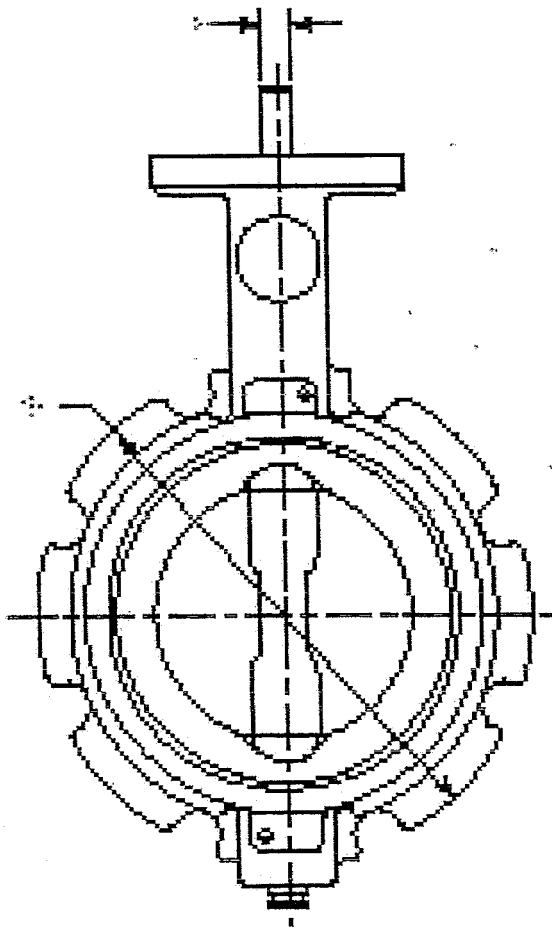


KEYSTONE FIGURE 601/602

INSTALLATION AND MAINTENANCE MANUAL



KEYSTONE FIGURE 601/602

Installation and Maintenance Instructions 2"-12" Figure 601/602 Butterfly Valve

INSTALLATION INSTRUCTIONS

Keystone butterfly valves are bi-directional, since control of fluid flow is equal in either direction, and are designed for installation between the faces of 125#/150# ANSI flanges. **DO NOT USE GASKETS.** The wafer bodies have locating lugs to ensure proper centering of the valve body when flange bolts are installed. Lug bodies have bolt hole locations same as mating flanges. The proper stud or bolt required by size is listed in the Stud and Bolt Specification on page 13.

Prior to installation, close the valve. Spread the flanges apart far enough to allow the valve to slip easily between the flanges. Insert the valve between the flanges. Be sure to center the valve and not damage the liner. Allow the flanges to return to their unspread state. Install and hand-tighten all flange bolts. Slowly open the valve, checking for free movement of the disc. If no obstruction is encountered, leave valve in the *open* position and tighten all flange bolts. Be certain to keep flange faces as parallel as possible during and after tightening bolts or studs. After final tightening, again check the valve for full opening and closing.

Lug style bodies used for dead end service must be installed as marked on the body (inlet-outlet).

MAINTENANCE

No regular maintenance or lubrication is required.

VALVE DISASSEMBLY

1. After removal of valve from the piping system, open the valve fully.
2. Remove the handle or actuator.
3. On sizes 2"-12", remove the stem retaining pins (6).
4. Pull out the upper stem (4).
5. Pull out the bottom stem (5).
6. Remove the disc (3) from the liner (2). Do not damage the disc edge.
7. Remove the liner (2).
8. If valve has bushings (7), remove by tapping with blunt instrument.
9. Inspect all components for wear and replace as required.

ORDER PARTS BY SIZE, ITEM NO. & DESCRIPTION

ITEM NO.	PART NAME	MATERIAL
1 A	Wafer Body	Cast Iron - ASTM A126 CL.B Ductile Iron - ASTM A536 65-45-12 Ductile Iron - ASTM A395 60-40-18
1B	Lug Body	Cast Iron - ASTM A126 CL.B Ductile Iron - ASTM A536 65-45-12 Ductile Iron - ASTM A395 60-40-18
2	Liner	Buna-N EPDM Viton [®]
3	Disc	Stainless Steel - ASTM A351 Aluminum Bronze - ASTM B148 C95400 Ductile Iron - ASTM A536 65-45-12
4	Drive Shaft	Stainless Steel - ASTM A586 Type 416 Stainless Steel - ASTM A276 Type 316
5	Disc	Stainless Steel - ASTM A586 Type 416 Stainless Steel - ASTM A276 Type 316
6	Retaining Pin	Steel
7	Upper Bearing	Bronze - ASTM B584 C93200

