



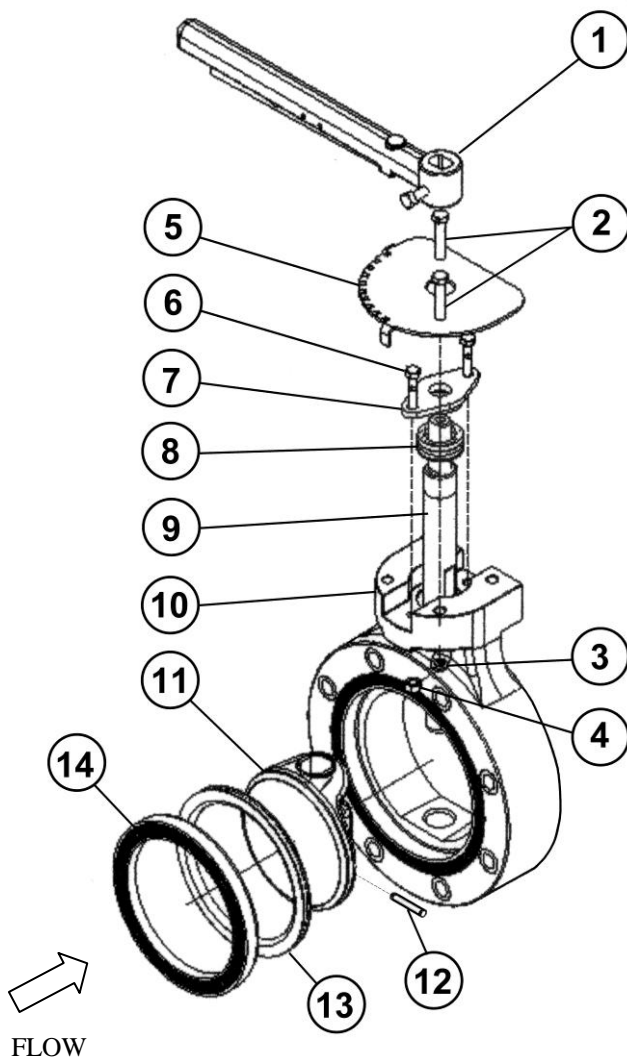
Nil-Cor HD Butterfly Valves

Installation, Maintenance and Operating Instructions 3"-12" Series 300HD, 310HD 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 HD-Series Double-Offset High Performance Butterfly Valves The full-face wafer body style offers a light-weight, economical installation with full flange support in FRP piping systems 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 HD-Series Butterfly Valves are available in 3" - 12" standard sizes.

The 310HD Series is ideal for on/off or modulating control service. Fire-Resistant versions are available.



Item No.	Description	Material
1	Hand Lever	D.I./Epoxy Coated
1-A	Gear (Not Shown)	Aluminum/Painted
2	Hex Head Screws (2 Req'd)	18-8 Stainless Steel
3	Lock Washers	18-8 Stainless Steel
4	Hex Nut (2 Req'd)	18-8 Stainless Steel
5	Positioning Plate	18-8 Stainless Steel
6	Hex Head Screws (2 Req'd)	Hastelloy-C
7	Gland	Hastelloy-C
8	Packing	Virgin PTFE V-Ring
9	Shaft	17-4PH/GR-VE or Hast-C/GR-VE,
10	Valve Body	Glass or Graphite Reinforced Vinyl Ester
11	Disc	Graphite Reinforced Vinyl Ester
12	Shaft Pin	Graphite-Reinforced Kynar
13	Seat Ring	Viton or PTFE;
14	Seat Retainer	Graphite Reinforced Vinyl Ester, 10" and 12", no retainer used.

Site Storage Precautions

For outside site storage ensure valves or containers are wrapped in plastic or otherwise protected from ingress of dust or blowing sand. Do not remove flange covers. Actuated or gear operated valves should be kept dry. Inside warehouse storage requires no special protections.

Installation

Nil-Cor 300/310 Composite Butterfly Valves are available in standard ANSI B16.5 Class 150 flange bolt patterns, or can be custom drilled for DIN PN10 or PN16. Face to face dimensions are standard per ANSI B16.10 Class 150 Extra wide and MSS SP-67, W-3, Extra Wide.

Nil-Cor butterfly valves must be installed with the seat Upstream and with the disc fully closed, 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.

