FLOWSERVE

Anchor/Darling and Durco
Butterfly Valves for Power Generation

Experience In Motion

Why Flowserve Anchor/Darling and Durco Butterfly Valves?

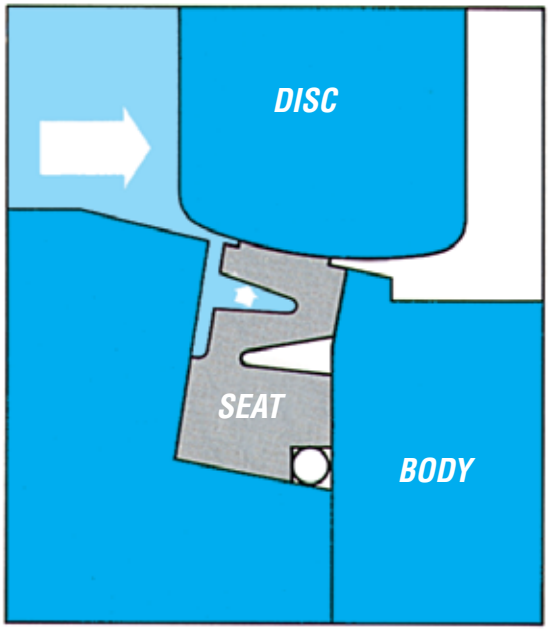
Flowserve Anchor/Darling and Durco butterfly valves have a high-performance, compact, user-friendly design that offers a value that is unsurpassed.

The use of a single-offset shaft (Anchor/Darling) provides for much lower operating torques than double or triple offset designs. The combination of relatively low operating torque and a compact design make it the choice for the replacement of original equipment, particularly where a customer desires to employ their original actuators.

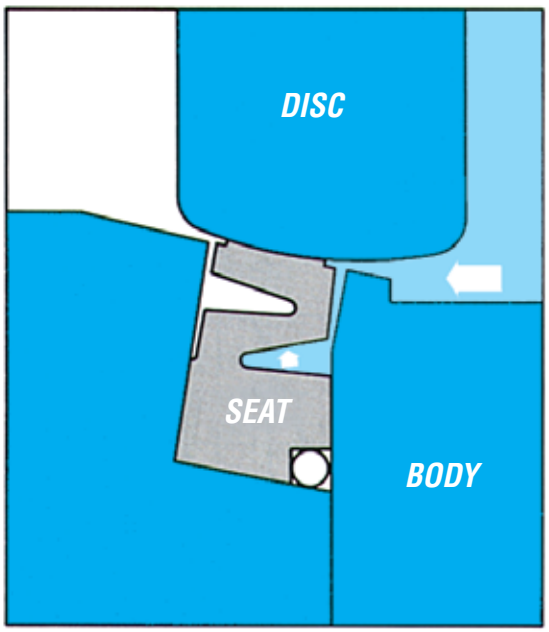
The standard body configuration is wafer or lugged for installation between ANSI B16.5 flanges. Special configurations are also available. Face-to-face dimensions can easily be customized to match those of the original equipment. Unless depicted otherwise, standard face-to-face dimensions are in accordance with MSS-SP-67.

Precision-machined valves provide bubble-tight shut-off in both directions. Valves are suitable for vacuum service and pressures to 1440 psig. The advanced seat design assures that seating stress becomes proportionally greater with increasing differential pressure. The unique design of the disc and seat provides a level of performance far exceeding other wafer-type designs. The seat is configured so that it is inherently flexible, which causes it to be self-compensating for wear and immune to compression setting, which plagues many resilient-seated designs.

As shown in the following sketches, the “accordion” configuration of the seat allows it to flex radially as closure occurs, creating a contact force between the disc and seat. Line pressure then serves to enhance sealing by exerting an inward force via a specially-designed cavity in the seat. Increased line pressure thereby enhances sealing capability. It is this sealing action that assures continuous bubble-tight closure. When the direction of flow is reversed, the cavity on the opposite side of the seat functions in a similar manner. The O-ring is an independent secondary safeguard to protect against leakage.

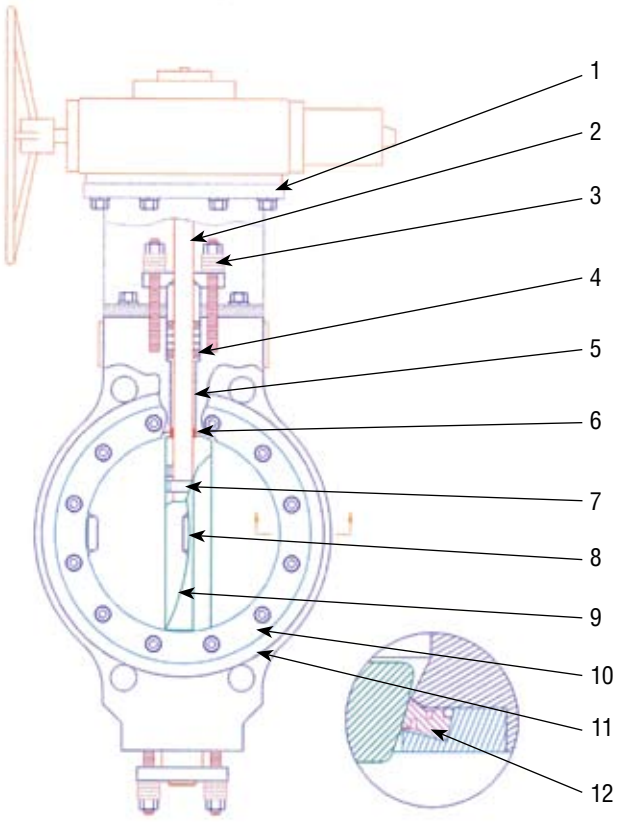


Fluid pressure forces the seat into the disc



… even when the direction of the flow is reversed

Features and Benefits of Anchor/Darling Butterfly Valves



1 Rugged actuator mounting bracket is adaptable to virtually any actuator configuration desired, including owner's original equipment.

2 Single-offset shaft eliminates unbalanced torque effects prevalent with double or triple offset designs, resulting in low operating torque requirements and true bi-directional sealing capability.

3 Available with live-loading of packing.

4 Industry-proven stuffing box arrangement to assure sealing integrity.

5 Anti-galling bronze bushings provide optimization of wear and frictional properties. Available with optional graphite-impregnated bushings for exceptionally low operating torque in particulate-laden service.

6 Wear-resistant thrust washers maintain proper location of disc, resulting in prolonged seat life and lower operating torque.

7 High-capacity disc pins are loaded in bearing rather than shear. Close-tolerance fit eliminates all backlash between the disc and stem.

8 Available with optional internal disc stop for over-travel protection.

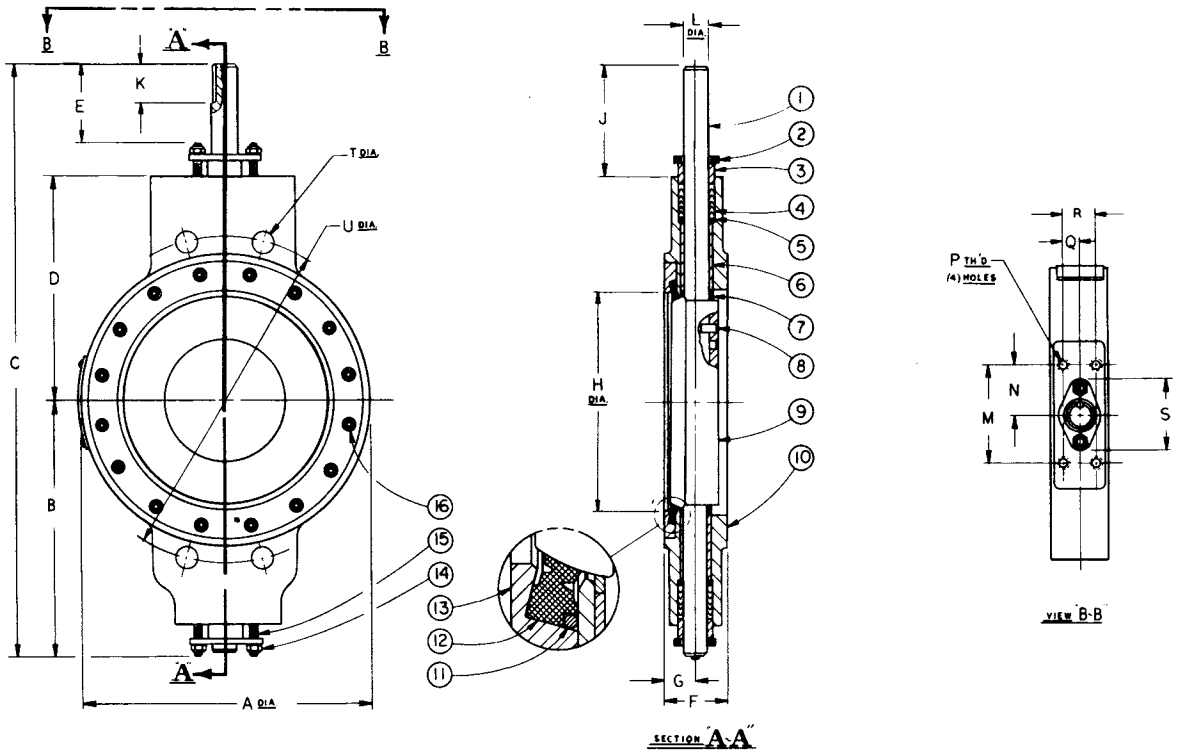
9 Streamlined disc for maximum Cv and minimum hydrodynamic torque.

10 Readily-removable seat retainer allows quick and easy replacement of valve seat.

11 Symmetrical body configuration permits the use of identical parts for top and bottom stuffing boxes. Minimizes spare parts inventory and eliminates confusion during maintenance.

12 Inherently-flexible seat reduces operating torque and provides bi-directional sealing at extremely low pressures. Seat is pressure-assisted at higher pressures. Available in a variety of materials to assure compatibility with service conditions.

