

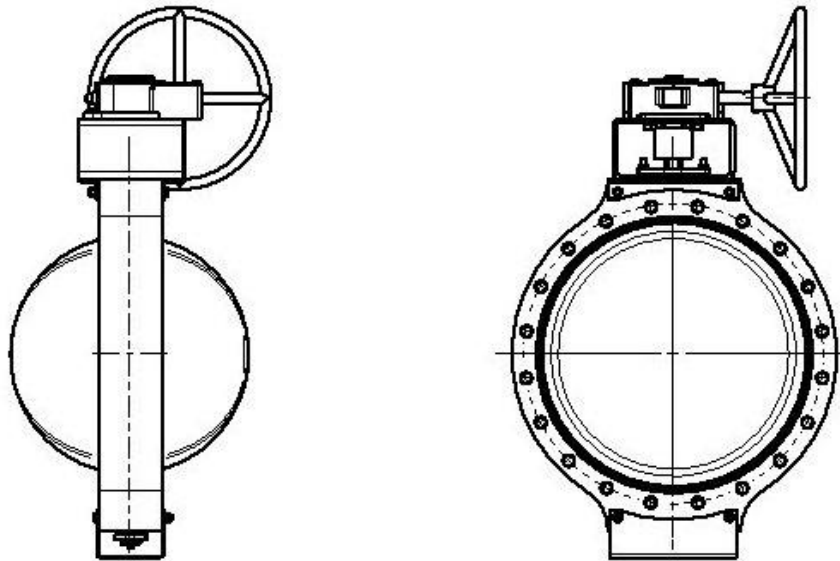


## **Nil-Cor HD Butterfly Valves**

### **Sizes 14"-42"**

Installation, Maintenance and Operating Instructions  
Standard Series 310HD Wafer Full Face & Lug Design

Sample Product Code:  
(*SIZE*)-310HD-F-V-S-GR



***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 310HD Series Butterfly Valve bodies are manufactured from premium vinyl ester resin reinforced with ECR glass fiber in a proprietary process developed by Nil-Cor, paralleling the outstanding corrosion resistance and other benefits and advantages of Nil-Cor 310 Series Ball Valves. The Lug and Full-Face Nil-Cor 310HD valves offer full flange support in

FRP and light gauge metal piping systems which eliminates the problem of piping flange breakage at installation. The Lug style valves are directly threaded and possess steel-like thread strength to resist high torque loading. Nil-Cor 310HD Series Butterfly Valves are available in sizes 14" - 42" with either FKM elastomer or PTFE-encapsulated FKM seats.

### Installation

Nil-Cor 310HD series valves are available in wafer style, with either threaded lugs or thru-drilled bodies, for installation between standard 125 lb. or 150 lb. ANSI flanges, MSS-SP-44 or DIN PN10 or 16 flanges per special order.

#### CAUTION:

**Nil-Cor 310HD butterfly valves sizes 14"-42" must be installed with the seat DOWNSTREAM, using the directional arrow on the side of the valve as a guide. The valve seat is designed to be retained by the downstream flange. For End-of-Line service, the seat must be retained by a downstream flange or spool.**

#### CAUTION: IMPORTANT LIFTING RESTRICTION

**Valves with gear, electric, pneumatic or hydraulic motor actuators must be lifted by attaching straps or other means to the actuator bracket. In no case may the assembly be lifted by attaching the lifting devices to the valve body alone.**

**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 and Gasket Requirements

1. Bolt length varies with the thickness of the line flanges.
2. Tighten flange bolts in a cross-pattern in stages until the recommended torque is achieved on all bolts.
3. Gaskets must be 1/8" to 1/4" thick full-face elastomer, with durometer (hardness) of 50-60 (Shore A scale). Do not use metallic spiral-wound gaskets or PTFE sheet.

**Caution: Fastener thread engagement length for eight (8) tapped blind holes around shaft must be equal to or less than the thread depth shown in the table on page 4, Column "K", to avoid bottoming out the fastener and stressing the valve body. We recommend installing studs in these eight (8) holes until they bottom out, then back out one turn. Install nuts on the studs, not allowing the stud to turn into the body.**

### Recommended Flange Bolt Torques:

VALVE SIZE	FLANGE BOLT TORQUES
	FT-LBS. / (NM)
14", 16"	<b>60-100</b> / (81-136)
18", 20"	<b>80-120</b> / (108-163)
24"-30"	<b>80-130</b> / (108-176)
36"-42"	<b>100-150</b> / (136-203)

### Seat Removal

Partially open the disc (8) and support valve in horizontal or vertical position. The seat (9) 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.

