



**Bray**<sup>®</sup>

**SERIES 30/31** Wafer/Lug  
50mm-500mm (2" - 20")

**BUTTERFLY VALVES**  
RESILIENT SEATED

# SERIES 30

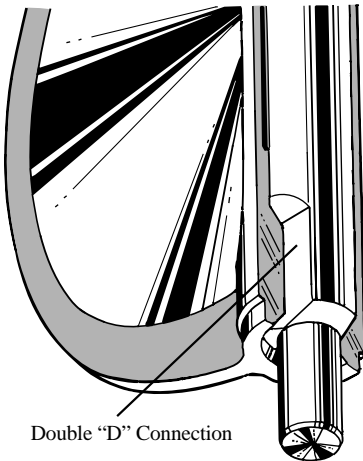
## 50mm–500mm (2"–20")

Bray® Controls is proud to offer a high quality line of butterfly valves to meet the requirements of today's market. Combining years of field application experience, research and development, Bray has designed many unique features in the Series 30/31 not previously available. The results are longer service life, greater reliability, ease of parts replacement and interchangeability of components.

### DISC AND STEM CONNECTION

(A) Features a high-strength through stem design. The close tolerance, double "D" connection that drives the valve disc is an exclusive feature of the Bray valve.

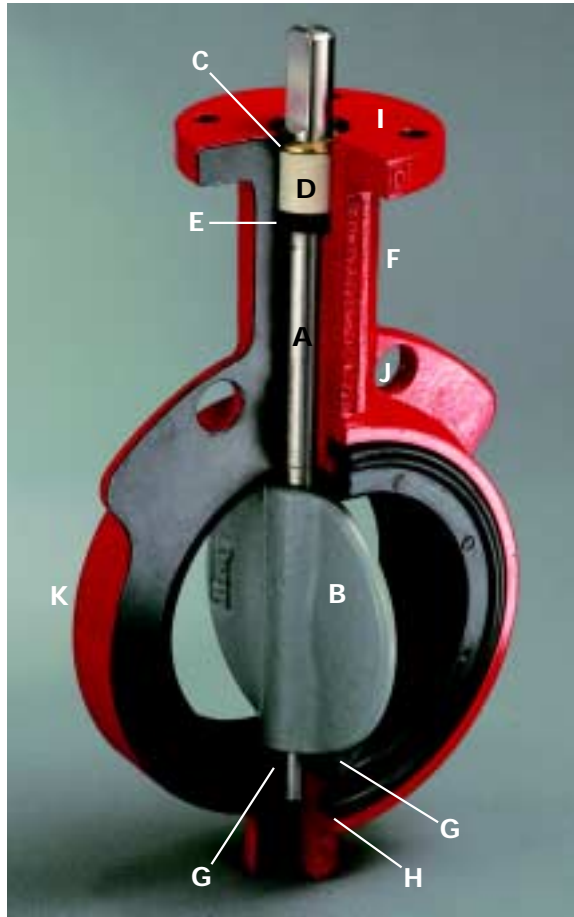
It eliminates stem retention components being exposed to the line media, such as disc screws and taper pins, which commonly result in leak paths, corrosion, and vibration failures. Disc screws or taper pins, due to wear and corrosion, often



Double "D" Connection

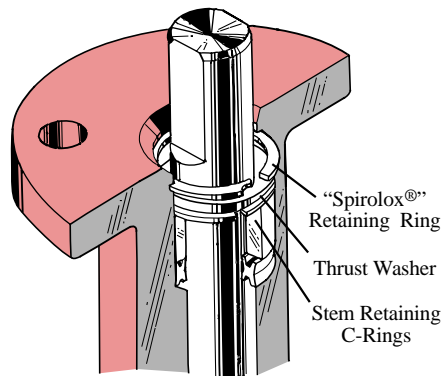
require difficult machining for disassembly. Disassembly of the Bray stem is just a matter of pulling the stem out of the disc. Without fasteners obstructing the line flow, the Series 30/31  $C_v$  values are higher than many other valves, turbulence is reduced, and pressure recovery is increased. The stem ends and top mounting flange are standardized for interchangeability with Bray actuators.