3" – 10" Class 150/300 Wafer Valve

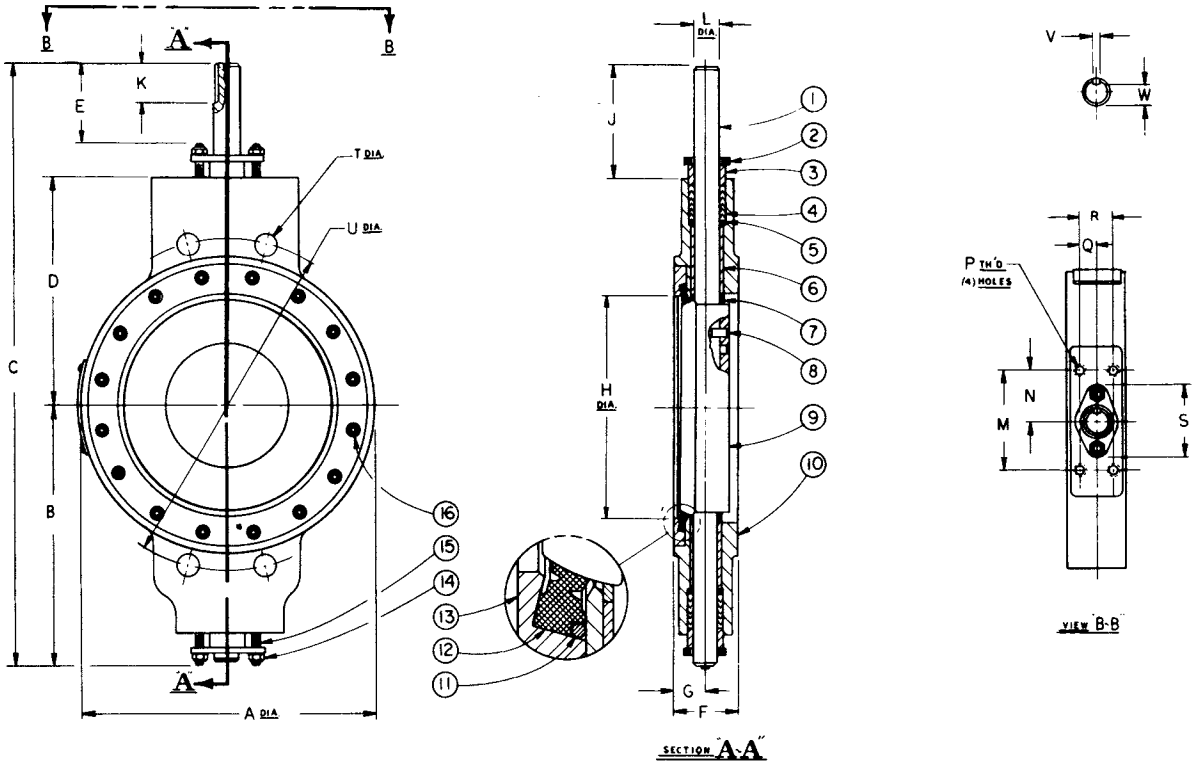


Dimensions (inches)

VALVE SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S
3	5 1/8	5 7/8	12 1/2	4 7/8	3/4	1 29/32	1 1/16	2 13/16	1 3/4	9/16	.499	3 1/8	1 9/16	3/8-16	7/16	7/8	2 1/4
4	6 3/4	7 1/16	15	6	3/4	2 1/8	1 1/16	3 7/8	1 3/4	9/16	.624	3 1/2	1 3/4	3/8-16	11/16	1 3/8	2 1/4
6	8 7/8	8	17	7 1/4	1	2 1/4	1 1/4	5 3/4	2	9/16	.873	3 1/4	1 5/8	3/8-16	7/8	1 1/2	2 11/16
8	10 7/8	10 1/2	19	7 1/2	1 3/8	2 1/2	1 7/16	7 5/8	2 5/8	5/8	1.124	4	2	3/8-16	1	1 11/16	3 3/16
10	13 1/8	13 1/8	25	9 1/2	1 5/16	2 13/16	1 21/32	9 17/32	2 5/8	1 1/4	1.250	4	2	3/8-16	1 1/16	1 11/16	3 3/16

NOTE: Dimensions are approximate and may vary, always consult installation drawing.

12" – 20" Class 150 Wafer Valve



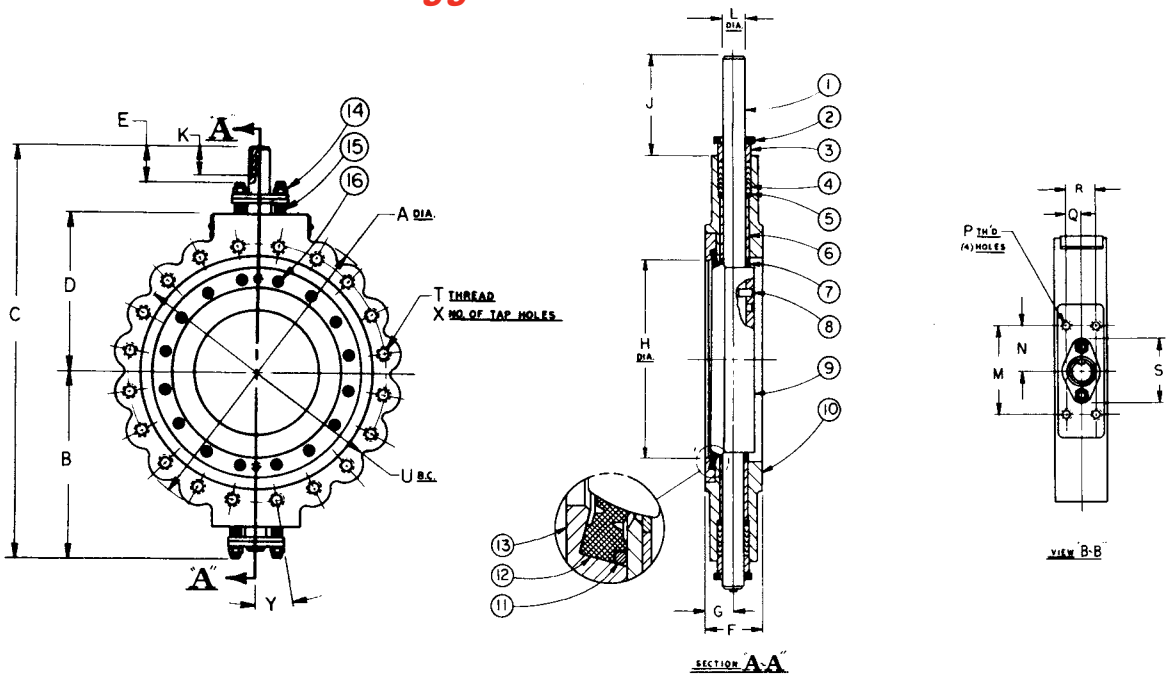
Dimensions (inches)

VALVE SIZE	A	B	C	D	E	F	G	H	J	K
12	15 3/32	8 21/32	21 11/16	10	1 13/32	3 3/16	1 25/32	11 13/16	3 1/32	1 3/8
14	16 3/8	9 25/32	24 9/16	11 1/8	2 3/32	3 3/16	1 29/32	12 29/32	3 21/32	2
16	20	14 5/8	32 13/16	13 1/8	3 5/16	4 1/8	1 29/32	14 25/32	5 1/16	3 1/8
18	21 1/4	15 1/4	34 1/16	13 3/4	3 5/16	4 5/8	2 1/16	16 23/32	5 1/16	3 3/8
20	23 1/4	17 3/8	38 3/16	15 3/4	3 7/16	5 1/8	2 7/32	18 11/16	5 1/16	3 3/8

VALVE SIZE	L	M	N	P	Q	R	S	T	U	V	W
12	1.250	4 1/2	2 1/4	1/2-13	1 1/16	1 3/4	3 1/4	1	8 1/2	.375	1.025
14	1.375	5 1/4	2 5/8	5/8-11	1 3/16	1 13/16	3 5/8	1 1/8	9 3/8	.375	1.153
16	1.375	4 3/4	2 3/8	5/8-11	1 3/8	2 3/4	4 1/2	1 1/8	21 1/4	.375	1.163
18	1.500	4 3/4	2 3/8	5/8-11	1 3/8	2 3/4	3 7/8	1 1/4	22 3/4	.375	1.287
20	1.750	4 3/4	2 3/8	5/8-11	1 3/8	2 3/4	4 1/2	1 1/4	25	.375	1.540

NOTE: Dimensions are approximate and may vary, always consult installation drawing.

3" – 20" Class 150 Lugged Valve

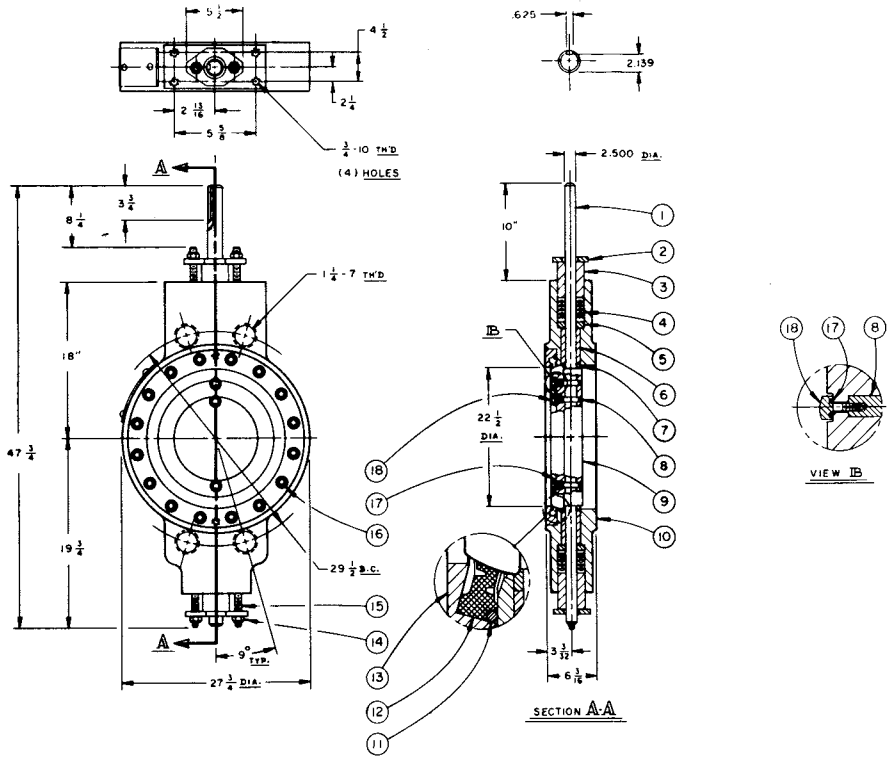


Dimensions (inches)

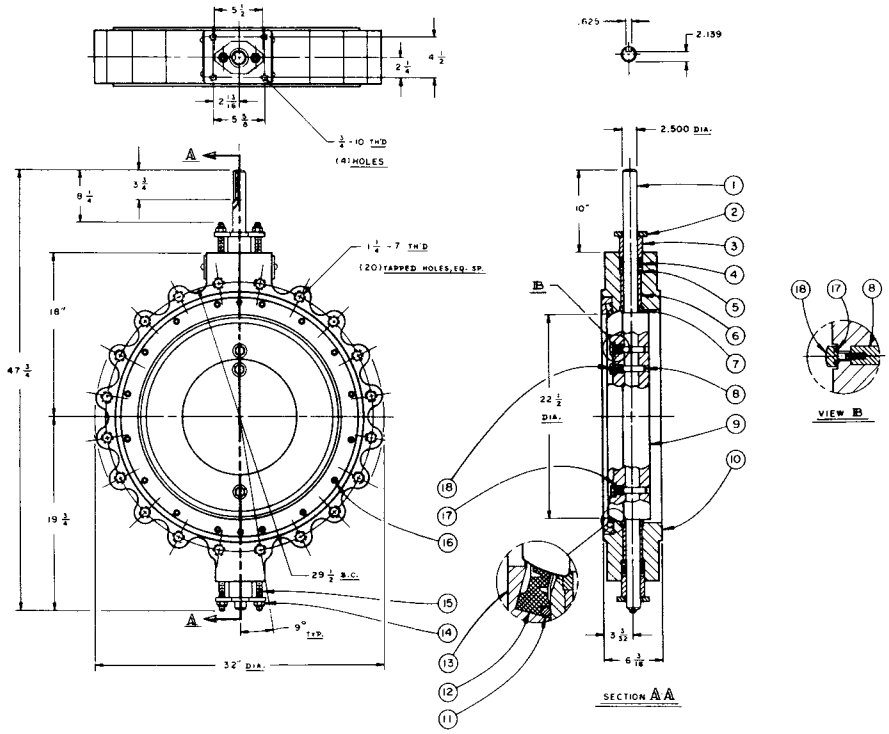
VALVE SIZE	A	B	C	D	E	F	G	H	J	K	L	M
3	7½	3 5/32	9 25/32	4 7/8	½	1 31/32	1 3/32	2 13/16	1 3/4	9/16	.499	3 1/8
4	9	4 29/32	12 13/32	5 3/4	5/8	2 1/8	1 1/16	3 7/8	1 3/4	9/16	.624	3½
6	11	5 21/32	14 29/32	7 1/4	29/32	2 1/4	1 1/4	5 3/4	2	9/16	.873	3 1/4
8	13½	6 15/16	18 1/16	8½	1 3/8	2½	1 15/32	7 5/8	2 5/8	5/8	1.125	4
10	16	8 13/32	19 17/32	8½	1 5/16	2 13/16	1 21/32	9 13/16	2 5/8	1 1/4	1.125	4
12	19	9 27/32	22 7/8	10	1 13/32	3 3/16	1 25/32	11 13/16	3 1/32	1 3/8	1.250	4½
14	21	10 27/32	25 5/8	11 1/8	2 3/32	3 3/16	1 29/32	12 29/32	3 21/32	2	1.375	5 1/4
16	23½	14 5/8	32 13/16	13 1/8	3 9/16	4 1/8	1 29/32	14 25/32	5 1/16	3 1/8	1.375	4 3/4
18	25	15 1/4	34 1/16	13 3/4	3 9/16	4 5/8	2 1/16	16 23/32	5 1/16	3 3/8	1.500	4 3/4
20	27½	17 3/8	38 3/16	15 3/4	3 7/16	5 1/8	2 7/32	18 11/16	5 1/16	3 3/8	1.750	4 3/4

