

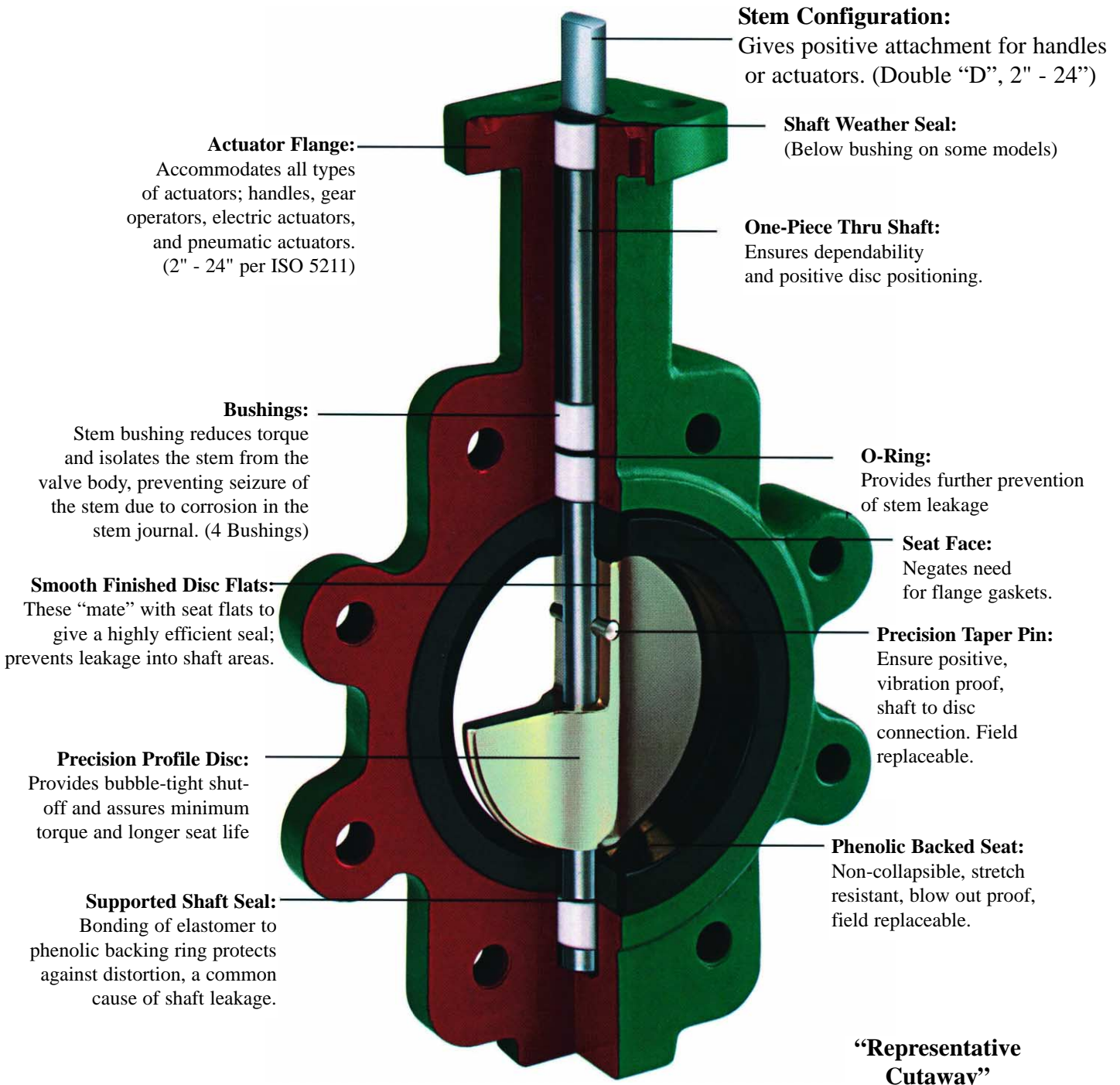
# **WSI**

**Valve Solutions Inc.**  
Commercial & Industrial Valve Automation

Resilient Seated Butterfly Valves

**APPLICATIONS:**

- HVAC
- Chemical/Petrochemical Processing
- Food and Beverage Industry
- Power and Utilities
- Pulp and Paper Industry