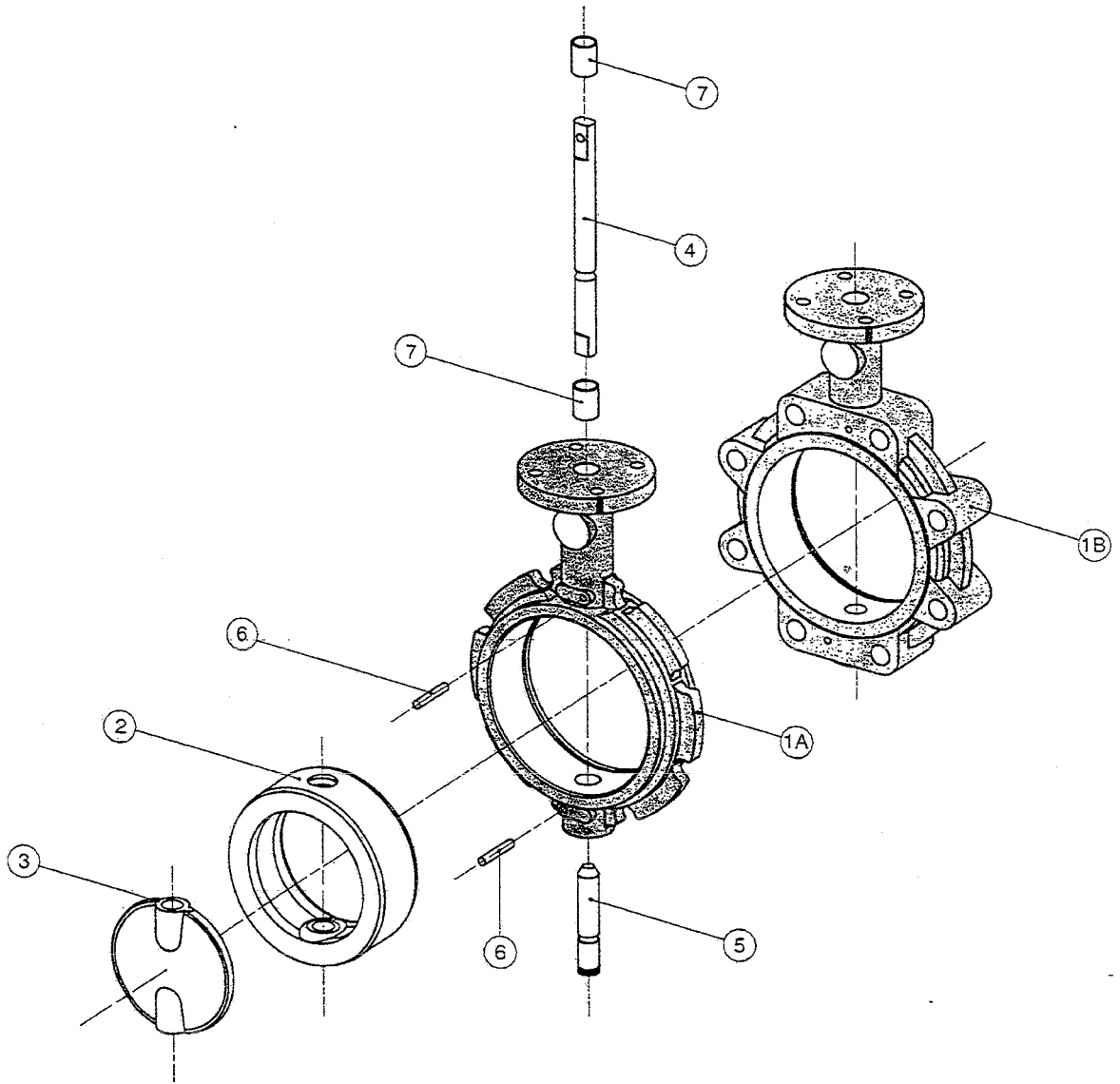
[®]Trademark of E.I. DuPont

VALVE ASSEMBLY

1. Clean all reusable parts.
2. If valve has bushings (7), tap one in from top of valve neck flange until it is about 1/4" from top surface. Tap the other in from inside the body seat bore into the bottom of the valve neck flange — about 1/4" from the bottom surface.
3. Apply a lubricant or soapy solution compatible with elastomers to facilitate assembly.
4. Insert liner (2) into body by pressing it into the body evenly. Be certain to line up the shaft holes and to place the elastomer free phenolic side of the liner so that it contacts the retention lip in the body when inserted on lug style bodies.
5. Insert disc (3) in open position into liner. Make certain broached end of disc is at the upper stem end of the body.
6. Coat the upper stem (4) with a general purpose lubricant & install into body.
7. Install bottom stem (5).
8. Install retaining pins (6) to both stems.
9. Install the operator.
10. Check assembly by opening & closing the valve several times.
11. Follow installation instructions for reinstalling the valve in the piping system.

KEYSTONE FIGURE 601/602

Figure 601/602 Butterfly Valve Parts — 2"-12" Sizes



KEYSTONE FIGURE 601/602

Installation and Maintenance Instructions 14"-24" Figure 601/602 Butterfly Valve

INSTALLATION INSTRUCTIONS

Keystone butterfly valves are bi-directional, since control of fluid flow is equal in either direction, and are designed for installation between the faces of 125#/150# ANSI flanges. Do not use gaskets. The wafer bodies have locating lugs to ensure proper centering of the valve body when flange bolts are installed. Lug bodies have bolt hole locations same as mating flanges. The proper stud or bolt required by size is listed in the Stud and Bolt Specification on page 13.

Prior to installation, close the valve. Spread the flanges apart far enough to allow the valve to slip easily between the flanges. Insert the valve between the flanges. Be sure to center the valve and not damage the liner. Allow the flanges to return to their unspread state. Install and hand-tighten all flange bolts. Slowly open the valve, checking for free movement of the disc. If no obstruction is encountered, leave valve in the *open* position and tighten all flange bolts. Be certain to keep flange faces as parallel as possible during and after tightening bolts or studs. After final tightening, again check the valve for full opening and closing.