VALVE SIZE	N	P	Q	R	S	T	U	V	W	X	Y
3	1 9/16	3/8-16	7/16	7/8	2 1/4	5/8-11	6	.125	—	4	45°
4	1 3/4	3/8-16	11/16	1 3/8	2 1/4	5/8-11	7½	.188	—	4	22½°
6	1 5/8	3/8-16	7/8	1½	2 11/16	3/4-10	9½	.250	—	8	22½°
8	2	3/8-16	1	1 11/16	3 3/16	3/4-10	11 3/4	.250	—	8	22½°
10	2	3/8-16	1 1/16	1 11/16	3 3/16	7/8-9	14 1/4	.250	.978	12	15°
12	2 1/4	1/2-13	1 1/16	1 3/4	3 1/4	7/8-9	17	.375	1.025	12	15°
14	2 5/8	5/8-11	1 3/16	1 13/16	3 5/8	1"-8	18 3/4	.375	1.153	12	15°
16	2 3/8	5/8-11	1 3/8	2 3/4	4½	1"-8	21 1/4	.375	1.163	16	11 1/4°
18	2 3/8	5/8-11	1 3/8	2 3/4	3 7/8	1 1/8-8	22 3/4	.375	1.287	16	11 1/4°
20	2 3/8	5/8-11	1 3/8	2 3/4	4½	1 1/8-8	25	.375	1.540	20	9°

24" Class 150 Wafer Valve

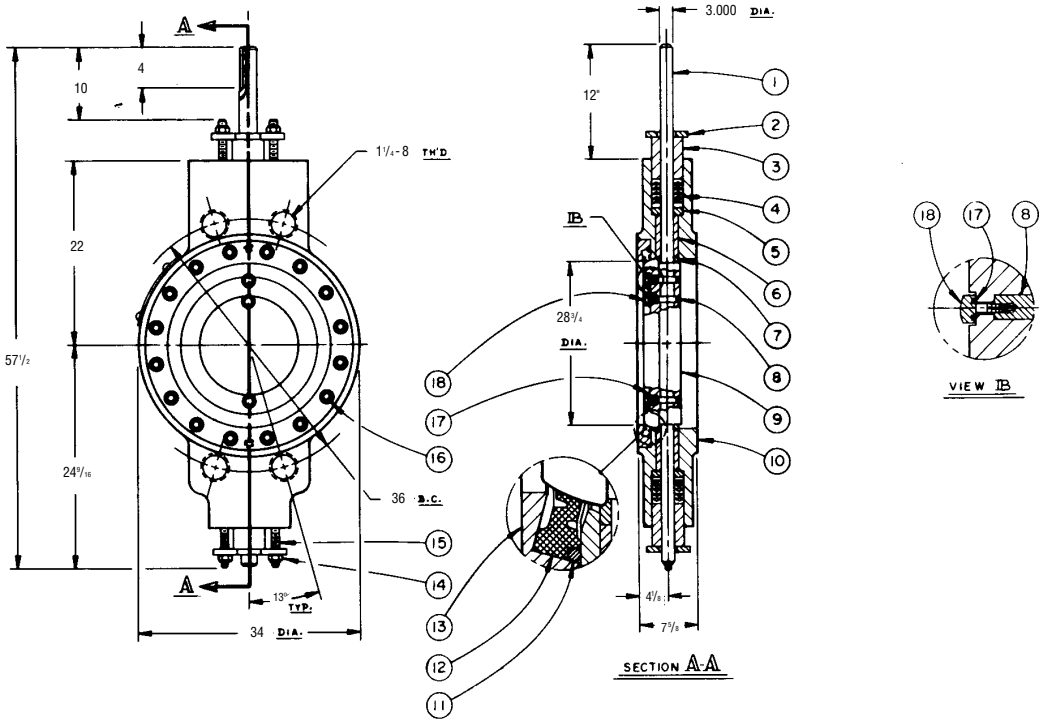


24" Class 150 Lugged Valve

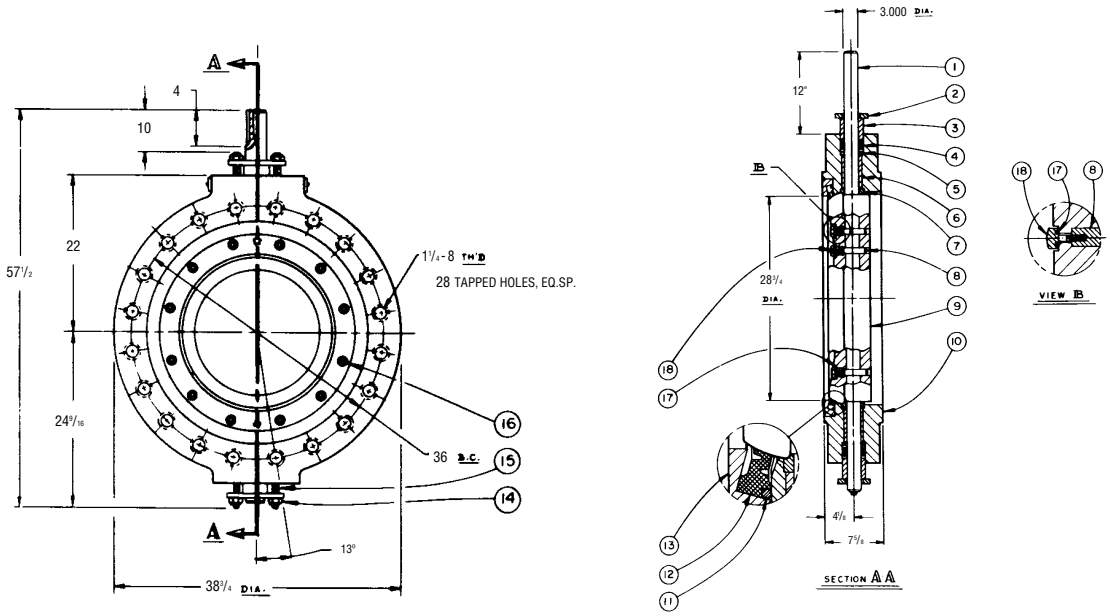


NOTE: Dimensions are approximate and may vary, always consult installation drawing.

30" Class 150 Wafer Valve



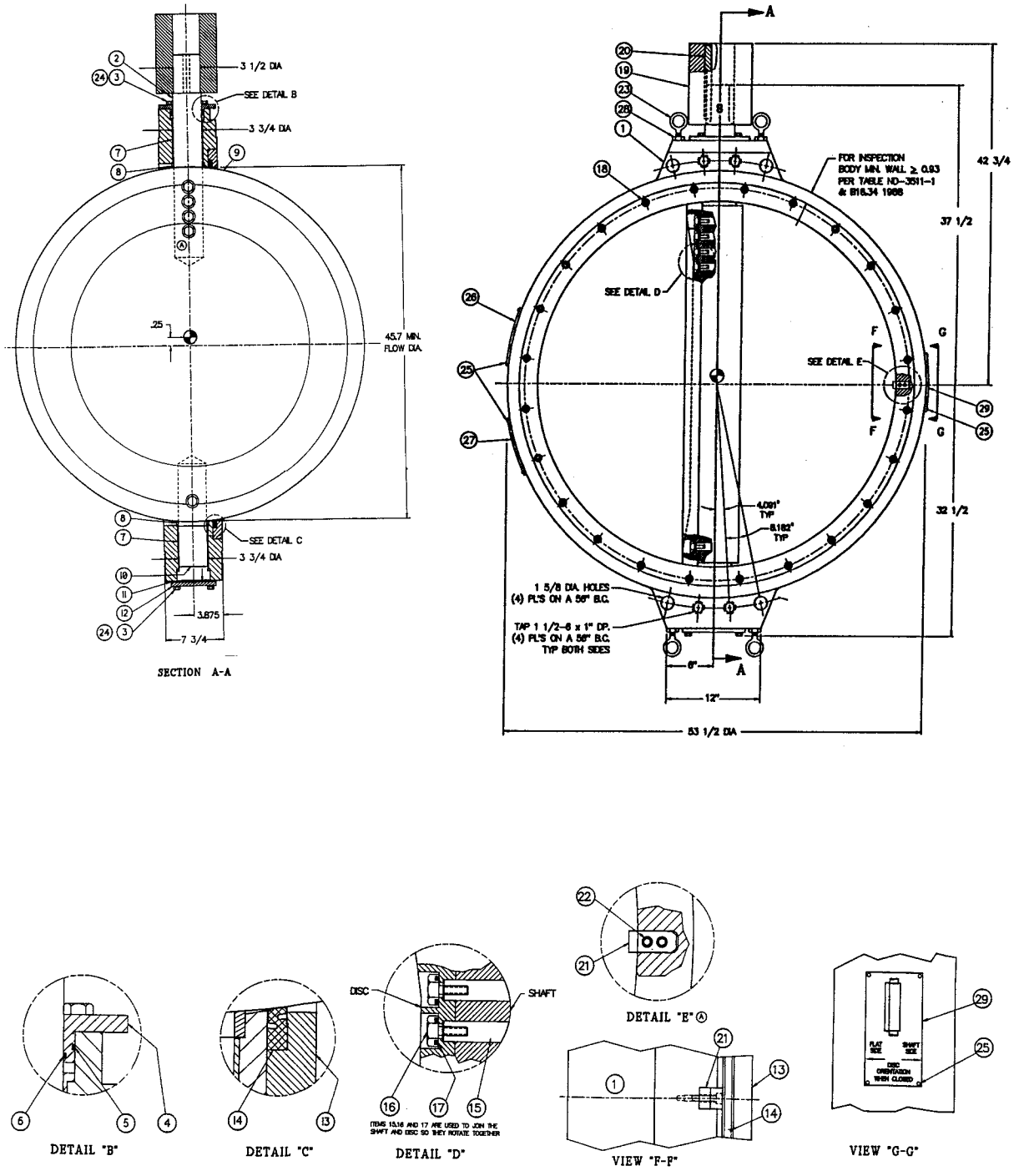
30" Class 150 Lugged Valve



NOTE: Also available in 36" wafer or 36" lugged.