**"Representative Cutaway"**

- Available in sizes 2" to 48".
- Available in Wafer or Lug style body (2" to 30").
- Full flange style body for 36" to 48" valves.
- Wafer body features four alignment holes.
- Pressure ratings for tight shut-off at temperatures up to the maximum limit of the seat material:
- 2" to 12" - 200 psi, 125 psi for PTFE seat.
- 14" to 48" -150 PSI.
- Ideal for on-off or throttling services.
- Available with handles (2" to 12"), manual gear operators (2" to 48"), and electric or pneumatic actuators (2" to 48").
- Refer to bulletins for details of pneumatic and electric actuators.
- Designed to comply with MSS SP-67.
- Compatible with ANSI 1251150 flanges.
- Valves 2" to 20" meet the intent and have passed the AWWA C-504-87 Section 5 proof of design tests.
- Type approval certification from ABS for marine applications (2" to 14").
- Bi-directional dead-end capability to 200 psi (2" to 12") and 150 psi (14" to 24") is available.
- Operators mounted perpendicular to pipe.

## Valve Seating Torques (In-Lbs)

Valve Size	Standard Disc Differential Pressure <span style="background-color: yellow;">kg*m=0.011*in-lbs</span>								Undercut Differential Pressure	
	50 PSIΔP Bushing		100 PSIΔP Bushing		150 PSIΔP Bushing		200 PSIΔP Bushing		100 PSIΔP Bushing	
	Bronze	PTFE	Bronze	PTFE	Bronze	PTFE	Bronze	PTFE	Bronze	PTFE
2"	106	100	117	106	129	111	140	117	102	92
2.5"	152	150	166	163	181	176	195	189	144	142
3"	213	207	230	220	248	232	265	244	226	191
4"	321	290	386	323	450	357	515	390	336	281
5"	481	423	598	481	715	540	832	598	520	418
6"	692	599	878	691	1,063	783	1,248	875	763	601
8"	1,326	1,060	1,716	1,183	2,106	1,307	2,496	1,430	1180	860
10"	2,239	1,671	3,010	1,872	3,780	2,074	4,550	2,275	1431	954
12"	3,959	2,568	4,953	2,795	5,948	3,023	6,942	3,250	2580	1517
14"	4,881	2,640	6,226	3,070	7,570	3,500	-	-	4620	2415
16"	7,020	4,260	8,580	4,880	10,140	5,500	-	-	6195	3780
18"	10,105	6,287	12,202	7,243	14,300	8,200	-	-	8715	5775
20"	13,923	8,360	16,582	9,180	19,240	10,000	-	-	11655	7035
24"	23,617	15,427	26,953	16,813	30,290	18,200	-	-	18165	12705
30"	39,721	27,313	43,391	29,407	47,060	31,500	-	-	28665	22155

All torques shown on the chart were derived from test data using water at 60°F. For torques using dry gases, multiply these numbers by 1.6. For torques involving other media, please consult the factory.

There is no safety factor included in the numbers shown on this chart. For actuator sizing, Valve Solutions Inc. recommends that these values be multiplied by 1.2 for single valve applications, and 1.5 for 3-way ("tee") applications.

Under certain conditions, hydrodynamic torque can meet or exceed seating and unseating torques. When designing valve systems, hydrodynamic torque must be considered to help insure correct selection for the application.