**DISC (B)** Casting is spherically machined and hand polished to provide a bubble-tight shut off, minimum torque, and longer seat life. The disc O.D. clearance is designed to work with all standard piping.



### STEM RETAINING ASSEMBLY (C)

The stem is retained in the body by means of a unique Stainless Steel "Spirolox®" retaining ring, a thrust washer and two C-rings, manufactured from brass as standard, stainless steel upon request. The retaining ring may be easily removed with a standard hand tool. The stem retaining assembly prevents unintentional removal of the stem during field service.



\*"Spirolox®" designation is a registered trademark of Kaydon Ring and Seal, Inc.

### STEM BUSHING (D)

Non-corrosive, heavy duty acetal bushing absorbs actuator side thrusts.

### STEM SEAL (E)

Double "U" cup seal design is self-adjusting and gives positive sealing in both directions. Prevents external substances from entering the stem bore.

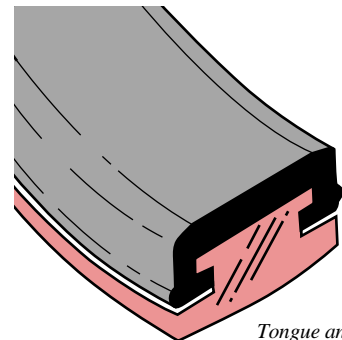
**NECK (F)** Extended neck length allows for 2" of piping insulation and is easily accessible for mounting actuators.

### PRIMARY AND SECONDARY SEALS (G)

The Primary Seal is achieved by an interference fit of the moulded seat flat with the disc hub. The Secondary Seal is created because the stem diameter is greater than the diameter of the seat stem hole. These seals prevent line media from coming in contact with the stem or body.

### BRAY UNIQUE SEAT DESIGN (H)

One of the valve's key elements is Bray's unique *tongue and groove* seat design. This resilient seat features lower torque than many valves on the market today and provides complete isolation of flowing media from the body. The tongue-and-groove seat to body retention method is superior to traditional designs, making field replacement simple and fast. The seat is specifically designed to seal with slip-on or weld-neck flanges. The seat features a molded O-ring which eliminates the use of flange gaskets. An important maintenance feature is that all resilient seats for Bray butterfly valves Series 20, 21, 30, 31 and 34 are completely interchangeable.



Tongue and Groove Design

## ACTUATOR MOUNTING FLANGE AND STEM CONNECTION (I)

Universally designed to ISO 5211 for direct mounting of Bray® power actuators and manual operators.

## FLANGE LOCATING HOLES (J)

Provide quick and proper alignment during installation.

**BODY (K)** One-piece wafer or lug style. Polyester coating for excellent corrosion resistance. Bray valve bodies meet 12 bar pressure ratings for hydrostatic test requirements.

## DESIGN FEATURES

Bray's Series 30 valve is a wafer version with flange locating holes, and the Series 31 is the companion lug version for dead-end service and other flange requirements. All Bray valves are tested to 110% of full pressure rating before shipment.

A major design advantage of Bray valve product lines is international compatibility. The same valve is compatible with most world flange standards - BS EN 1092-1, PN 10/16, DIN ND, ANSI 125/150, BS10 Table D/E, AS 2129. In addition the valves are designed to comply with ISO 5752 face-to-face and ISO 5211 actuator mounting flanges. Therefore, one valve design can be used in many different world markets.

Due to a modular concept of design, all Bray® handles, manual gear operators and pneumatic and electric actuators mount directly to Bray valves. No brackets or adapters are required.



Bray interchangeability and compatibility offers you the best in uniformity of product line and low-cost performance in the industry today.

## POLYESTER COATING CORROSION PROTECTION

Bray's standard product offers valve bodies with a polyester coating, providing excellent corrosion and wear resistance to the valve's surface. The Bray polyester coating is a hard, gloss red finish.

Chemical Resistance – resists a broad range of chemicals including: dilute aqueous acids and alkalies, petroleum solvents, alcohols, greases and oils. Offers outstanding resistance to humidity and water.