Disassembly

1. If the valve has been in service, make sure it has been decontaminated with no residual fluid remaining in the valve. Wear appropriate protection for potentially hazardous fluids.
2. Use caution and lay the valve on a soft protector such as a sheet of cardboard to protect the flange sealing serrations from damage during the following procedures.
3. Secure the valve with clamps or bolts with the retainer side up on a flat surface. Nil-Cor recommends using a wooden or aluminum plate with four flange bolts through it to position the valve onto the bolts. Then the board or aluminum plate is clamped to the work surface.
4. 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. (10" and 12" valves do not have a seat retainer. Simply lift the seat out.)
5. Remove the operator (hand lever and 10-position locking plate, gear drive, or actuator and mounting bracket assembly).
6. Remove the two hex head cap screws (6) retaining the gland (7), and remove the gland.

7. Turn disk 90 degrees to the body and tap out the shaft retainer pin (12) from the split end with a 3/16" driver with a flat end.
8. Clamp the shaft flats in a non-marring vise and pull or tap (with a soft mallet) the body off the shaft. Hold the body vertical while doing so and hold onto the disk to keep it from falling out.
9. The packing (8) will usually come off with the shaft, but could stay in the body. If it does, fish it out of the packing bore with a finger or soft tool, being careful not to mar the interior of the packing bore.
10. With the shaft removed the disk may be removed from the seat side of the valve.

Assembly

1. Inspect all parts to make sure they are free of dust, grit or other foreign material. A new seat, packing, and retainer pin should be used each time the valve is reassembled.
2. A good lubricant, compatible with the fluid service, such as silicone grease, should be applied lightly to the seat, packing ID and OD, and threaded retainer ring to aid in assembly.
3. Start assembly with the valve standing vertically, with wedges or rags at the base for stability.
4. With the seat side facing the technician (threaded opening), install the disc with flat side out. Ribs will be on the back side. NOTE: The retainer pin hole must be on the bottom of the disk. Looking through the shaft hole from the top, align the disk to allow insertion of the shaft.
5. Insert the packing into the packing box making sure it is aligned properly (points of the "V" rings must be up).
6. Orientate the notch near the bottom of the shaft toward the rib side of the disk to match the retainer pin hole. Install the shaft through the packing, disk, and into the recess in the bottom of the body. The top of the composite shaft should be flush with the packing.
7. Install the gland with the two nickel alloy hex head gland bolts. Use the gland to press the packing into place and slightly draw up the packing by tightening the two gland bolts in equal increments.
8. Gland bolts should be tightened as indicated in Table 1. If leakage should occur, additional tightening may be necessary up to the maximum torque value. Over tightening can result in the valve body threads stripping. Use caution when adjusting the packing.
9. Next, lay the valve on its back with the seat side up. Lay the seat (13) into the threaded recess. **(Note: on 10" and 12" valves the recess is not threaded and the seat assembly slips into the recess. There is no threaded retainer ring.)** Viton seats are asymmetrical, so be sure to install the seat with the larger I.D. facing down. PTFE envelope seats are symmetrical; install with either side down.
10. Start the threaded retainer ring (14) by hand until it becomes too difficult to turn. Next, clamp and position the valve body to a surface able to withstand high torque as described in paragraph 3 of Disassembly.

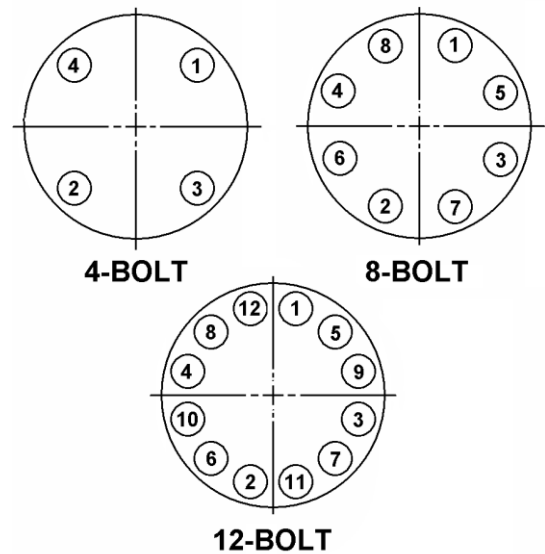
11. Screw in the retainer ring using the special spanner wrench until it is flush or just below the body. This requires high torque in the larger size valves and caution must be used at this step. It may be helpful to have a second technician to hold the spanner wrench down and engaged while the other turns it with a large wrench and pipe extension to control torque.
12. The valve can now be tested as required to insure it is leak free. Caution: Do not use compressed air to check for leaks. Always use water and proper test equipment to safely test the valve. If the seat leaks at test pressure, tighten the retainer ring in 1/8-turn increments until it stops. Consult your Nil-Cor representative if the leakage cannot be stopped.