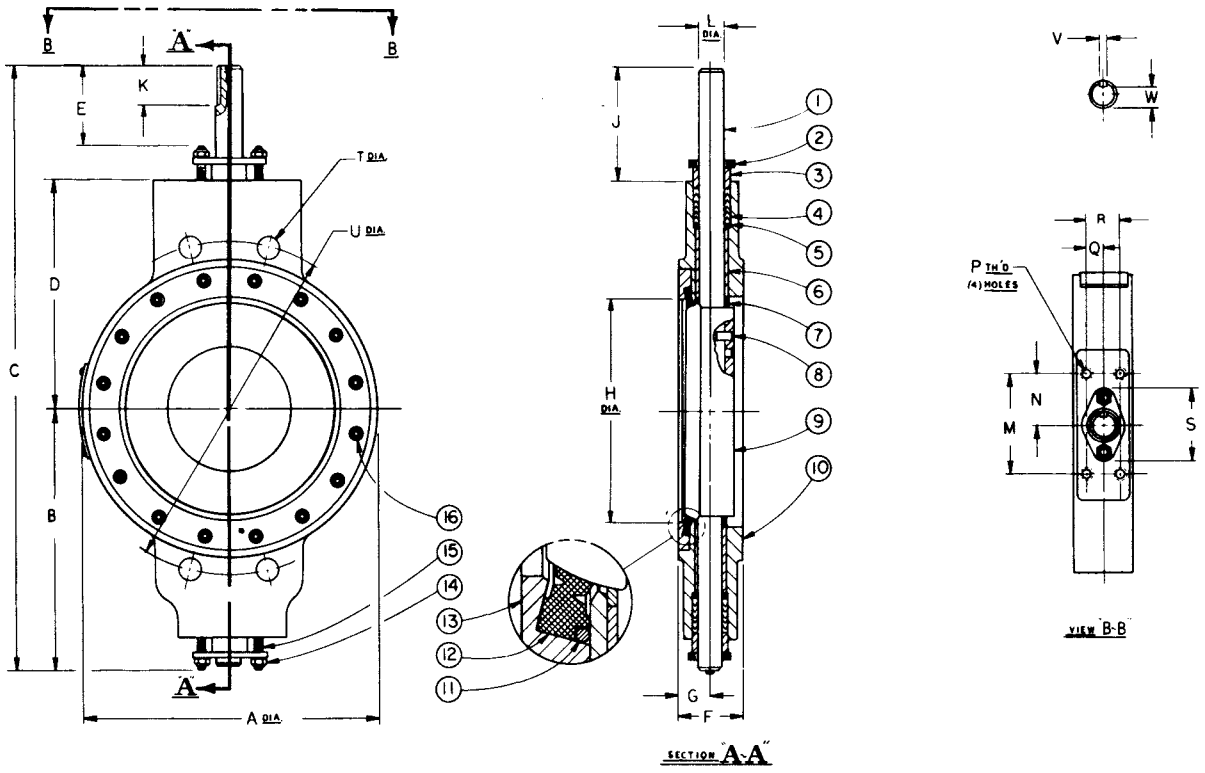
NOTE: Dimensions are approximate and may vary, always consult installation drawing.

48" Class 150 Wafer Valve



NOTE: Dimensions are approximate and may vary, always consult installation drawing.

12" - 20" Class 300 Wafer Valve



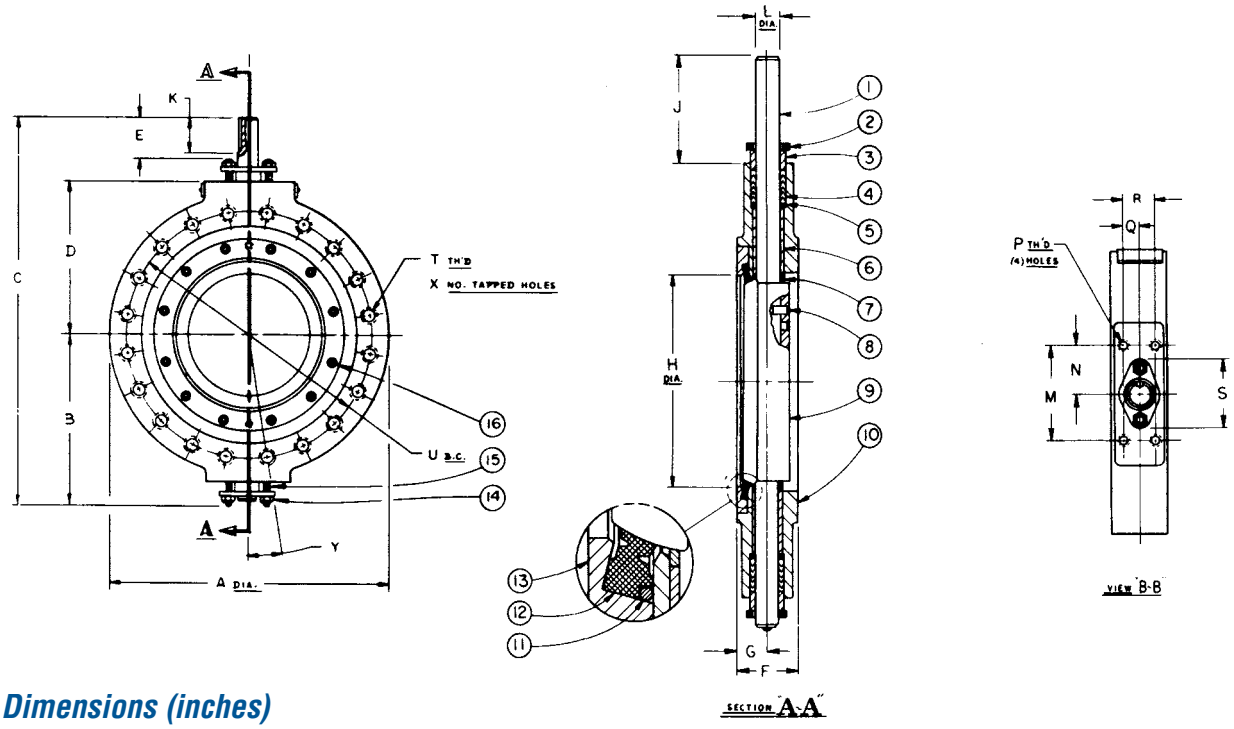
Dimensions (inches)

VALVE SIZE	A	B	C	D	E	F	G	H	J	K	L
12	15¾	12⁹⁄₁₆	29²⁷⁄₃₂	12	4³⁄₃₂	3³⁄₁₆	1¹¹⁄₁₆	11⅜	5⁹⁄₃₂	2⁵⁄₁₆	1.500
14	17⅜	13⅛	31	12⅝	4⅛	3¾	1⅞	12²⁷⁄₃₂	5¼	2¹¹⁄₁₆	1.750
16	18⅝	15⁹⁄₁₆	32¹⁷⁄₃₂	14¼	1⁷⁄₁₆	6³⁄₁₆	3³⁄₃₂	14¾	2¾	1⅜	2.366
18	21⅛	17³⁄₁₆	35²⁹⁄₃₂	15⅞	1¹⁷⁄₃₂	6⅞	3⁷⁄₁₆	16⅝	2²⁷⁄₃₂	1½	2.741
20	23⅛	19½	43½	17¾	4½	7⁵⁄₁₆	3²¹⁄₃₂	18½	6¼	4½	2.991

VALVE SIZE	M	N	P	Q	R	S	T	U	V	W
12	5¼	2⅝	⅝-11	1	2	3⅞	1¼	17¾	.375	1.287
14	5¼	2⅝	⅝-11	1	2	4½	1⅛-8 TAP	20¼	.375	1.540
16	6	3	¾-10	2	4	3½	1¼-8 TAP	22½	.625	2.006
18	6½	3¼	¾-10	2¼	4½	4	1¼-8 TAP	24¾	.625	2.387
20	7	3½	¾-10	2½	5	4½	1¼-8 TAP	27	.750	2.554

NOTE: Dimensions are approximate and may vary, always consult installation drawing.
Sizes 16" through 20" employ upper and lower shafts

3" – 20" Class 300 Lugged Valve



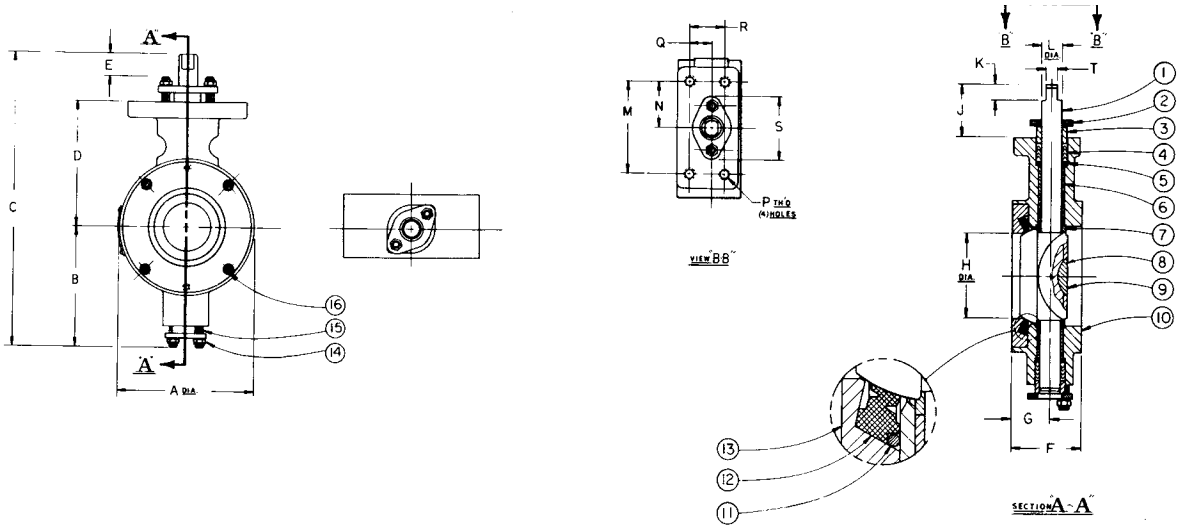
Dimensions (inches)

VALVE SIZE	A	B	C	D	E	F	G	H	J	K	L	M
3	8¼	5⅞	12½	4⅞	¾	1 29/32	1 1/16	2 13/16	1¾	9/16	.499	3⅛
4	10	5 7/16	12 15/16	5¾	1 1/16	2⅛	1 1/16	3⅞	1¾	9/16	.624	3½
6	12½	7 9/16	16 27/32	7¼	3/32	2¼	1¼	5¾	2	9/16	.873	3¼
8	15	8⅜	19 9/16	8½	1 7/16	2½	1 7/16	7⅝	2⅝	⅝	1.124	4
10	17½	11⅛	26¾	10⅜	4⅛	2 13/16	1 7/16	9 17/32	5¼	1 5/16	1.250	4½
12	20½	12 9/16	29 27/32	12	4 3/32	3 3/16	1 11/16	11⅜	5 9/32	2 5/16	1.500	5¼
14	23	13⅛	31	12⅝	4⅛	3¾	1⅞	12 27/32	5¼	2 11/16	1.750	5¼
16	25½	15 9/16	32 17/32	14¼	1 7/16	6 3/16	3 3/32	14¾	2¾	1⅜	2.366	6
18	28	17 3/16	35 29/32	15⅞	1 17/32	6⅞	3 7/16	16⅝	2 27/32	1½	2.741	6½
20	30½	19½	43⅛	17¾	4½	7 5/16	3 21/32	18½	6¼	4½	2.991	7

VALVE SIZE	N	P	Q	R	S	T	U	V	W	X	Y
3	1 9/16	⅜-16	7/16	⅞	2¼	¾-10	6⅝	—	—	8	22½°
4	1¾	⅜-16	1 1/16	1⅜	2¼	¾-10	7⅞	—	—	8	22½°
6	1⅝	⅜-16	⅞	1½	2 11/16	¾-10	10⅝	—	—	12	15°
8	2	⅜-16	1	1 11/16	3 3/16	⅞-9	13	—	—	12	15°
10	2¼	½-13	⅞	1¾	3¼	1-8	15¼	.375	1.061	16	11¼°
12	2⅝	5/8-11	1	2	3⅞	1⅛-8	17¾	.375	1.287	16	11¼°
14	2⅝	5/8-11	1	2	4½	1⅛-8	20¼	.375	1.540	20	9°
16	3	¾-10	2	4	3½	1¼-8	22½	.625	2.006	20	9°
18	3¼	¾-10	2¼	4½	4	1¼-8	24¾	.625	2.387	24	7½°
20	3½	¾-10	2½	5	4½	1¼-8	27	.750	2.554	24	7½°

NOTE: Dimensions are approximate and may vary, always consult installation drawing.