Lug style bodies used for dead end service must be installed as marked on the body (inlet-outlet).

MAINTENANCE

No regular maintenance or lubrication required.

VALVE DISASSEMBLY

1. Remove valve from piping system.
2. Fully open the valve.
3. Remove the operator.
4. Remove the adjusting plug (8).
5. Remove the thrust washer (7).
6. Remove the retaining screw (6).
7. Remove the bottom shaft (5).
8. Remove the drive shaft (4).
9. Remove the disc (3).
10. Inspect the bearings (9 & 10) for wear. Remove if necessary.
11. Inspect the liner (2) for wear. Remove if necessary by tapping it out using a soft drift. Note: Liner can only be removed in the direction away from the retention lip in the body (1).
12. Inspect all components for wear and replace as required.

VALVE ASSEMBLY

1. Clean all parts.
2. Install the bearings (9 & 10) in the body. Align the hole in the upper bearing with the hole in the body (1) for the retaining screw (6).
3. Install liner (2) in the body (1) by locating the alignment rib on the liner with the alignment guide in the body and tapping the liner into the body.
4. Lubricate the sealing surfaces and the shaft holes of the liner with silicone lubricant.
5. Install the disc (3) in the open position.
6. Install the drive shaft (4).
7. Lubricate and install the bottom shaft (5).
8. Install the thrust washer (7).
9. Put a small amount of Loctite® #242 or equivalent on the threads of the adjusting screw (8) and install the screw by turning it into the body until the bottom shaft contacts the disc. Do not over tighten.
10. Install the retaining screw (6).
11. Follow installation instructions for re-installing the valve in the piping system.

For assembly drawing see page 17.

ORDER PARTS BY SIZE, ITEM NO. & DESCRIPTION

ITEM NO.	PART NAME	MATERIAL
1 A	Wafer Body	Cast Iron - ASTM A126 CL.B Ductile Iron - ASTM A536 65-45-12 Ductile Iron - ASTM A395 60-40-18
1B	Lug Body	Cast Iron - ASTM A126 CL.B Ductile Iron - ASTM A536 65-45-12 Ductile Iron - ASTM A395 60-40-18
2	Liner	Buna-N EPDM Viton [®]
3	Disc	Stainless Steel - ASTM A351 Aluminum Bronze - ASTM B148 C95400 Ductile Iron - ASTM A536 65-45-12
4	Drive Shaft	Stainless Steel - ASTM A586 Type 416 Stainless Steel - ASTM A276 Type 316
5	Bottom Shaft	Stainless Steel - ASTM A586 Type 416 Stainless Steel - ASTM A276 Type 316
6	Retaining Screw	Steel
7	Thrust Washer	Acetal
8	Plug	Cast Iron - ASTM A126 CL.B
9	Upper Bearing	Teflon [®] (Reinforced)
10	Lower Bearing	Teflon [®] (Reinforced)

[®]Trademark of E.I. DuPont.