### Seat Replacement

Place the valve body on a clean, flat surface with the seat counterbore up. Protect the flange sealing ribs by placing cardboard under the valve. With the disc in the closed position, place seat into the body counterbore, making sure the seat's tapered ID surface is next to the disc.

### Valve Disassembly (Refer to Fig.1, next page)

1. Remove operator, such as gear drive, or actuator assembly and bracket.
2. Lay the valve on a clean, flat surface, on cardboard, with the seat side up. Secure it firmly with clamps. Do not clamp on the flange gasket sealing surfaces of the body.
3. Remove two stainless steel nuts (1) holding top packing gland, and remove the gland (3).
4. Remove the two cap screws (17) holding the bottom shield (18) to the body.
5. Remove two stainless steel hex head cap screws (14) holding bottom gland (12), and remove the gland.
6. Using a rawhide or hard rubber mallet, drive the shaft (4) out from the bottom toward the top of the valve. Support the disc (8) so that it does not fall as the shaft comes out. Use a wooden dowel to drive the shaft all the through the disc until it can be pulled out by hand.
7. Using an appropriate means, taking care not to damage the body, lift the valve body away from the disc. Remove the disc spacers (6, 10) from each end of the disc.
8. Using a packing hook or similar tool, lift out the top and bottom packing (5, 11).

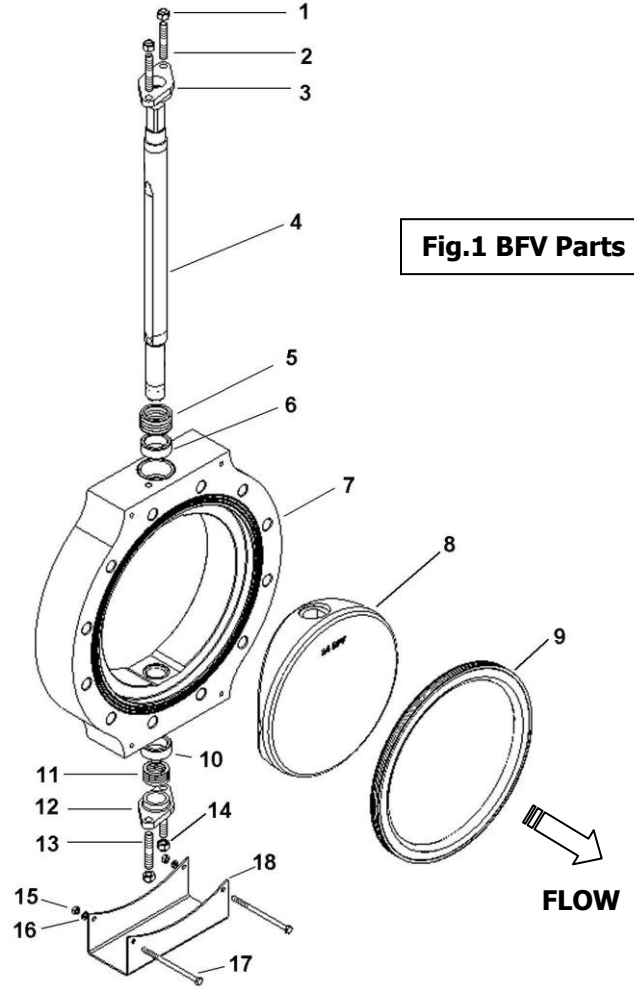
### Assembly

1. Clean away dust and grit on the body with pressurized air.
2. Grease vane sealing surface, seat OD and ID, and shaft.
3. Slip dowel rod into small shaft bushing at bottom of body.
4. Inspect the vane sealing (tapered) surface and finish sand with 400 grit sandpaper if any defects are present.
5. Inspect shaft fit with vane. It should be snug on the flats and slip-fit on the diameter.
6. Insert spacers in vane pockets at either end of the vane. Line up top of vane with large shaft bushing at top of body. Use the dowel rod coming in from the bottom to support the vane and spacer assembly in place while installing the shaft from top end of body.
7. Install the small packing (11) over the shaft and into the packing bore, and small gland (12) over the bottom packing studs. Install and tighten the bottom packing nuts (14) to the required torque.

8. Install the top packing (5), gland (3) and nuts(1) in the top packing box. Tighten the packing nuts to the required torque. See table below. Begin by tightening packing to the low side of the specification in Table 1. Tighten as necessary if leakage occurs during testing. Do not exceed maximum torque.
9. Install seat ring (9) with sealing rib to outside of body (*See Seat Ring Installation, P. 2*).
10. Nil-Cor strongly recommends the use of studs rather than cap screws in the eight blind-tapped flange bolt holes around the shaft in valve sizes 18" and larger (*See Flange Bolting and Gasket Requirements, P.2*).