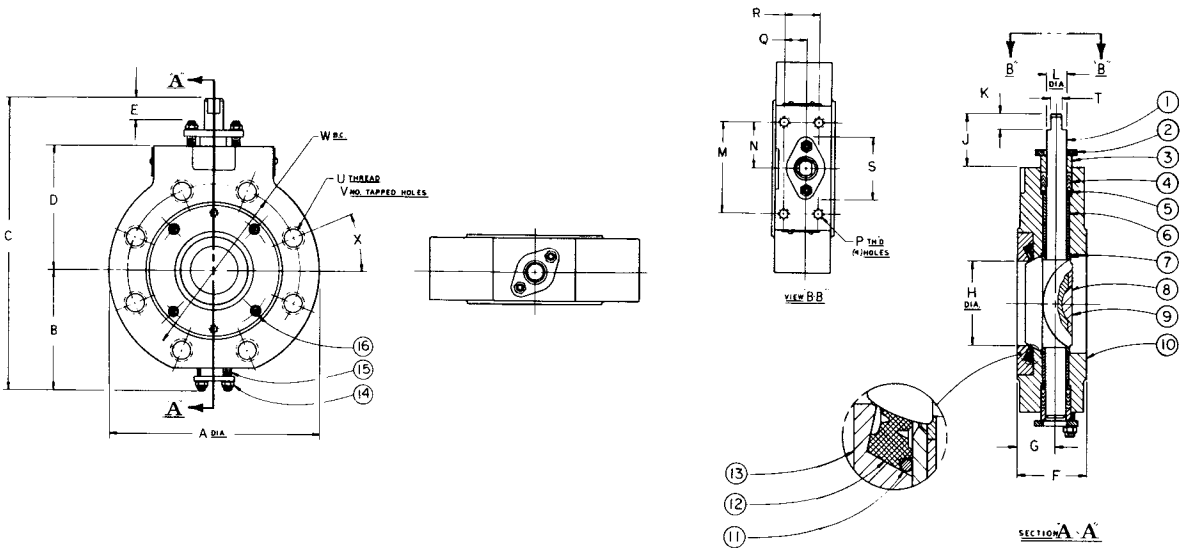
3" - 4" Class 600 Wafer Valve



Dimensions (inches)

VALVE SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T
3	5 1/8	4 13/16	11 17/32	4 3/4	29/32	2 7/16	1 3/8	2 29/32	1 31/32	9/16	.747	3 1/2	1 3/4	3/8-16	13/16	1 5/16	2 5/16	1/2
4	6 1/4	5 13/16	13 15/16	5 7/8	1 1/16	2 15/32	1 7/16	3 9/16	2 1/4	5/8	.995	3 1/2	1 3/4	3/8-16	13/16	1 5/16	2 11/16	3/4

3" - 4" Class 600 Lugged Valve

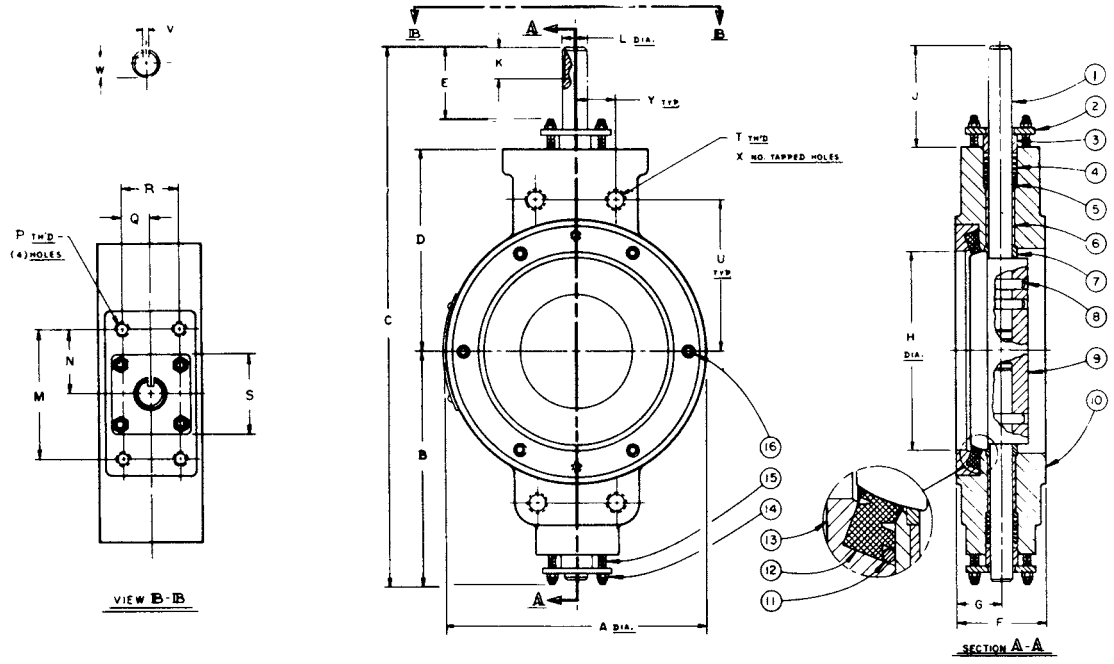


Dimensions (inches)

VALVE SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X
3	8 1/4	4 13/16	11 17/32	4 3/4	29/32	2 7/16	1 3/8	2 29/32	1 31/32	9/16	.747	3 1/2	1 3/4	3/8-16	13/16	1 5/16	2 5/16	1/2	3/4-10	8	6 5/8	22 1/2
4	10 3/4	5 13/16	13 15/16	5 7/8	1 1/16	2 15/32	1 7/16	3 9/16	2 1/4	5/8	.995	3 1/2	1 3/4	3/8-16	13/16	1 5/16	2 11/16	3/4	7/8-9	8	8 1/2	22 1/2

NOTE: Dimensions are approximate and may vary, always consult installation drawing.

6" – 20" Class 600 Wafer Valve



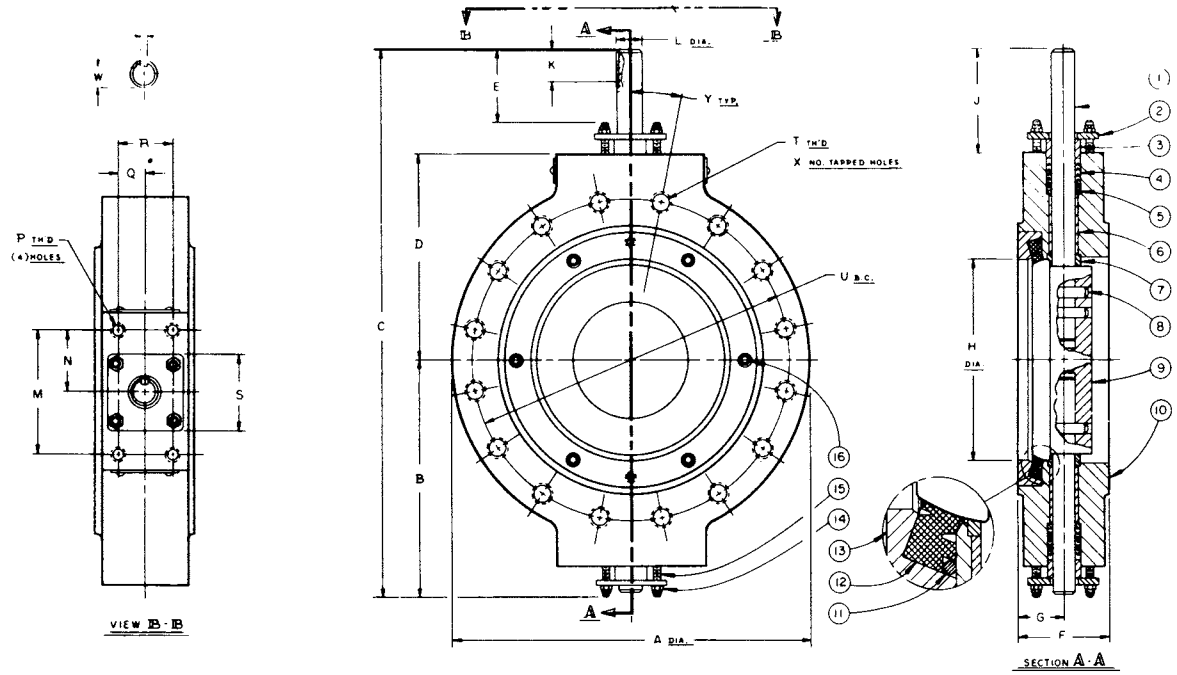
Dimensions (inches)

VALVE SIZE	A	B	C	D	E	F	G	H	J	K	L	M
6	8 9/16	8 7/8	19 3/4	7 5/8	2	3 5/8	1 13/16	5 13/16	3 1/4	1 1/2	1.498	4 1/2
8	10 11/16	10 9/16	22 7/8	8 15/16	1 3/4	3 15/16	1 31/32	7 11/32	3 3/8	1 1/2	1.868	4 7/8
10	12 7/8	12 9/16	27 1/8	10 15/16	2	5 7/8	2 15/16	9 3/4	3 5/8	1 3/4	2.243	5 1/4
12	15 1/4	14 3/8	31	12 5/8	2 1/4	6 3/4	3 3/8	11 3/8	4	2	2.617	6
14	16 3/8	15 1/4	33 1/4	13 1/2	2 1/4	7 9/16	3 25/32	12 1/2	4 1/2	2 1/2	2.992	7
16	18 3/4	18 9/16	39 3/8	16 3/16	2 1/4	8 1/4	4 1/8	14 1/4	4 5/8	2	3.491	7 3/4
18	21 1/4	20 1/8	43 9/16	17 3/4	3 5/16	9 1/16	4 17/32	16 1/8	5 11/16	3	3.990	7 3/4
20	23 1/4	21 1/2	46 1/4	19 1/8	3 1/4	9 7/8	4 15/16	18	5 5/8	3	4.490	7 3/4

VALVE SIZE	N	P	Q	R	S	T	U	V	W	X	Y
6	2 1/4	1/2-13	1 3/16	2 3/8	4 3/16	1-8	5.554	.375	1.281	8	1.488
8	2 7/16	1/2-13	1 1/4	2 1/2	4 3/8	1 1/8-8	6.640	.500	1.583	8	1.779
10	2 5/8	5/8-11	2 1/8	4 1/4	3 1/2SQ	1 1/4-8	8.337	.500	1.964	8	1.658
12	3	5/8-11	2 3/8	4 3/4	4SQ	1 1/4-8	9.507	.625	2.267	8	1.508
14	3 1/2	3/4-10	2 5/8	5 1/4	4 1/2SQ	1 3/8-8	10.247	.750	2.561	8	1.623
16	3 7/8	3/4-10	3	6	5 1/2SQ	1 1/2-8	11.729	.875	2.995	8	1.858
18	3 7/8	3/4-10	3 3/8	6 3/4	6SQ	1 5/8-8	12.716	1.000	3.428	8	2.014
20	3 7/8	3/4-10	3 3/4	7 1/2	6SQ	1 5/8-8	14.128	1.000	3.936	8	1.860

NOTE: Dimensions are approximate and may vary, always consult installation drawing.

