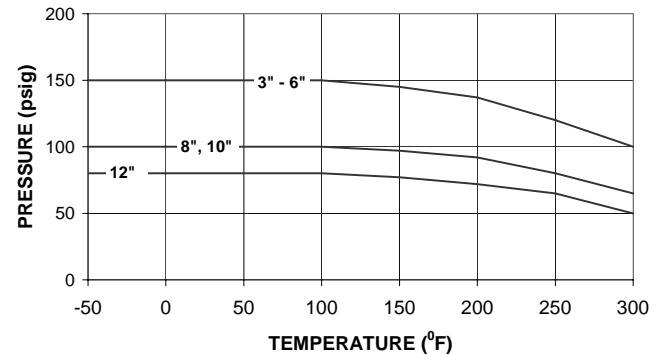
| Item No. | Description | Material |
|----------|---------------------------|--|
| 1 | Hand Lever | FRP/D.I. |
| 2 | Hex Head Screws (2 Req'd) | Stainless Steel |
| 3 | Lock Washers | Stainless Steel |
| 4 | Positioning Lock Plate | FRP/Painted Steel |
| 5 | Hex Head Screws (2 Req'd) | Hastelloy-C, Stainless Steel, or Monel |
| 6 | Gland | Hastelloy-C |
| 7 | Packing | Virgin PTFE V-Ring |
| 8 | Stem | 17-4PH/GR-VE or Hast-C/GR-VE |
| 9 | Valve Body | Glass or Graphite Reinforced Vinyl Ester |
| 10 | Spacer | Graphite-Reinforced Kynar |
| 11 | Disc | Graphite Reinforced Vinyl Ester |
| 12 | Seat Ring Assembly | Viton or PTFE |
| 13 | Stem Pin | Graphite-Reinforced Kynar |
| 14 | O-Ring, Shipping Retainer | Viton |

Nil-Cor Butterfly Valve Dimensions and Weights

(all dimensions in inches)



Maximum Shutoff Pressure vs. Temperature
NIL-COR BUTTERFLY VALVES



| SIZE | A _W Wafer | A _L FF/Lug | B _W Wafer | B _L FF/Lug | C _W Wafer | C _L FF/Lug | D | E | F | G | H | J | K | L |
|------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------|-------|-------|------|-------|-------|------|------|
| 3 | 5.38 | 7.50 | 1.81 | 2.06 | 10.25 | 11.31 | 4.13 | 6.38 | 7.56 | 1.50 | 3.13 | 2.38 | 3.13 | 3.50 |
| 4 | 6.88 | 9.00 | 2.05 | 2.30 | 12.25 | 13.31 | 5.45 | 7.13 | 8.81 | 1.50 | 4.13 | 3.39 | 3.63 | 4.00 |
| 6 | 8.75 | 11.00 | 2.20 | 2.45 | 14.00 | 15.18 | 7.45 | 8.13 | 9.68 | 1.63 | 6.13 | 5.43 | 3.63 | 4.00 |
| 8 | 11.00 | 13.50 | 2.36 | 2.61 | 16.88 | 18.13 | 9.53 | 9.50 | 11.38 | 1.63 | 8.13 | 7.54 | 3.63 | 4.00 |
| 10 | 13.38 | NA | 2.67 | NA | 20.00 | NA | 11.51 | 11.38 | 13.31 | 2.13 | 10.06 | 9.50 | 3.94 | 4.00 |
| 12 | 16.13 | NA | 3.07 | NA | 23.00 | NA | 13.51 | 12.88 | 14.94 | 2.13 | 12.06 | 11.42 | 3.94 | 4.00 |

| SIZE | ACTUATOR MOUNTING DIMENSIONS | | | | FLANGE BOLTING DIMENSIONS | | | | LEVER DIMENSIONS | | GEAR DIMENSIONS | | | | Cv | OPERATING TORQUE (IN-LBS) | | WEIGHT, BARE STEM (LBS.) | | |
|------|------------------------------|------|------|------|---------------------------|-----|----|--------|------------------|-------|-----------------|-------|-------|------|------|---------------------------|----------|--------------------------|-----------|------|
| | M (+.000 -.002) | N | P | R | S | T | U | V | W | X | W | X | Y | HW | | <50 psid | >50 psid | Wafer | Full Face | Lug |
| 3 | 0.266 | 0.38 | 2.66 | 1.18 | 6.00 | .75 | 4 | 5/8-11 | 9.00 | 7.56 | 6.00 | 8.80 | 10.50 | 6.00 | 220 | 240 | 240 | 3.0 | 5.0 | 6.5 |
| 4 | 0.391 | 0.47 | 3.25 | 1.68 | 7.50 | .75 | 8 | 5/8-11 | 12.00 | 8.81 | 6.00 | 9.40 | 11.25 | 6.00 | 395 | 360 | 480 | 6.0 | 8.5 | 12.0 |
| 6 | 0.562 | 0.69 | 3.25 | 1.55 | 9.50 | .88 | 8 | 3/4-10 | 14.00 | 9.68 | 6.00 | 10.40 | 12.25 | 6.00 | 950 | 780 | 960 | 9.0 | 12.5 | 15.9 |
| 8 | 0.594 | 0.75 | 3.25 | 1.88 | 11.75 | .88 | 8 | 3/4-10 | 14.00 | 11.38 | 7.38 | 11.80 | 15.13 | 9.00 | 2250 | 1680 | 2160 | 13.0 | 19.0 | 22.0 |
| 10 | 0.625 | 0.81 | 3.25 | 1.93 | NA | NA | NA | NA | NA | NA | 7.38 | 11.80 | 15.13 | 9.00 | 3640 | 2400 | 4200 | 21.0 | NA | NA |
| 12 | 0.718 | 0.94 | 3.25 | 2.06 | NA | NA | NA | NA | NA | NA | 7.38 | 11.80 | 15.13 | 9.00 | 3690 | 3960 | 6360 | 34.0 | NA | NA |