### Seat Temperature Ratings

Material	Temperature Ratings °F
Buna-N	+10 to 180
Abrasive Resistant Buna-N	+10 to 180
Neoprene	+20 to 200
EPDM (2" - 16")	-30 to 275
EPDM (18" & Above)	0 to 275
EPDM, Food Grade (2" - 12")	-30 to 225
Hypalon	0 to 275
Viton	+10 to 275
High Temp. Viton	+10 to 400
PTFE over Buna-N (125 psi, 2" - 12")	+40 to 250
PTFE over Buna-N (75 psi, 2" - 12")	+40 to 275

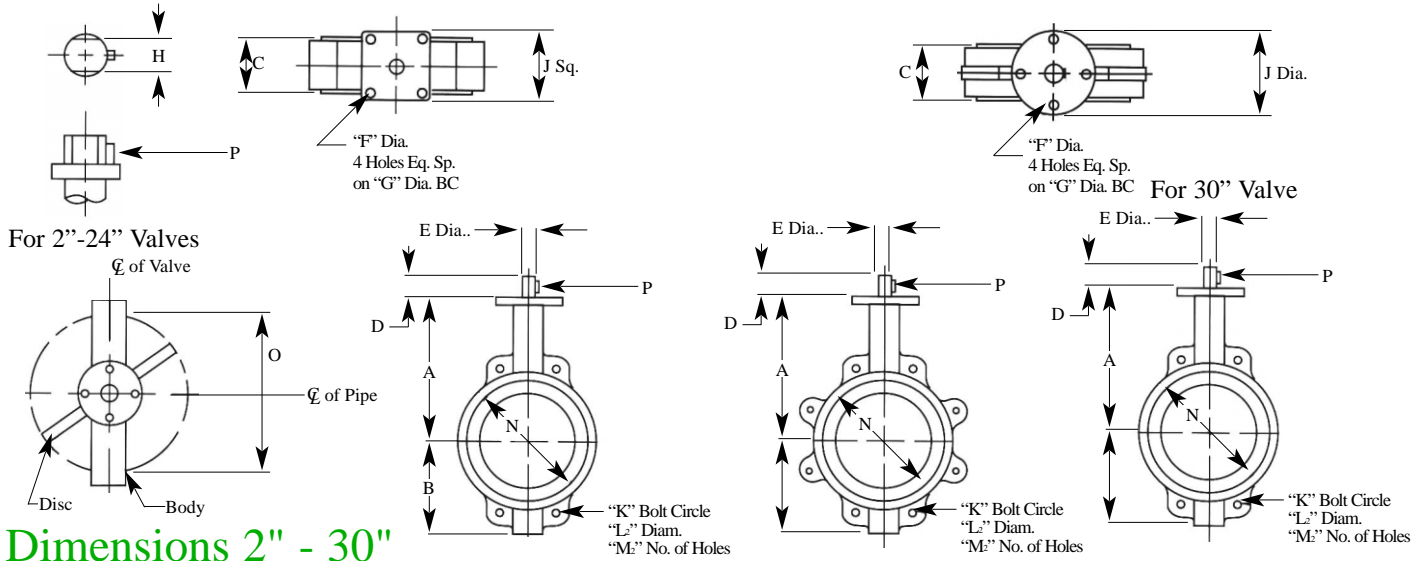
Although elastomers have an effective operating temperature range, when used in valves, these ranges may have to be modified. The temperature ranges shown in the table have been adjusted accordingly.

For Low Temperature: While the seat materials selected for use in Valve Solutions Inc. butterfly valves are capable of withstanding lower temperatures without damage, the durometer of the elastomer may change. This "hardening" of the seat can increase the operating torque beyond the structural limits of the stem and/or the disc to stem connection.

For High Temperature: When using High Temperature Viton®, the operating pressure of the valve is reduced above 275°F.