6" – 20" Class 600 Lugged Valve



Dimensions (inches)

VALVE SIZE	A	B	C	D	E	F	G	H	J	K	L	M
6	14	8⅞	19¾	7⅝	2	3⅝	1 13/16	5 13/16	3¼	1½	1.498	4½
8	16½	10 9/16	22⅞	8 15/16	1¾	3 15/16	1 31/32	7 11/32	3⅜	1½	1.868	4⅞
10	20	12 9/16	27⅛	10 15/16	2	5⅞	2 15/16	9¾	3⅝	1¾	2.243	5¼
12	22	14⅜	31	12⅝	2¼	6¾	3⅜	11⅜	4	2	2.617	6
14	23¾	15¼	33¼	13½	2¼	7 9/16	3 25/32	12½	4½	2½	2.992	7
16	27	18 9/16	39⅜	16 3/16	2¼	8¼	4⅛	14¼	4⅝	2	3.491	7¾
18	29¼	20⅛	43 9/16	17¾	3 5/16	9 1/16	4 17/32	16⅛	5 11/16	3	3.990	7¾
20	32	21½	46¼	19⅛	3¼	9⅞	4 15/16	18	5⅝	3	4.490	7¾

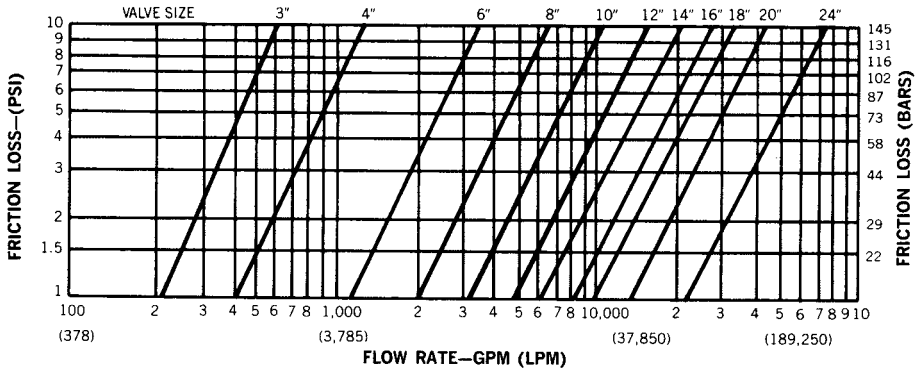
VALVE SIZE	N	P	Q	R	S	T	U	V	W	X	Y
6	2¼	½-13	1 3/16	2⅜	4 3/16	1-8	11½	.375	1.281	24	15°
8	2 7/16	½-13	1¼	2½	4⅜	1⅛-8	13¾	.500	1.583	24	15°
10	2⅝	⅝-11	2⅛	4¼	3½SQ	1¼-8	17	.500	1.964	32	11¼°
12	3	⅝-11	2⅜	4¾	4SQ	1¼-8	19¼	.625	2.267	40	9°
14	3½	¾-10	2⅝	5¼	4½SQ	1⅜-8	20¾	.750	2.561	40	9°
16	3⅞	¾-10	3	6	5½SQ	1½-8	23¾	.875	2.995	40	9°
18	3⅞	¾-10	3⅜	6¾	6SQ	1⅝-8	25¾	1.000	3.428	40	9°
20	3⅞	¾-10	3¾	7½	6SQ	1⅝-8	28½	1.000	3.936	48	7½°

NOTE: Dimensions are approximate and may vary, always consult installation drawing.

Performance Characteristics

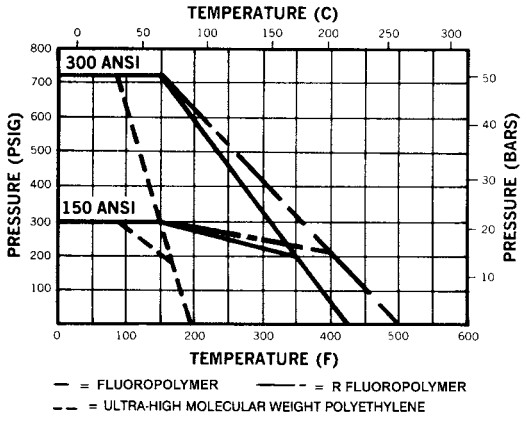
Anchor/Darling High-Performance Valves

Friction Loss versus Flow – Based on Water

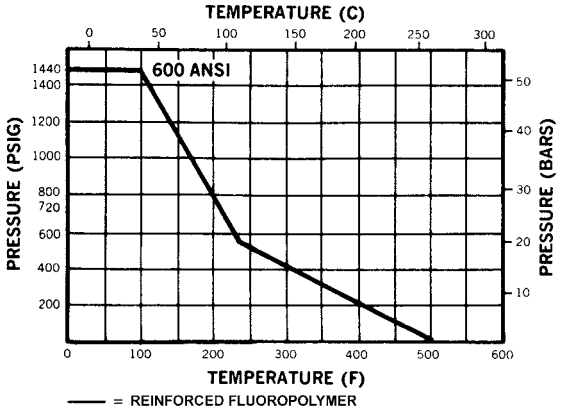


Pressure/Temperature Capability

Class 150 and 300 ANSI



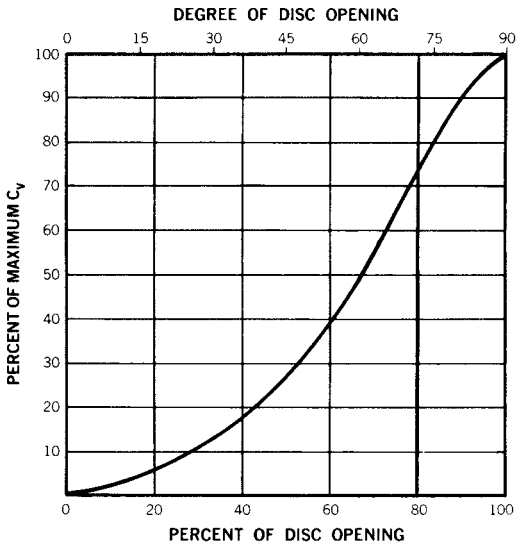
Class 600 ANSI



Cv values

Size (inches)	150	300
3	210	210
4	400	400
6	1150	1150
8	2100	2100
10	3410	3410
12	6525	4800
14	8400	6100
16	11000	7400
18	14800	9600
20	18700	11900
24	22000	*
30	30000	*
36	50000	*
48	95000	*

Flow Characteristics



Approximate Weights by Valve Design (lb)

SIZE (in.)	150#L	150#W	300#L	300#W	600#L	600#W
3	33	30	35	30	40	35
4	45	40	45	40	65	50
6	60	55	65	55	130	70
8	125	115	135	115	215	147
10	175	156	200	156	417	306
12	240	170	275	200	556	425
14	350	270	570	325	648	498
16	450	345	790	510	858	693
18	600	450	1050	625	1148	884
20	850	540	1500	972	1568	1248
24	1300	750	2061	1200	—	—
30	2300	1700	—	—	—	—
36	3700	2850	—	—	—	—
48	—	5100	—	—	—	—

NOTES:

1) Weights are approximate and believed to be conservative. Weights for larger valves will vary considerably with face-to-face dimensions. Always consult the factory when evaluating replacements for specific equipment.

2) Weights include an allowance for typical actuator mounting brackets.

Standard Materials of Construction

Anchor/Darling High-Performance Valves

Description for 3" through 36" Butterfly Valves (wafer and lugged design)

PART NO.	DESCRIPTION	MATERIAL CARBON STEEL	MATERIAL STAINLESS STEEL
1	SHAFT	17 – 4 PH	17 – 4 PH
2	GLAND RETAINER	CARBON STEEL	CARBON STEEL
3	GLAND RING	300 STAINLESS STEEL	300 STAINLESS STEEL
4	PACKING	GRAPHITE	GRAPHITE
5	GLAND RING	300 STAINLESS STEEL	300 STAINLESS STEEL
6	BUSHING	BRONZE	BRONZE
7	THRUST WASHER	BRONZE	BRONZE
8	DISC PIN	316 STAINLESS STEEL	316 STAINLESS STEEL
9	DISC	SEE NOTE #1	316 STAINLESS STEEL
10	BODY	CARBON STEEL	316 STAINLESS STEEL
11	O-RING	VITON OR EPR	VITON OR EPR
12	SEAT	SEE NOTE #2	SEE NOTE #2
13	SEAT RETAINER	CARBON STEEL	316 STAINLESS STEEL
14	NUT	CARBON STEEL	CARBON STEEL
15	STUD	CARBON STEEL	CARBON STEEL
16	SOCKET HD. CAP SCREW	ALLOY STEEL	ALLOY STEEL
17	SEAL (NOTE #3)	VITON OR EPR	VITON OR EPR
18	RETAINER (NOTE #3)	316 STAINLESS STEEL	316 STAINLESS STEEL

GENERAL NOTES

1. 3" through 10" carbon steel valves supplied with 316 stainless disc, sizes 12" and above supplied with carbon steel disc with electroless nickel plating.
2. Standard valves are supplied with reinforced fluoropolymer seat. Ultra-high-molecular- weight polyethylene, tefzel, and ethylene propylene seat materials are also available.
3. Applies to 24" through 36" sizes only.
4. 16" through 20" Class 300, 24" through 36" Class 150, and 10" through 20" Class 600 employ upper and lower shafts.