KEYSTONE FIGURE 601/602

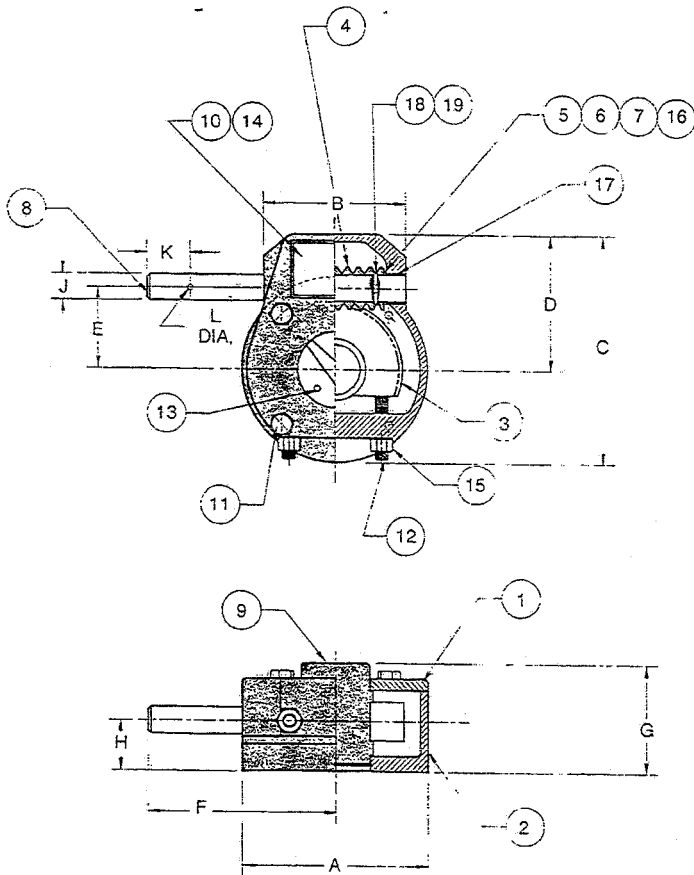
Gear Operators —

14" -24" Figure 601/602 Butterfly Valves

All gear operators are mounted directly to the valve. These units are totally enclosed, life-time lubricated, and gasketed. Standard units are weather-proof. Submersible service units are available on special request. All gear units feature high strength body, position indication, travel adjustment screws, ductile iron segment gears and high strength worm gears. Handwheel operators are standard.

GEAR BOX ADJUSTMENT

For each adjusting screw follow the procedure below.
 Back off lock nut part #15.
 Then back off adjusting screw part #12.
 Position valve. Turn stopscrew until it contacts segment gear part #3.
 Tighten lock nut.