### Cv Values - Valve Sizing Coefficients (US-GPM @ 1ΔP)

Size	10°	20°	30°	40°	50°	60°	70°	80°	90°
2"	0.06	3	7	15	27	44	70	105	115
2.5"	0.1	6	12	25	45	75	119	178	196
3"	0.2	9	18	39	70	116	183	275	302
4"	0.3	17	36	78	139	230	364	546	600
5"	0.5	29	61	133	237	392	620	930	1022
6"	0.8	45	95	205	366	605	958	1437	1579
8"	2	89	188	408	727	1202	1903	2854	3136
10"	3	151	320	694	1237	2047	3240	4859	5340
12"	4	234	495	1072	1911	3162	5005	7507	8250
14"	6	338	715	1549	2761	4568	7230	10844	11917
16"	8	464	983	2130	3791	6282	9942	14913	16388
18"	11	615	1302	2822	5028	9820	13168	19752	21705
20"	14	791	1647	3628	6465	10698	16931	25396	27908
24"	22	1222	2587	5605	9989	16528	26157	39236	43116
30"	37	2080	4406	9546	17010	28147	44545	66818	73426

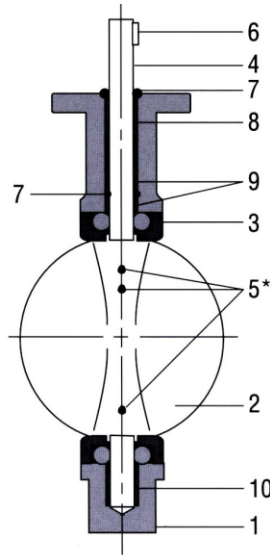


## Dimensions 2" - 30"

Inches mm	A	B	C	D	E	F	G	H	J	K	L <sub>1</sub> *	L <sub>2</sub> *	M <sub>1</sub> *	M <sub>2</sub> *	N	D	P	
ulli-10	2" 50	6 3/8 161.93	3 1/4 82.55	1 3/4 44.45	1 1/4 31.75	1/2 12.70	3/8 9.53	2.76 70	0.39 10	2 3/4 69.85	4 3/4 120.65	5/8-11 17.46	11/16	4	4	4	1.26	No. 3 Wooduff #3
	2.5" 65	6 7/8 174.63	3 3/4 95.25	1 7/8 47.63	1 1/4 31.75	1/2 12.70	3/8 9.53	2.76 70	0.39 10	2 3/4 69.85	5 1/2 139.70	5/8-11 17.46	11/16	4	4	4 3/4 120.65	1.83 46.5	No. 3 Wooduff #3
	3" 75	7 1/8 180.98	4 101.60	1 7/8 47.63	1 1/4 31.75	1/2 12.70	3/8 9.53	2.76 70	0.39 10	2 3/4 69.85	6 152.40	5/8-11 17.46	11/16	4	4	5 1/8 130.1	2.54 64.5	No. 3 Wooduff #3
	4" 100	7 7/8 200.03	4 7/8 123.83	2 1/8 53.98	1 1/4 31.75	5/8 15.88	3/8 9.53	2.76 70	0.47 12	2 3/4 69.85	7 1/2 190.50	5/8-11 17.46	11/16	8	4	6 3/4 171.45	3.54 89.9	No. 9 Wooduff #9
	5" 125	8 3/8 212.73	5 3/8 136.53	2 1/4 57.15	1 3/4 44.45	3/4 19.05	3/8 9.53	2.76 70	0.55 14	2 3/4 69.85	8 1/2 215.90	3/4-10 20.64	13/16	8	4	7 3/4 196.58	4.36 110.7	No. 9 Wooduff #9
	6" 150	8 7/8 225.43	5 7/8 149.23	2 1/4 57.15	1 1/4 31.75	3/4 19.05	3/8 9.53	2.76 70	0.55 14	2 3/4 69.85	9 1/2 241.30	3/4-10 20.64	13/16	8	4	8 5/8 219.08	5.72 145.3	No. 9 Wooduff #9
ulli-50	8" 200	10 1/4 260.35	7 1/8 180.98	2 1/2 63.50	1 3/4 44.45	3/4 19.05	7/16 11.11	4.02 102	0.67 17	3 3/4 95.33	11 3/4 298.45	3/4-10 20.64	13/16	8	4	10 9/16 268.29	7.6 193.0	No. 9 Wooduff #9
	10" 250	11 1/2 292.10	8 1/4 209.55	2 3/4 69.85	1 3/4 44.45	7/8 22.23	7/16 11.11	4.02 102	0.87 22	3 3/4 95.33	14 1/4 361.95	7/8-9 23.81	15/16	12	4	13 1/16 331.79	9.5 241.3	No. 9 Wooduff #9