Weatherability – outdoor tested resistant to ultra-violet radiation.

Abrasion Resistance – excellent resistance to abrasion.

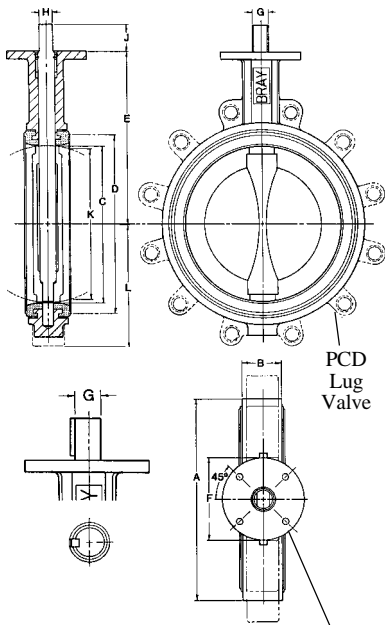
Impact Resistance – withstands impact without chipping or cracking.

## NYLON 11 COATING

Optionally available for valve bodies where outstanding protection and performance is needed. A thermoplastic produced from a vegetable base, this coating is inert to fungus growth and molds. Nylon 11 is *USDA Approved*, as well as certified to ANSI/NSF 61 for water service.

Corrosion Resistance – superior resistance to a broad range of chemical environments. Salt spray tested in excess of 2,000 hours and seawater immersion tested for over 10 years without corrosion to metal substrates.

Nylon 11 features a very low coefficient of friction and excellent resistance to impact and ultra-violet radiation.



See chart for Actuator Mounting Flange Drilling.

### DIMENSIONS SERIES 30 Wafer

Valve Size mm ins	A	B	C	D	E	F	Mounting Flange Drig.			G	H	J	K	L	
							PCD	No. Holes	Hole Dia.						
50	2	94	43	51	72	140	90	70	4	9.5	14	10	32	33	51
65	2 1/2	106	46	64	85	152	90	70	4	9.5	14	10	32	49	59
80	3	124	46	76	102	159	90	70	4	9.5	14	10	32	65	67
100	4	154	52	102	131	178	90	70	4	9.5	16	11	32	91	87
125	5	181	56	127	156	190	90	70	4	9.5	19	13	32	118	107
150	6	206	56	146	178	203	90	70	4	9.5	19	13	32	138	120
200	8	267	60	197	241	241	150	125	4	14	22	16	32	189	153
250	10	324	68	248	291	273	150	125	4	14	30	22	50	242	188
300	12	378	78	298	342	311	150	125	4	14	30	22	50	291	213

Valve Size mm ins	A	B	C	D	E	F	Mounting Flange Drig.			G	J	KEY SIZE	K	L	
							PCD	No. Holes	Hole Dia.						
350	14	430	78	337	388	346	150	125	4	14	35	51	10x10	331	238
400	16	484	102	387	442	375	150	125	4	14	35	51	10x10	337	273
450	18	537	108	438	495	406	210	165	4	21	50	64	10x12	428	305
500	20	591	127	489	548	438	210	165	4	21	50	64	10x12	475	348

Actuator Mounting Flange ISO recess dimensions.  
 50mm-150mm valves F07  
 200mm-400mm valves F12  
 450mm-500mm valves F16

\*NOTE: Lug bolting data for PN10 rated valves. For PN16 ratings, please consult factory.

### SERIES 31 Lug

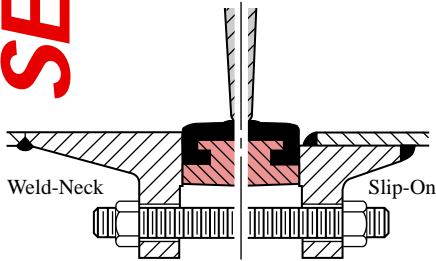
Lug Bolting Data*		
PCD	No. Holes	ISO Count Threads
125	4	M16
145	4	M16
160	8	M16
180	8	M16
210	8	M16
240	8	M20
295	8	M20
350	12	M20
400	12	M20