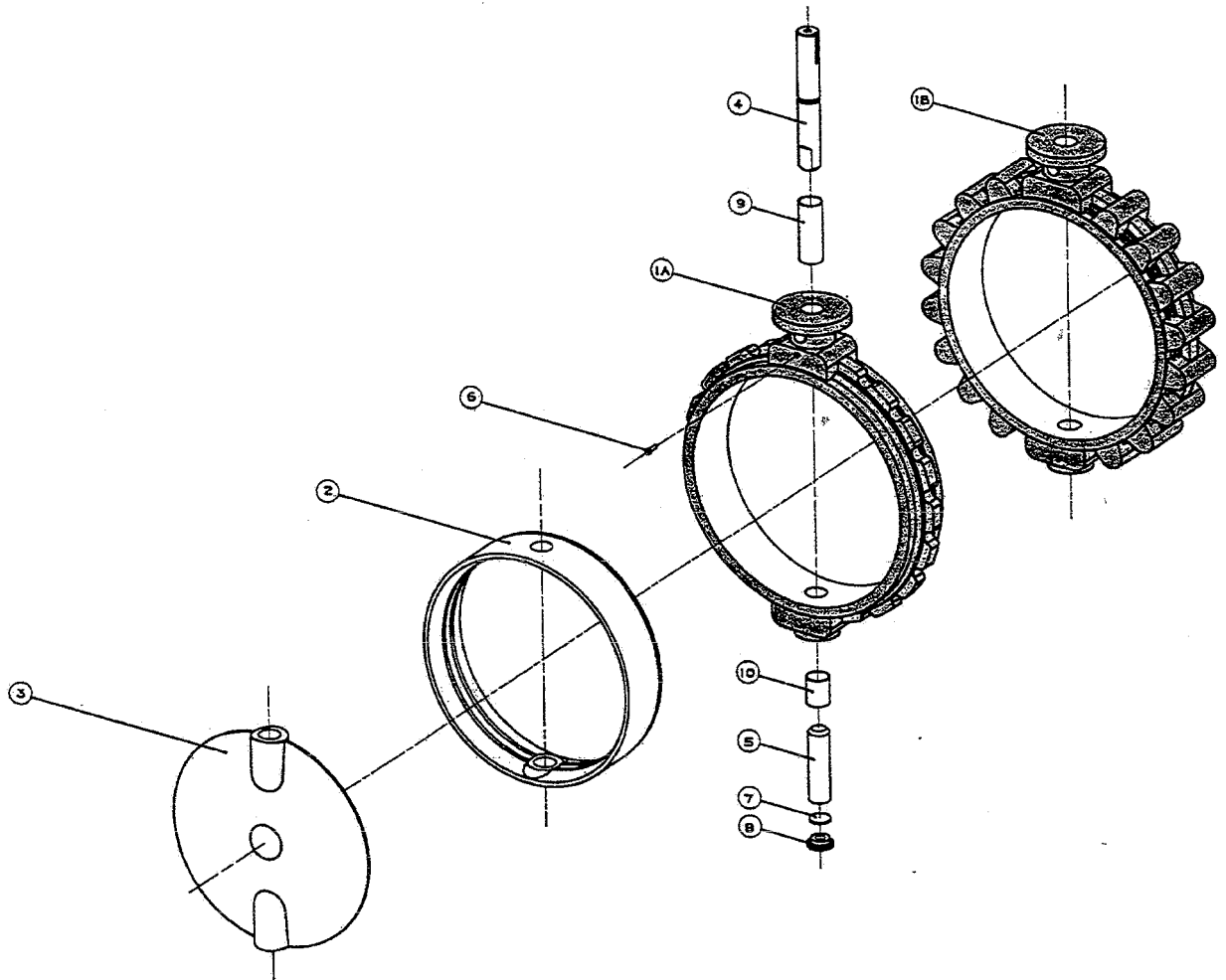


PART NO	PART NAME	MATERIAL
1	COVER	C.I ASTM A126
2	GEAR CASE	C.I ASTM A126
3	QUADRANT	DUCTILE IRON ASTM 536
4	WORM	STEEL SAE 1138-1140
5	WASHER	
6	SHIM	STEEL SAE 1016-1019
7	SHIM	STEEL SAE 1016-1019
8	INPUT SHAFT	STEEL SAE 1138-1140
9	INDICATOR CAP	PLASTIC
10	NAME PLATE	SS SAE 51442
11	SCREW	CARBON STEEL PLATED
12	STOPSCREW	STEEL SAE 4140
13	SCREW	CARBON STEEL PLATED
14	SCREW	CARBON STEEL PLATED
15	LOCKNUT	CARBON STEEL PLATED
16	WASHER	
17	BUSHING	BRONZE
18	TENSION PIN	STEEL
19	TENSION PIN	STEEL

VALVE SIZE	G. O. SIZE	HANDWHEEL DIA.	TURNS TO CLOSE	A	B	C	D	E	F	G	H	J	K	L	GEAR RATIO
14"-16"	GY	15"	10	6.00	5.50	7.25	5.00	3.02	13.00	3.62	1.55	.75	1.38	3/16	40:1
18"-20"	GA	15"	11.1	7.00	5.50	8.24	5.37	3.37	13.50	3.69	1.75	.88	1.38	1/4	46:1
24"	GC	18"	15	10.82	8.00	11.12	7.62	5.37	16.50	4.14	1.87	1.00	1.38	3/8	60:1