	12" 300	13 1/4 336.55	9 3/4 247.65	3 1/8 79.38	1 3/4 44.45	1 1/8 28.58	7/16 11.11	4.02 102	0.95 24	3 3/4 95.33	17 431.80	7/8-9 23.81	15/16	12	4	16 1/8 409.58	11.45 290.8	No. 15 Wooduff #15
	14" 350	14 1/2 368.30	11 279.40	3 1/8 79.38	1 3/4 44.45	1 1/4 31.75	7/16 11.11	4.02 102	0.95 24	3 3/4 95.33	18 3/4 476.25	1-8 26.99	1 1/16	12	4	17 1/8 434.98	12.78 324.6	No. 15 Wooduff #15
ulli-200	16" 400	15 3/4 400.05	12 304.80	3 1/2 88.90	2 50.80	1 5/16 33.34	7/8 22.23	6.50 165	1.06 27	6 1/2 165.10	21 1/4 539.75	1-8 26.99	1 1/16	16	4	20 508.00	14.97 380.2	5/16" Sq. x 1 3/4"
	18" 450	16 5/8 422.28	14 3/8 365.13	4 1/4 107.95	2 50.80	1 1/2 38.10	7/8 22.23	6.50 165	1.06 27	6 1/2 165.10	22 3/4 577.85	1 1/8-7 31.75	1 1/4	16	4	21 3/8 542.93	16.83 427.5	3/8" Sq. x 1 1/2"
	20" 500	18 4/8 479.43	14 5/8 371.48	5 1/4 133.35	2 1/2 63.50	1 5/8 41.28	7/8 22.23	6.50 165	1.26 32	6 1/2 165.10	25 635.00	1 1/8-7 31.75	1 1/4	20	4	23 5/16 592.14	18.67 474.2	3/8" Sq. x 1 3/4"
	24" 600	22 1/8 561.98	18 457.20	6 1/8 155.58	2 3/4 69.85	2 50.80	7/8 22.23	6.50 165	1.42 36	6 1/2 165.10	29 1/2 749.30	1 1/4-7 34.93	1 1/4	20	4	27 7/8 708.03	22.62 574.5	1/2" Sq. x 2 1/4"
	30" 750	25 1/2 647.70	24 1/4 615.95	6 3/4 171.45	3 1/4 85.55	2 1/2 63.50	7/8 22.23	8.5 215.90	N/A	11 1/4 285.75	36 914.40	1 1/4-7 34.93	1 1/4-7	28	4	34 3/8 873.13	28.6 726.4	5/8" Sq. x 2 5/8"

\*L1 and \*M1 refer to Lug style valves, L2 and M2 refer to Wafer Style. "C" dimension is listed with elastomer in the relaxed condition. Approximately 1/8" total compression is required for proper sealing with pipe flanges. Valves are designed for installation between ANSI 1316.1 Class 125 (Iron) and B16.5 Class 150 (Steel) flanges. Gaskets are not needed, and should not be used since the seat face seals against the mating flange. If the valve is to be installed in plastic or fiberglass flanges, flange rings, or Van Stone style flanges, consult your Valve Solutions agent or the factory for additional information. Valve Solutions Inc. recommends that a blind flange be used on end of line applications.

<sup>1</sup>Consult factory for dimension to 2 1/2" and 5" PTFE seated valves. "O" dimension is the valve clearance dimension.