Lug Bolting Data*		
PCD	No. Holes	ISO Count Threads
460	16	M20
515	16	M24
565	16	M24
620	20	M24

# SELECTION DATA

## FLANGE REQUIREMENTS

Bray valves are designed for installation between ISO PN 10/16, DIN ND, ANSI 125/150, BS10 Table D/E and AS 2129 weld neck or slip-on flanges, either flat faced or raised faced. While weld-neck flanges are recommended, Bray has specifically designed its valve seat to work with slip-on flanges, thus eliminating common failures of other butterfly valve designs. When using raised face flanges be sure to properly align valve and flange. Type C stub-end flanges are not recommended.



## PRESSURE RATINGS\*

For bi-directional bubble-tight shut off, disc in closed position:

mm	Inches	bar	psig
50-300	2-12	12	175
350-500	14-20	10	150

## For Dead-end Service Applications:

With *downstream flanges installed* the dead-end pressure ratings are equal to valve bi-directional ratings as stated above. With no downstream flanges the dead-end pressure rating for 50mm-300mm valves is 5 bar (75 psi) for 350mm-500mm valves it is 3.5 bar (50psi).

\*Pressure Ratings are based on standard disc diameters. For low pressure application, Bray offers a standard reduced disc diameter to decrease seating torques and to extend seat life, thus increasing the valve's performance and reducing actuator costs for the customer.

## VELOCITY LIMITS

For On/Off Services:

Fluids – 9m/s (30 ft/sec)

Gases – 54m/s (175 ft/sec)

## C<sub>v</sub> VALUES – VALVE SIZING COEFFICIENT

Valve Size		Disc Position (degrees)								
mm	ins	90°	80°	70°	60°	50°	40°	30°	20°	10°
50	2	144	114	84	61	43	27	16	7	1
65	2½	282	223	163	107	67	43	24	11	1.5
80	3	461	364	267	154	96	61	35	15	2
100	4	841	701	496	274	171	109	62	27	3
125	5	1376	1146	775	428	268	170	98	43	5
150	6	1850	1542	1025	567	354	225	129	56	6
200	8	3316	2842	1862	1081	680	421	241	102	12
250	10	5430	4525	2948	1710	1076	667	382	162	19
300	12	8077	6731	4393	2563	1594	1005	555	235	27
350	14	10538	8874	5939	3384	2149	1320	756	299	34
400	16	13966	11761	7867	4483	2847	1749	1001	397	45
450	18	17214	14496	10065	5736	3643	2237	1281	507	58
500	20	22339	18812	12535	7144	4536	2786	1595	632	72

C<sub>v</sub> is defined as the volume of water in U.S.G.P.M. that will flow through a given restriction or valve opening with a pressure drop of one (1) p.s.i. at room temperature. Recommended control angles are between 25°–70° open. Preferred angle for control valve sizing is 60°–65° open.

## EXPECTED SEATING/UNSEATING TORQUES (Nm)

Valve Size		Full-Rated Pressure Valves				Reduced Disc Diameter
mm	ins	Δ P (Bar)				Δ P (Bar)
		3.5	7	10	12	3.5
50	2	14	15	15	16	—
65	2½	22	23	24	25	—
80	3	30	31	33	34	20
100	4	45	48	51	53	30
125	5	70	76	82	86	47
150	6	91	104	114	119	61
200	8	168	187	207	217	112
250	10	254	286	318	334	170
300	12	388	440	491	516	259
350	14	562	647	733	—	375
400	16	727	875	1022	—	485
450	18	897	1124	1352	—	598
500	20	1170	1465	1760	—	780

Valve Torque Rating – Bray has classified valve torque ratings according to 3 types: non-corrosive lubricating service, general service, and severe service. Torques listed above are for general services. Consult Bray for torque information corresponding to specific applications.

TO USE TORQUE CHART, NOTE THE FOLLOWING:

1) For Bray valves, Series 20, 21, 30, 31 and 34.  
 2) Review Technical Bulletin No. 1001, Expected Seating/Unseating Torques, for explanation of the three service classes and their related seating/unseating torque values for given pressure differentials of Full-Rated and Reduced Disc Diameter valves.