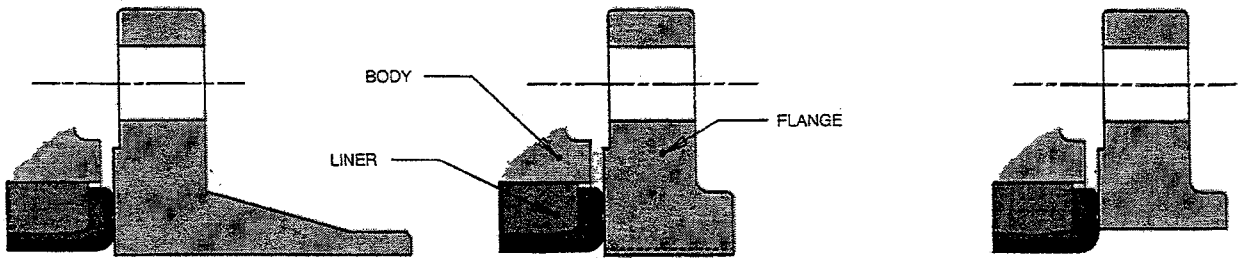
KEYSTONE FIGURE 601/602

Figure 601/602 Butterfly Valve Parts — 14"-24" Sizes

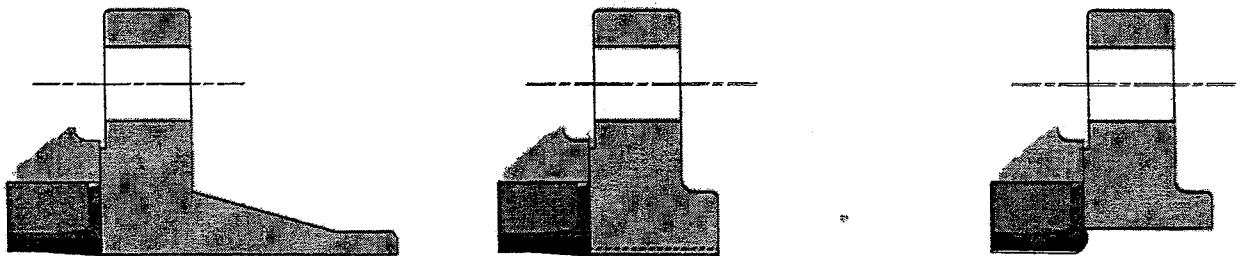


KEYSTONE FIGURE 601/602

Liner To Flange Interface Figure 601/602 Butterfly Valves



LINER UNCOMPRESSED



WELDING NECK

THREADED

SLIP-ON

LINER COMPRESSED

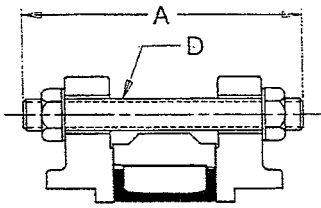
Butterfly Valve Weights (Lbs.)

		2	2½	3	4	5	6	8	10	12	14	16	18	20	24
Wafer Body	Lever* Operator	10	11	12	16	22	24	46	66	96	131	174	206	302	465
	Gear Operator	14	15	16	20	26	28	54	74	108	155	198	230	326	535
Lug Body	Lever Operator	13	15	15½	22	30	32	54	80	118	172	216	282	362	495
	Gear Operator	17	19	19½	26	34	36	62	88	130	196	240	306	386	565

*14"-24" sizes — weights are for no operator

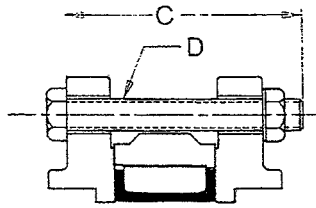
These weights are approximate and can vary with the make up of valves.