**Table 1  
Gland Bolt Torque**

Valve Size (in.)	Valve Size (mm)	Gland Bolt Torque (Ft.-Lb.)
14"	350	15-20
16"	400	20-30
18"	450	20-30
20"	500	25-35
24"	600	25-35
26"	650	25-35
30"	750	35 max
36"	900	35 max
42"	1050	35 max



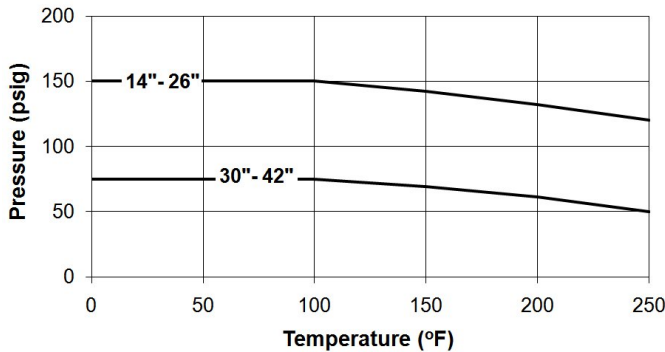
**Fig.1 BFV Parts**

**Maintenance**

Periodic observation is recommended to ensure that the valve is functioning normally. The frequency of observation depends on the application. In case the valve is subjected to rapid cycling, adjustment to both top and bottom stem gland packing sets should be made periodically to compensate for wear.

Item	Description	Material
1	Gland Nut, Top	304 Stainless Steel
2	Gland Stud, Top	304 Stainless Steel
3	Gland, Top	316 Stainless Steel
4	Shaft	17-4PH SS/Vinyl Ester
5	Packing, Top	Virgin PTFE V-Rings
6	Disc Spacer, Top	Glass-reinforced PTFE
7	Valve Body	Fiberglass reinforced Vinyl Ester
8	Disc	Fiberglass reinforced Vinyl Ester
9	Seat Ring	Viton GF or PTFE Envelope
10	Disc Spacer, Bottom	316 Stainless Steel
11	Packing, Bottom	Virgin PTFE V-Rings
12	Gland, Bottom	316 Stainless Steel
13	Gland Stud, Bottom	304 Stainless Steel
14	Gland Nut, Bottom	304 Stainless Steel
15	Nuts, Bottom Shield	304 Stainless Steel
16	Lock Washers	304 Stainless Steel
17	Hex Head Cap Screws	304 Stainless Steel
18	Bottom Shield	Epoxy-coated Carbon Steel

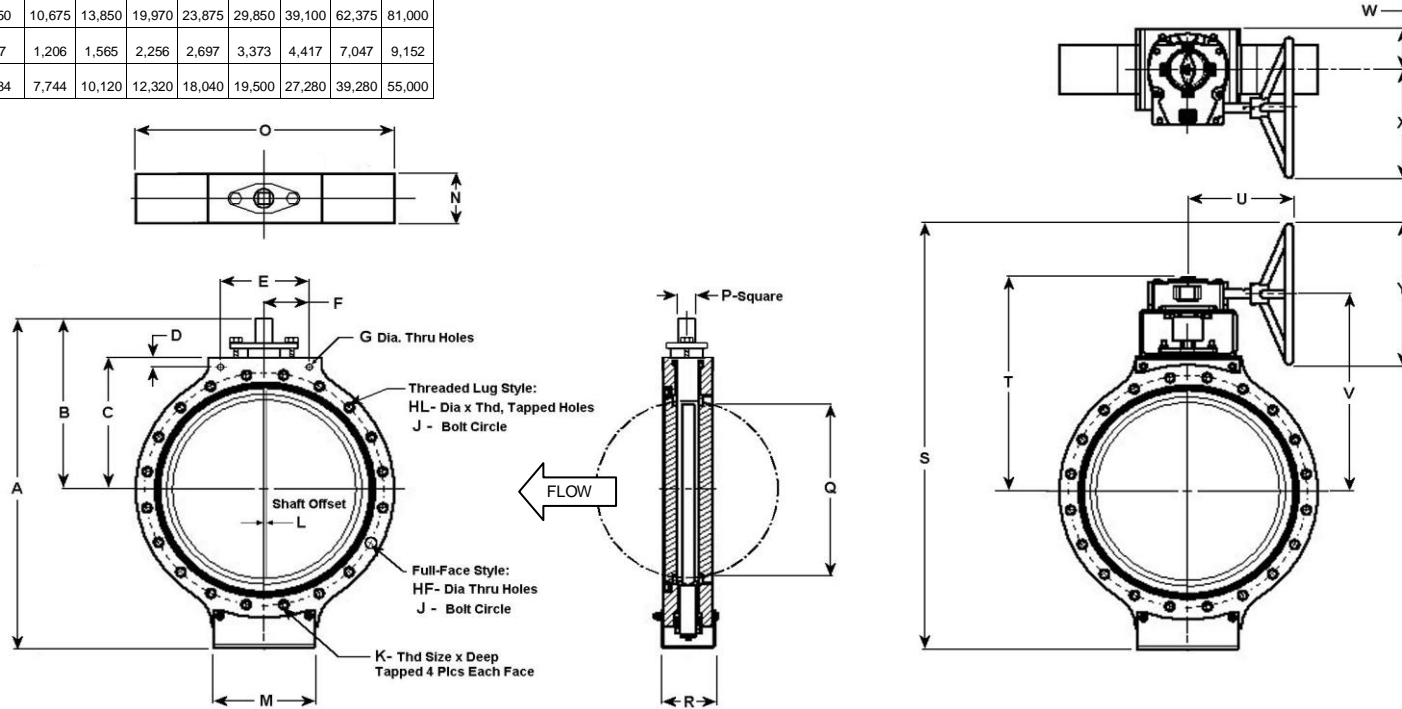
**Shutoff Pressure/Temperature  
14"- 42" HD Butterfly Design**