3) Dynamic Torque values are not considered. See Technical Bulletin No. 1002 for evaluation of Dynamic Torque values vs. Seating/Unseating Torque values.  
 4) Safety factor included, but may vary dependant of process conditions - consult factory.

# SPECIFICATIONS

## RECOMMENDED SPECIFICATIONS FOR BRAY SERIES 30/31 SHALL BE:

- Polyester coated, cast iron, wafer or lug bodies.
- With flange locating holes that meet ANSI Class 125/150, BS10 Tables D/E, BS4504 NP 10/16, DIN ND10/16 and AS 2129.
- Through-stem direct drive double "D" design requiring no disc screws or pins to connect stem to disc with no possible leak paths in disc/stem connection.
- Stem mechanically retained in body neck and no part of stem or body exposed to line media.
- Tongue-and-groove seat design with primary hub seal and a moulded O-ring suitable for weld-neck and slip-on flanges. Seat totally encapsulates the body with no flange gaskets required.
- Spherically machined, hand polished disc edge and hub for minimum torque and maximum sealing capability.
- Equipped with non-corrosive bushing and self-adjusting stem seal.
- Bi-directional and tested to 110% of full rating.
- No field adjustment necessary to maintain optimum field performance.
- The valve shall be Bray Series 30 wafer / 31 lug or equal.

## WEIGHTS

Valve Size		Series 30
mm	ins	
50	2	2.95
65	2 1/2	3.86
80	3	4.31
100	4	5.44
125	5	7.26
150	6	9.07
200	8	15.90
250	10	22.70
300	12	39.50
350	14	53.50
400	16	83.90
450	18	96.20
500	20	139.00

Weights are in kgs.

## MATERIALS SELECTION

50mm-500mm (2" - 20")

### BODY:

- Cast Iron ASTM A126 Class B
- Ductile Iron DIN 1693 GGG40•3 (ASTM -A395 Grade 60-40-18)
- Carbon Steel ASTM A216 WCB
- Aluminum ASTM B26

### SEAT:

- Buna-N – Food Grade
- EPDM – Food Grade
- FKM\*
- White Buna-N – Food Grade

### STEM:

- 416 Stainless Steel ASTM A582 Type 416
- 304 Stainless Steel ASTM A276 Type 304
- 316 Stainless Steel ASTM A276 Type 316
- Monel K500