Flange Bolt Tightening Procedure:

1. Lubricate bolt threads with anti-seize
2. Install washers on nut side.
3. Hand tighten fasteners, then snug up to 10-20 ft-lbs in patterns shown below.
4. Round 1 – Tighten to 33% of final torque value.
5. Round 2 – Tighten to 66% of final torque value.
6. Round 3 – Tighten to 100% of final torque value.
7. Rotational round for final flange assembly 100% of final torque. Use clockwise rotational tightening starting with bolt #1 for one complete round until no further nut rotation occurs.
8. Retighten to 100% torque values after 24-48 hours by repeating steps 6 and 7 above.

FLANGE BOLTING REQUIREMENTS

Valve Size (in)	Bolts per valve	Flange Bolt Size and Length*	Flange Bolting Torque
3	4	5/8-11 UNC x 4.75"	30 ft-lb
4	8	5/8-11 UNC x 5-5.25"	40 ft-lb
6	8	3/4-10 UNC x 6.00"	50 ft-lb
8	8	3/4-10 UNC x 6.25"	60 ft-lb
10	12	7/8-9 UNC x 6.75"	75 ft-lb
12	12	7/8-9 UNC x 7.00"	85 ft-lb



*Typical for CL 150 Fibercast FRP flanges.

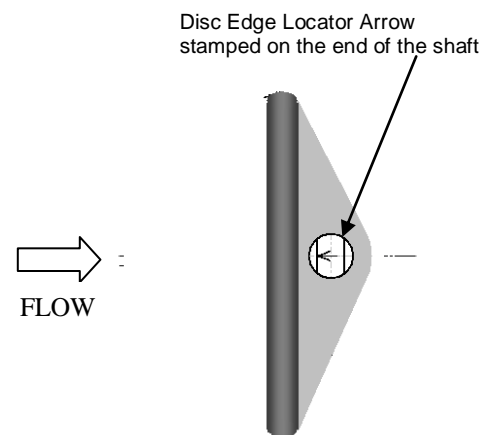
PACKING BOLT TORQUE

Valve Size (in.)	Torque (in-lb)	
	Recom.	Max.
3	20	40
4	20	40
6	35	70
8	35	70
10	50	100
12	50	100

Periodic Maintenance

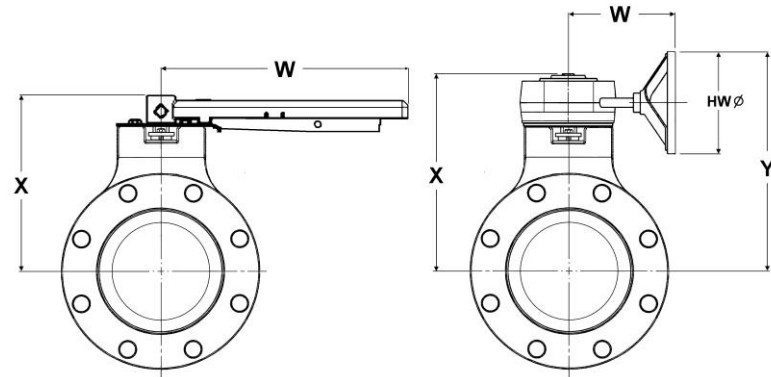
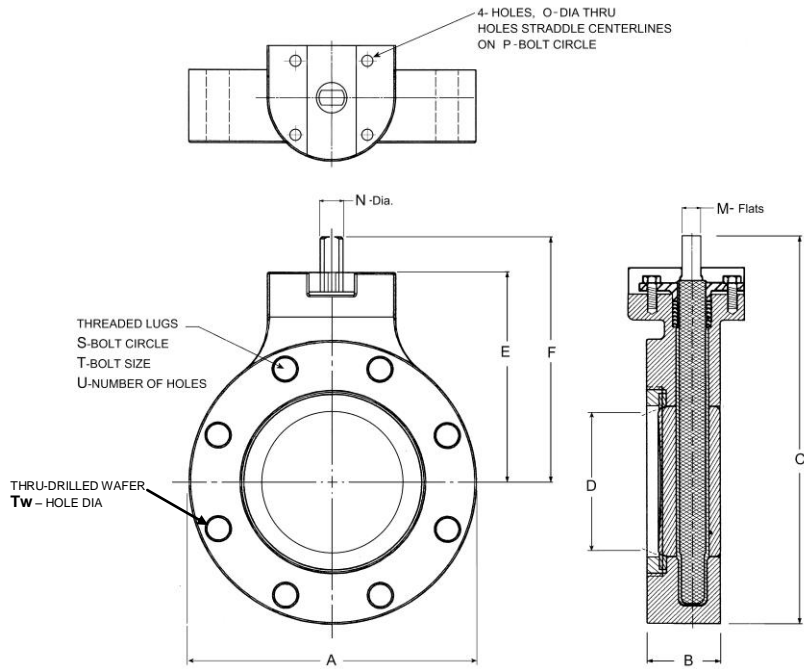
Periodic observation is recommended to ensure that the valve is functioning normally. The frequency of observation depends on the application. Check for leaks around the shaft area, flange gaskets, and around the fasteners. Adjustment to the shaft gland packing may be required periodically in high cycle applications to compensate for wear caused by the shaft turning on the PTFE packing.