Standard Materials of Construction

Anchor/Darling High-Performance Valves

Description for 48" Class 150 Wafer Design

PART NO.	DESCRIPTION	MATERIAL CARBON STEEL	MATERIAL STAINLESS STEEL
1	BODY	CARBON STEEL	316 STAINLESS STEEL
2	UPPER SHAFT	17 – 4 PH	17 – 4 PH
3	HEX HEAD CAPSCREW	ALLOY STEEL	ALLOY STEEL
4	GLAND RING	300 STAINLESS STEEL	300 STAINLESS STEEL
5	O-RING (BODY)	VITON OR EPR	VITON OR EPR
6	O-RING (SHAFT)	VITON OR EPR	VITON OR EPR
7	BUSHING	BRONZE	BRONZE
8	THRUST WASHER	BRONZE	BRONZE
9	DISC	CARBON STEEL	316 STAINLESS STEEL
10	LOWER SHAFT	17 – 4 PH	17 – 4 PH
11	GASKET	NITRILE	NITRILE
12	SHAFT CAP	CARBON STEEL	316 STAINLESS STEEL
13	SEAT RETAINER	CARBON STEEL	316 STAINLESS STEEL
14	SEAT	SEE NOTE #2	SEE NOTE #2
15	PIN	316 STAINLESS STEEL	316 STAINLESS STEEL
16	PIN RETAINER	316 STAINLESS STEEL	316 STAINLESS STEEL
17	O-RING (PIN RETAINER)	VITON OR EPR	VITON OR EPR
18	SOCKET HEAD CAPSCREW	ALLOY STEEL	ALLOY STEEL
19	SHAFT COUPLING	CARBON STEEL	316 STAINLESS STEEL
20	KEY	CARBON STEEL	CARBON STEEL
21	TRAVEL STOP	CARBON STEEL	316 STAINLESS STEEL
22	SOCKET HEAD CAPSCREW	ALLOY STEEL	ALLOY STEEL
23	EYE BOLTS	CARBON STEEL	CARBON STEEL
24	LOCKWASHER	CARBON STEEL	STAINLESS STEEL
25	DRIVE SCREW	STAINLESS STEEL	STAINLESS STEEL
26	NAMEPLATE	STAINLESS STEEL	STAINLESS STEEL
27	NATIONAL BOARD TAG	STAINLESS STEEL	STAINLESS STEEL
28	JAM NUT	CARBON STEEL	CARBON STEEL
29	DISC ORIENTATION TAG	STAINLESS STEEL	STAINLESS STEEL

GENERAL NOTES

1. Travel stop is optional.
2. Standard valves are supplied with EPR/EPDM seat. Reinforced fluoropolymer and ultra-high-molecular-weight polyethylene (UHMWPE) seats are also available.
3. National board tag is optional.

Technical Information and Optional Features

Torque Requirements

The required operating torque of an Anchor/Darling butterfly valve is dependent on several parameters, including: operating media, valve materials selection, amount of shaft offset/eccentricity, and actual service conditions. Total operating torque is comprised of various components, including: seating torque, bearing torque, packing torque, and hydrodynamic torque. Through the use of a single-offset shaft, streamlined disc, and careful materials selection, total operating torque is kept to a minimum. Although seating torque will typically govern over hydrodynamic torque, the unlimited combinations of possible service conditions makes it impractical to publish standardized torque data. Please consult the factory for the required operating torque for your specific service conditions.

Alternate Base Materials

Material	Notable Characteristics
• AL6XN	• Exceptional corrosion resistance for service water.
• CF8	• Economical stainless steel (304 grade).
• CF3M	• Low-carbon grade (316L grade), reduces potential for SSC.
• CF3	• Low-carbon grade (304L grade), reduces potential for SSC.

Alternate Seat Materials

Material	Notable Characteristics
• UHMWPE	• Radiation resistant, high toughness, low friction.
• Tefzel	• Exceptional wear characteristics.
• EPR	• Increased flexibility for maximum sealing capability.

Optional Features

Optional Feature	Why/Where/When to Consider?
• Live-loaded/custom packing	• Reduced maintenance for restricted-access valves.
• Internal disc stop	• Assurance of repeatable disc location.
• Graphite-impregnated bushings	• Reduced torque in abrasive medias.
• SMARTSTEM[1]	• Torque monitoring for GL-89-10 valves.

FOOTNOTES:

[1]*SMARTSTEM is a trademark of Teledyne Engineering Services, Inc.*

Anchor/Darling Butterfly Valves

High-Performance, Pressure-Assisted Seating

Anchor/Darling has applied our vast knowledge and experience in materials, manufacturing, and design to our butterfly valves. Anchor/Darling butterfly valves incorporate proven performance features into an economically designed package. The result is a valve that offers the optimum combination of performance and life-cycle cost.

So when you need the best value in a proven butterfly valve, specify Flowserve Anchor/Darling.

Features that assure dependable operation

- High operating pressures… to 1440 PSI.
- Excellent flow and throttling characteristics.
- High operating temperatures… to 500º F.
- High-performance, pressure-assisted bi-directional seat.
- Self-compensating seat design for maximum performance.
- Pressure-balanced shaft reduces thrust wear.
- Bubble-tight shut-off at all pressures.
- Low torque for smooth and easy operation.
- Available with lift-to-unlock handle which automatically locks when released.
- Handle positions in 15-degree increments.
- Easily adaptable to automatic operation with electric, pneumatic, or hydraulic actuators.
- Fourteen sizes from 3-inches to 48-inches inclusive.
- Suitable for vacuum service.
- Wide-band disc sealing area.
- Compact design cuts weight and space requirements.
- Heavy-duty corrosion-resistant shaft bearings.
- Adjustable shaft packing.
- Available in wafer, lugged, or flanged body design.
- Also available: Direct replacements for Contromatics butterfly valves.

Flowserve Durco MX ANSI Class 300 lb Valves

Lug and Wafer Designs 3 in (80 mm) Thru 18 in (450 mm)

The Flowserve Durco Big Max MX valve is a heavy-duty high performance valve built to deliver long, continuous, high cycle operation where economical, minimum maintenance valving is essential.

Positive Shutoff With Minimum Maintenance Even In The Toughest Services

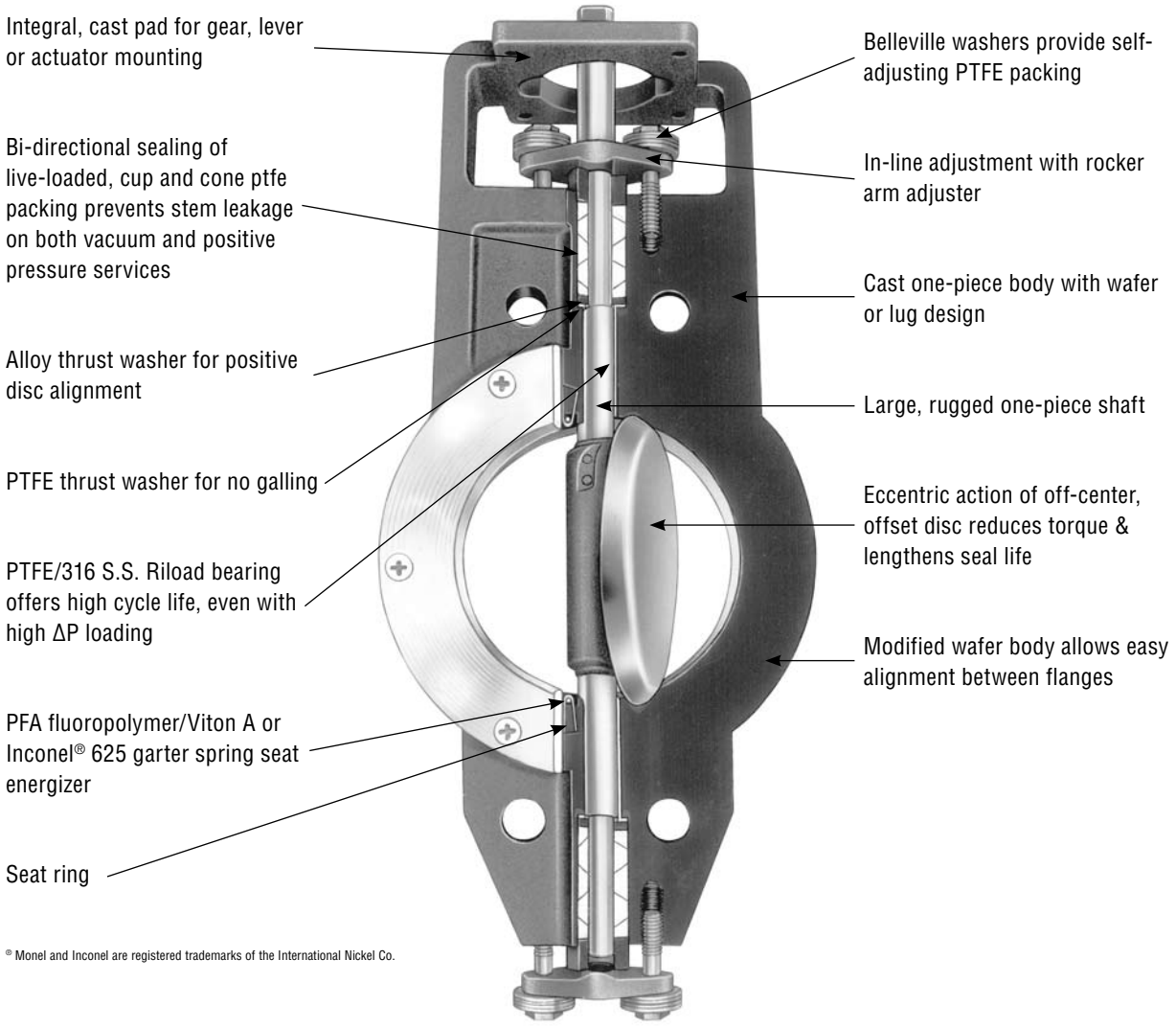
For fire safe services, there are the fire sealed MX and the TriFlex® metal seated valves. A specially trimmed Monel® MX valve is available for special service considerations such as chlorine.

Whichever version you choose, the Big Max MX delivers unequaled reliability, performance and value in high performance valves.

NOTE: For information about Big Max BX2001 ANSI Class 150 lb valves, see Bulletin V-39.

Quality And Performance

- All castings meet the rigorous requirements of the applicable ASTM standards.
- All BIG MAX valves comply with both the design and dimensional requirements of API 609 and MSS SP68.
- 100% of all PFA fluoropolymer seated valves are tested in accordance with MSS SP61. No through or external leaks are allowed. This exceeds the shutoff requirements of ANSI/FCI 70-2 for all classes.
- All TriFlex metal seated valves are tested to ANSI/FCI 70-2 Class VI leakage rates.



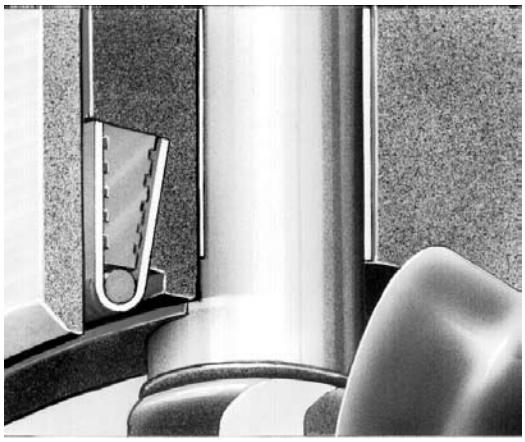
® Monel and Inconel are registered trademarks of the International Nickel Co.

Seat Design Options

Standard Seat

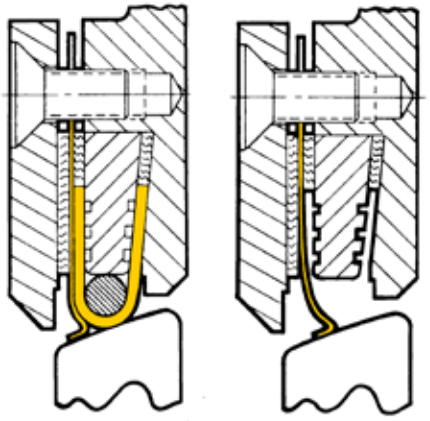
Large PFA fluoropolymer/Viton A energized or optional Inconel 625 garter spring energized seat provides positive shutoff on low pressure and vacuum as well as high ΔP service. PFA offers better chemical and higher temperature resistance than other types of filled or unfilled PTFEs. The large cross sectional disc/seat contact area affords a more forgiving seat than those of competitors.