Stud and Bolt Specification: Figure 601/602 Butterfly Valve



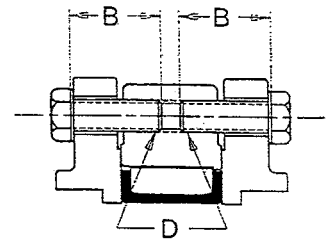
STUD

WAFER TYPE BUTTERFLY VALVE



ALTERNATE BOLT

WAFER TYPE BUTTERFLY VALVE

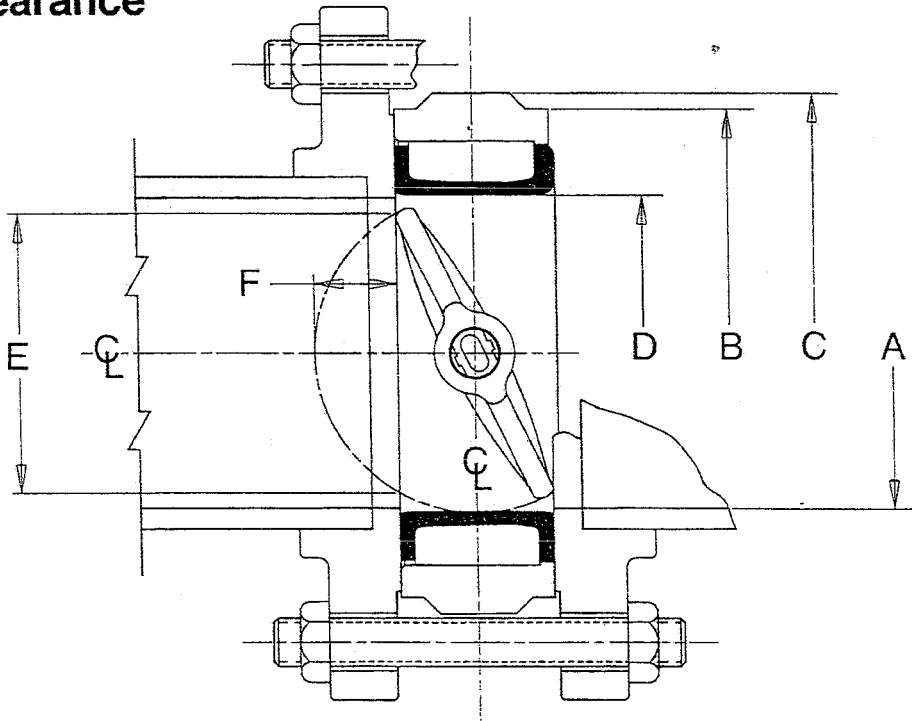


LUG TYPE BUTTERFLY VALVE

VALVE SIZE

DIM.	2"	2½"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"
A	5	5½	5½	5¾	6	6½	7	7½	8	8½	9½	10½	11	12½
B	1½	1½	1½	1¾	1¾	2	2	2¼	2½	2¾	3¼	3½	4	5
C	4	4½	4½	5	5	5	5½	6	7	7½	8	9	9½	11
D	⅝ -11 UNC	⅝ -11 UNC	⅝ -11 UNC	⅝ -11 UNC	¾ -10 UNC	¾ -10 UNC	¾ -10 UNC	⅞ -9 UNC	⅞ -9 UNC	1 -8 UNC	1 -8 UNC	1½ -7 UNC	1½ -7 UNC	1¾ -7 UNC
No. of Bolts (Wafer)	4	4	4	8	8	8	8	12	12	12	16	16	20	20
No. of Bolts (Lug)	8	8	8	16	16	16	16	24	24	24	32	32	40	40

Disc Clearance



VALVE SIZE

DIM.	DESCRIPTION	2"	2½"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"
A	SCH. 40 I. D. PIPE	2.07	2.47	3.07	4.03	5.05	6.07	7.98	10.02	12.00	13.13	15.00	16.88	18.81	22.63
B	RAISED FACE DIAMETER	3.75	4.31	5.12	5.42	7.44	8.50	10.75	13.12	15.44	16.75	19.00	21.00	23.00	27.25
C	VALVE BODY DIAMETER	4.12	4.84	5.34	6.81	7.77	8.75	11.00	13.38	16.02	17.50	20.06	21.44	23.69	28.06
D	SEAT I. D.	2.13	2.50	3.12	4.10	5.10	6.07	7.86	9.97	11.85	13.27	15.27	17.26	19.27	23.25
E	DISC CHORD	1.41	1.82	2.62	3.62	4.67	5.68	7.54	9.65	11.49	12.97	14.85	16.76	18.72	22.59
F	PROTRUSION INTO PIPELINE	.26	.39	.70	1.06	1.50	1.93	2.77	3.68	4.44	5.13	5.75	6.46	7.24	8.73

Note: When using Grinnell Butterfly Valve in pipe which has been lined, or pipe other than SCH. 40, verify disc clearance with pipe I.D.