If necessary, the valve shall be refurbished as described in the appropriate Disassembly and Assembly sections. Rebuild kits are available from the manufacturer.



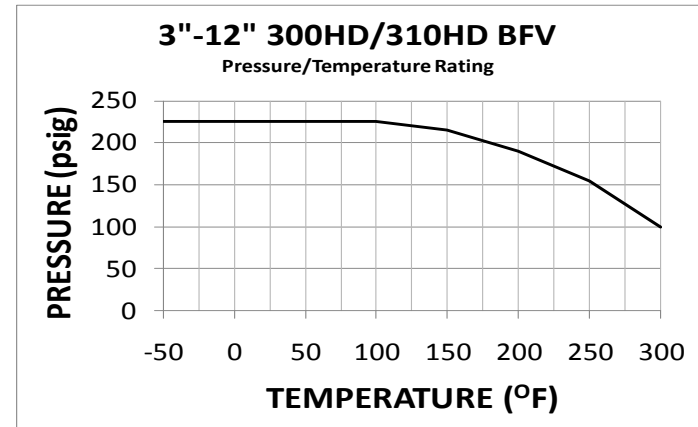
Nil-Cor 310HD Butterfly Valve

Dimensions and Weights (all dimensions in inches)



→
FLOW

SIZE	A	B	C	D	E	F	S	T	Tw	U
3	7.50	2.060	11.31	2.50	6.38	7.56	6.00	5/8 - 11	0.75	4
4	9.00	2.300	13.31	3.47	7.13	8.81	7.50	5/8 - 11	0.75	8
6	11.00	2.810	15.00	5.38	8.13	9.50	9.50	3/4 - 10	0.88	8
8	13.50	2.940	18.13	7.56	9.50	11.38	11.75	3/4 - 10	0.88	8
10	16.00	3.130	21.31	9.40	11.38	13.31	14.25	7/8 - 9	1.00	12
12	19.00	3.380	24.44	11.42	12.88	14.94	17.00	7/8 - 9	1.00	12



SIZE	ACTUATOR MOUNTING DIMENSIONS				LEVER DIMENSIONS		GEAR DIMENSIONS				Cv	OPERATING TORQUE (IN-LBS)		WEIGHT (LBS.)		
	M (+.000 .002)	N	O	P	W	X	W	X	Y	HW		<50 psid	>50 psid	BARE	W/LEVER	W/GEAR
3	0.433	0.555	0.345	4.016	14.00	8.13	6.32	9.09	11.58	8.00	220	240	240	7.8	11.7	11.8
4	0.551	0.713	0.423	4.016	14.00	8.88	6.32	9.84	12.33	8.00	395	360	480	13.4	17.3	17.4
6	0.669	0.874	0.423	4.016	14.00	9.86	7.40	11.03	14.40	10.00	950	780	960	19.4	23.3	26.4
8	0.866	1.110	0.423	4.016	14.00	11.21	7.78	12.40	16.77	12.00	2250	1680	2160	26.9	30.8	33.9
10	1.063	1.425	0.502	4.921	NA	NA	9.43	14.78	19.87	14.00	3640	2400	4200	46.0	NA	61.0
12	1.063	1.425	0.502	4.921	NA	NA	9.43	16.28	21.37	14.00	5180	3960	6360	68.0	NA	83.0