# Nil-Cor 14"-42" 310HD BUTTERFLY VALVE DIMENSIONS / ANSI CL 150 / MSS-SP44

All dimensions are in inches unless otherwise specified

SIZE	14"	16"	18"	20"	24"	26"	30"	36"	42"
TORQUE (IN-LBS)	7,850	10,675	13,850	19,970	23,875	29,850	39,100	62,375	81,000
TORQUE (NM)	887	1,206	1,565	2,256	2,697	3,373	4,417	7,047	9,152
Cv	5,984	7,744	10,120	12,320	18,040	19,500	27,280	39,280	55,000



SIZE	A	B	C	D	E	F	G	HF	HL	J	K	No. HOLES	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	WT. BARE STEM	WT. WITH GEAR
14	26.56	13.65	10.79	0.75	9.00	4.50	0.34	1.13	1" - 8	18.75	NA	12	.05	10.00	3.75	23.00	1.063	12.78	4.08	36.66	18.75	10.06	16.75	3.75	10.52	14.00	77	106
16	30.34	15.72	12.25	0.88	9.00	4.50	0.34	1.13	1" - 8	21.25	NA	16	.05	10.00	4.12	25.50	1.063	14.97	4.46	39.84	20.22	10.06	18.22	3.75	10.52	14.00	132	163
18	32.27	16.87	13.40	0.81	8.50	4.25	0.41	1.25	1-1/8" - 7	22.75	1-1/8" - 7 x 1.0	16	.05	10.00	4.63	28.00	1.417	17.00	4.96	41.77	21.37	10.06	19.37	3.75	10.52	14.00	145	176
20	34.69	17.89	14.39	1.06	11.50	5.75	0.41	1.25	1-1/8" - 7	25.00	1-1/8" - 7 x 1.0	20	.075	13.00	5.12	30.50	1.811	18.86	5.45	48.37	25.36	12.84	22.36	5.13	13.84	18.00	187	246
24	40.80	20.78	17.28	1.25	11.00	5.50	0.53	1.38	1-1/4" - 7	29.50	1-1/4" - 7 x 1.25	20	.075	12.50	6.19	36.00	1.811	22.71	6.61	54.27	28.25	12.84	25.25	5.13	13.84	18.00	281	343
26	43.14	21.95	18.45	1.25	11.38	5.69	0.53	1.38	1-1/4" - 7	31.75	1-1/4" - 7 x 1.25	24	.075	13.00	6.38	38.25	1.811	24.73	6.80	56.61	29.41	13.83	26.41	5.75	15.06	18.00	383	449
30	49.00	24.64	20.64	1.38	12.50	6.25	0.66	1.38	1-1/4" - 7	36.00	1-1/4" - 7 x 1.25	28	.075	14.00	6.50	43.00	2.165	28.00	7.13	67.00	34.50	16.50	31.00	5.75	18.50	24.00	595	704
36	58.00	29.52	24.49	1.50	14.00	7.00	0.66	1.62	1-1/2" - 6	42.75	1-1/2" - 6 x 1.5	32	.100	15.00	7.88	50.00	2.165	34.00	8.63	74.97	24.49	16.50	34.00	5.75	18.50	24.00	893	1100
42	65.00	33.00	27.50	5.50	16.00	8.00	0.76	1.62	1-1/2" - 6	49.50	1-1/2" - 6 x 1.5	36	.125	17.00	9.68	57.00	2.953	39.50	10.43	85.50	24.49	18.00	36.00	6.50	19.00	26.00	1105	1364