PFA seated MX valves will seal bubble-tight when pressurized from either direction.



Fire Sealed

Meets fire test specifications set forth by API 607, OCMA and Factory Mutual. Positive shut-off is assured during normal operation by a proven fluoropolymer PFA primary seat with a Viton O-ring energizer. If the valve is subjected to a fire and the elastomeric components become non-functional, the patented Inconel metal back-up seat is activated. This provides a metal-to-metal seat. Sealing is further enhanced by line pressure acting on the metal lip. During normal operation the metal seat does not contact the disc, assuring a leak-free, soft-seated valve with high cycle life.

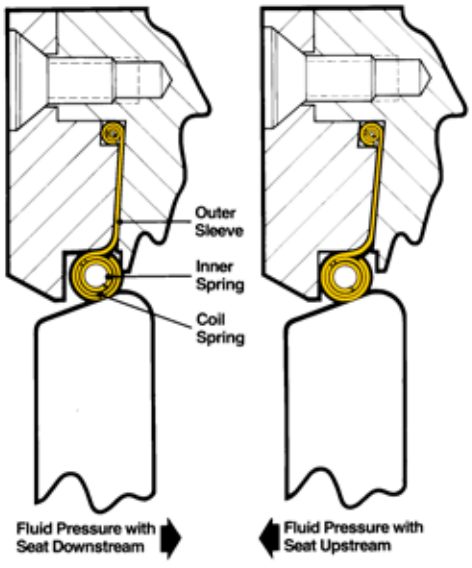


Triflex® Metal Seated

Uniquely designed for reliability and tested to ANSI Class VI, TriFlex utilizes the sleeve and coil action of three individual springs plus the energizing force of process fluid pressure to provide outstanding shutoff service. These highly resilient springs also offer excellent corrosion and abrasion resistance for extended service life. The design is inherently fire-safe.

Three models of the TriFlex valve are offered:

- Standard to 400°F (204°C)
- High temperature to 800°F (427°C)
- Modified high temperature to 1000°F (538°C)



Flowserve Durco BX2001 Performance Plus Economy Equals Total Value

The Big Max BX2001 high performance valve is a superior quality, ASME Class 150 and 300 valve available in standard PFA and optional UHMWPE, fire sealed, Apex™ and TriFlex® metal seated versions. Offered in 2 in (50 mm) through 36 in (900 mm) sizes and in both wafer and lug body designs, all are available with a wide variety of packing options to meet your routine or most rigid service requirements.

Total Quality

The BX2001 effectively contains fugitive process media emissions regulated by the federal Clean Air Act, including chlorine, hydrofluoric acid and anhydrous HCl. It is the ideal choice for precise throttling control or on-off service with lighter weight piping systems and less expensive, energy efficient actuators.

Superior Features

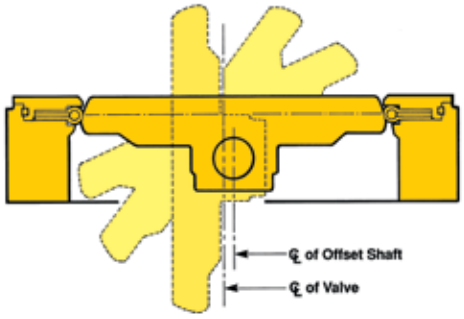
- Primary stem seal plus two optional secondary seals provide triple leak protection.
- Retainer is locked in the valve body by a unique lock or fasteners, depending on size.
- Adjustable, live-loaded packing option is available.
- Self-adjusting, self-contained, constant preload stem seal option may be specified.
- Low profile disc increases capacity and provides better flow control.
- Wide range of optional materials include: D20, DMM, DC2, DC3, DNI and DINC.

World Class Valve Performance

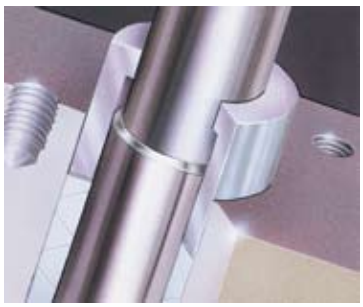
- All castings meet rigid ASTM standards.
- All BX2001 valves comply with ASME B16.34, ASME B16.5, ASME B16.10, MSS SP68, MSS SP61, API 598, API 607, API 609 and ISO 5752.
- All PFA seated valves and optional UHMWPE seated valves are tested in accordance with ASME B16.34 and MSS SP61. No through or external leaks are allowed, thereby exceeding the shut-off requirements of ASME/FCI 70-2 for all classes.
- All Apex and TriFlex metal seated valves are tested to ASME/FCI 70-2 Class IV and VI, respectively, leakage rates.
- All valves available in ASME Class 150 and 300; DIN PN 10, -16, -20, -25 and -40 drilling.

PFA/Viton® A energized seat provides positive, bidirectional shut-off with long cycle life on low pressure and vacuum, and high ΔP services. (See page 23 for more information about seating.)

Unique, high strength Gibb pin positively locks valve shaft to the disc. Gibb pin is used on 2 in. (50 mm) through 12 in. (300 mm) sizes.



The BX2001's double offset disc creates an eccentric seating action which eliminates seat wear, reduces torque and allows disc to "cam" into seat for tight shut-off.



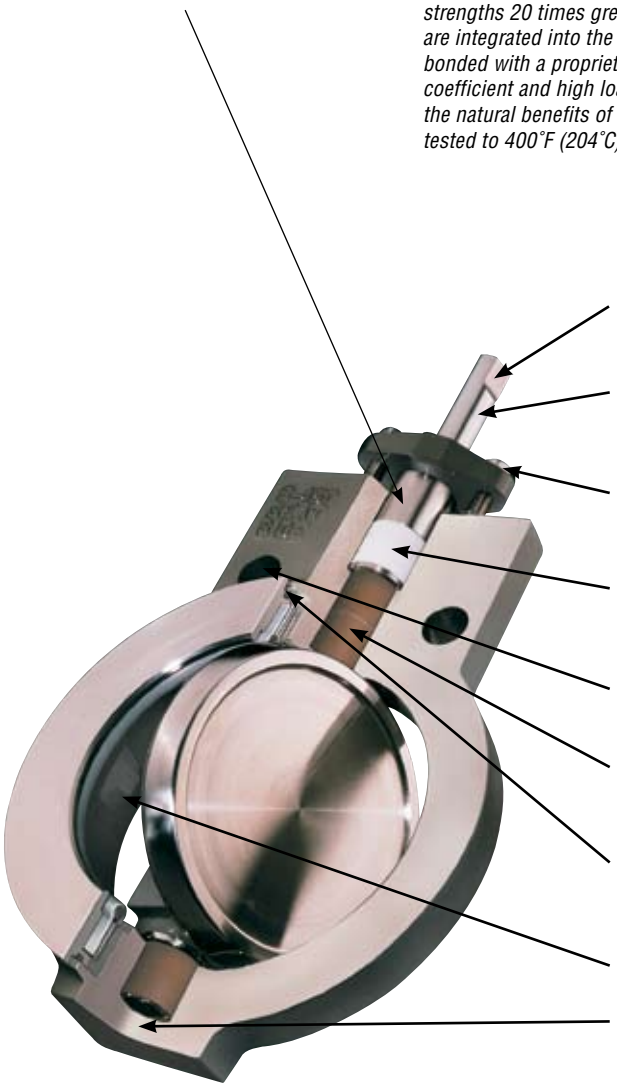
Blowout proof stem design complies with API 609 criteria to guard against catastrophic leakage and stem blowout in the event of shaft failure.

Poly Lube® Bearings

A patented fiberglass weaving/winding process results in a seamless filament-wound fiberglass. Fluoropolymer superfilaments with tensile strengths 20 times greater than PTFE resins are integrated into the bearing and chemically bonded with a proprietary epoxy. A low friction coefficient and high load-carrying capacity are the natural benefits of this bearing. Flowserve tested to 400˚F (204˚C).

Severe Service Bearings

The special PTFE resin is pressure molded onto a perforated 316 SS sheet. The perforations lock the PTFE onto the 316 SS making a unified bearing that exhibits high corrosion resistance with unparalleled cycle life. This process results in a PTFE/SS bearing where high radial and lateral loads will not deform the PTFE and strip it from its stainless steel backing. Particularly suited for environments detrimental to glass fibers or epoxies.



Flats or “double D” on shaft provide positive indication of valve position and simplified adaption to automatic actuation.

Large diameter, one-piece high strength shaft reduces deflection for positive, repeatable shut-off at higher ΔP than similar valves.

Independent packing set adjustment prevents stem seal emissions.

Wide choice of packing materials including adjustable and self-adjusting live-loaded with leak detection port or purge fittings for lethal, toxic or sub zero services.

Positioning holes on wafer body allow easy installation and proper alignment between flanges.

Poly Lube® bearings or optional Severe Service bearings both offer low torque and high cycle life.

360° O-ring squarely and securely locks retainer ring into valve body. Full coverage retainer ring allows complete compatibility with all gaskets and no interruption in the sealing surface.

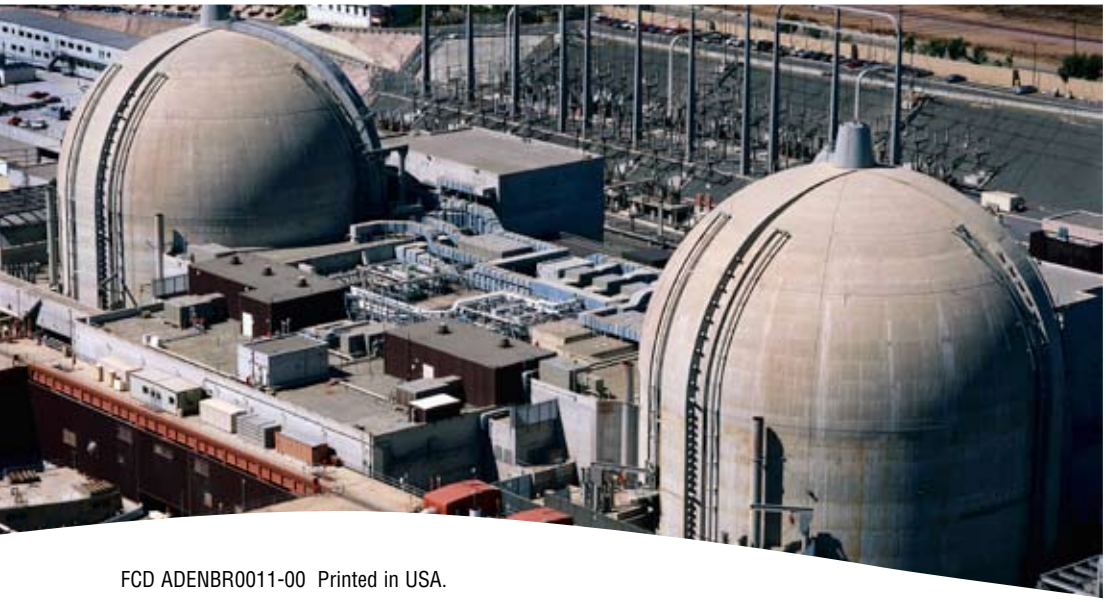
Integral cast overtravel disc stop is designed into the casting, not welded in place as an afterthought.

Blind bottom shaft hole eliminates potential leak point.

Compact construction allows installation in tight spaces.

Economical, simplified field repair due to minimum parts, interchangeable disc and shaft, and simple assembly procedures.

All carbon steel bodies electrostatic epoxy coated for enhanced corrosion protection.



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