### DISC:

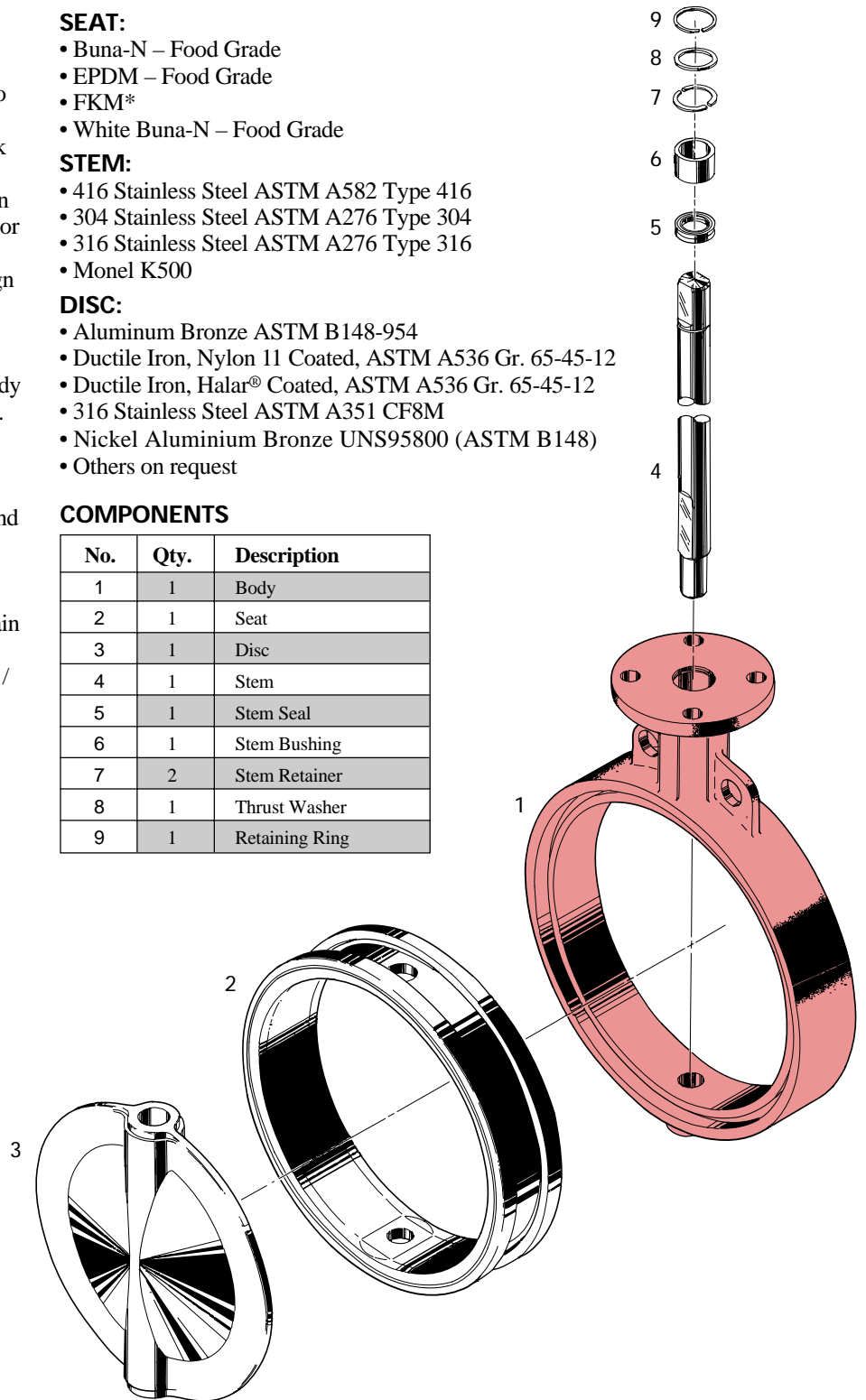
- Aluminum Bronze ASTM B148-954
- Ductile Iron, Nylon 11 Coated, ASTM A536 Gr. 65-45-12
- Ductile Iron, Halar® Coated, ASTM A536 Gr. 65-45-12
- 316 Stainless Steel ASTM A351 CF8M
- Nickel Aluminium Bronze UNS95800 (ASTM B148)
- Others on request

## COMPONENTS

No.	Qty.	Description
1	1	Body
2	1	Seat
3	1	Disc
4	1	Stem
5	1	Stem Seal
6	1	Stem Bushing
7	2	Stem Retainer
8	1	Thrust Washer
9	1	Retaining Ring

## TEMPERATURE RANGE OF SEATS

Type	Maximum	Minimum
EPDM	121°C (+250°F)	-40°C (-40°F)
Buna-N	100°C (+212°F)	-18°C (0°F)
FKM*	204°C (+400°F)	-18°C (0°F)



\*FKM is the ASTM D1418 designation for Fluorinated Hydrocarbon Elastomers (also called Fluoroelastomers).

Hastelloy® is a registered trademark of Haynes International, Inc.

Halar® is a registered trademark of Ausimont U.S.A., Inc.

# ASSEMBLY

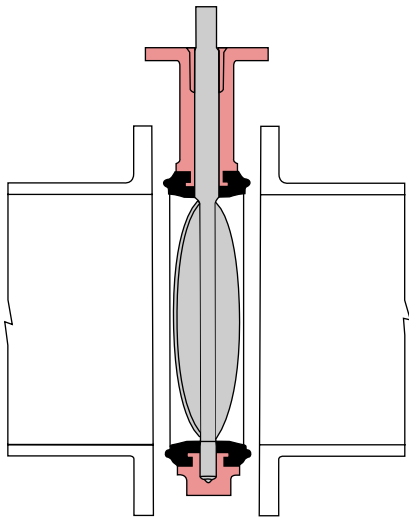
## INSTALLATION

Position the disc in the partially open position, maintaining the disc within the body face-to-face. Place the body between the flanges and install flange bolts. *Do not use flange gaskets.* Before tightening flange bolts, carefully open the disc to the full open position to ensure proper alignment and clearance of the disc O.D. with the adjacent pipe I.D. Leave disc in the full open position and tighten flange bolts per required specification. Once bolts are

tightened, carefully rotate disc to closed position to ensure disc O.D. clearance.

## MAINTENANCE AND REPAIR

The many Bray features minimize wear and maintenance requirements. No routine lubrication is required. All components – stem, disc, seat, bushing, stem seal, etc., are field replaceable, no adjustment is needed. If components require replacement, remove the valve from the line by placing the disc near the closed position, spread the flanges, support the valve, then remove the flange bolts. No valve maintenance, including removal of manual or power actuators, should be performed until the piping system is completely depressurized.

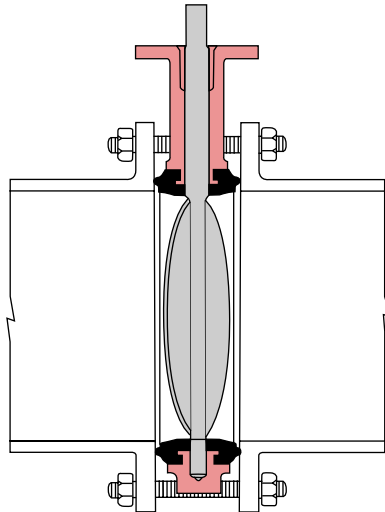


Disc in the Near Closed Position

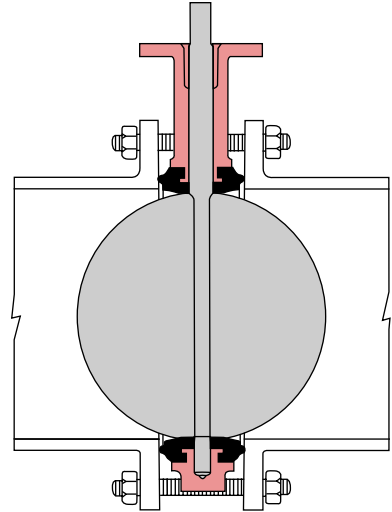
All statements, technical information, and recommendations in this bulletin are for general use only. Consult Bray representatives or factory for the specific requirements and material selection for your intended application. The right to change or modify product design or product without prior notice is reserved.

United States patent number 5,152,501.

Other patents issued and applied for worldwide.



Disc in the Partially Open Position



Disc in the Full Open Position

## DISASSEMBLY

Remove the handle, gear operator, or actuator from actuator mounting flange. Remove “Spirolox®” retaining ring. Remove stem with its thrust washer and two C-ring stem retainers. Remove bushing and seal. Remove the disc from the seat, protecting disc edge at all times. Push the seat into an oval shape, then remove the seat from the body.

## ASSEMBLY

Push the valve seat into an oval and push it into the body with seat stem holes aligned to body stem holes. Push stem into the stem hole of body. For aid in inserting disc, slightly protrude stem beyond the I.D. of the top of the seat. Install a light coating of foodgrade silicone oil (for silicone free applications use soap and water) on the I.D. of seat. Insert the disc into the seat by lining up the disc hole with the stem hole of the seat. Note: the broached double “D” flats

in the disc must be toward the bottom of valve body. (Take special care when lining disc up with stem.) With a downward pressure and rotating the stem back and forth, push the stem until the stem touches the bottom of the body stem hole. Make certain that when pushing the stem through disc bottom, the broached flats of stem and disc are aligned. After the stem has engaged the disc, but before the stem is firmly seated in the body, replace the stem seal and bushing. Install the two C-ring stem retainers in the groove in the stem and thrust washer on top of the C-rings. Seat the stem firmly in the body and install the “Spirolox®” retaining ring back into position.

### DISTRIBUTOR

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