Sizes 2"-30"

\*Qty Of 3 pins required for sizes 30" and above

Bill of Materials 2" - 30"

Item	Description	Materials	Optional Materials
1	Body	Ductile Iron	
2	Disc	316 Stainless Steel Monel	Aluminum Bronze, Ductile Iron
3	Seat	EPDM	Neoprene, Hypalon, Viton, PTFE, FDA Abrasion Resistant, Buna
4	Shaft	416 Stainless Steel	316 Stainless Steel Monel
5	Taper Pin	316 Stainless Steel	Monel
6	Key	Carbon Steel	No Option Available
7	O-Ring	Buna-N	No Option Available
8	Bushing	PTFE	Luberized Bronze
9	Bushing	PTFE	Luberized Bronze
10	Bushing	PTFE	Luberized Bronze

<sup>1</sup>ENP plated for 2" - 12" valves

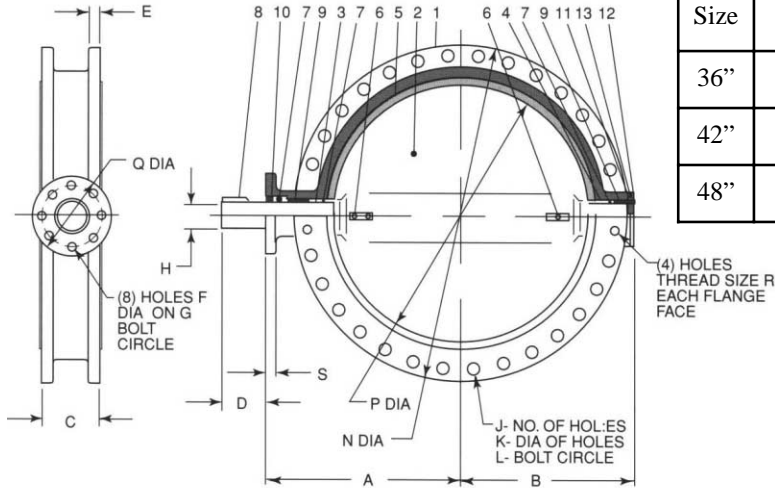
Bill of Materials 36" - 48"

Item	Description	Materials	Optional Materials
1	Body	Ductile Iron	No Option Available
2	Disc	Ductile Iron	Aluminum Bronze, 316 Stainless Steel Monel
3	Upper Shaft	416 Stainless Steel	316 Stainless Steel Monel
4	Lower Shaft	416 Stainless Steel	316 Stainless Steel Monel
5	Seat	Buna-N or EPDM	Hypalon Viton
6	Taper Pin	316 Stainless Steel	Monel
7	O-Ring	Buna-N	No Option Available
8	Key	Carbon Steel	No Option Available
9	Bushing	Luberized Bronze	No Option Available
10	Bushing	Luberized Bronze	No Option Available
11	Thrust Washer	Luberized Bronze	No Option Available
12	End Plate	Ductile	No Option Available
13	O-Ring	Buna-N	No Option Available



## Valve Seating Torques (In-Lbs.)

Valve Size	Standard Disc Differential Pressure			Undercut Differential Pressure 75 psi
	50 psi	100 psi	150 psi	
36"	54,667	57,035	59,400	39,600
42"	82,460	86,034	89,600	60,000
48"	108,022	112,704	117,376	78,600



## Weights

Size		Wafer	Lug
2"	Lbs.	6	7
	Kg.	2.72	3.18
2.5	Lbs.	7	8
	Kg.	3.18	3.63
3	Lbs.	10	14
	Kg.	4.54	6.35
4	Lbs.	13	26
	Kg.	5.90	11.79
5	Lbs.	18	28
	Kg.	8.16	12.70
6	Lbs.	20	31
	Kg.	9.07	14.06
8	Lbs.	32	49
	Kg.	14.51	22.23
10	Lbs.	42	72
	Kg.	19.05	32.66
12	Lbs.	70	105
	Kg.	31.75	47.63
14	Lbs.	95	155
	Kg.	43.09	70.31
16	Lbs.	117	195
	Kg.	53.07	88.45
18	Lbs.	165	230
	Kg.	74.84	104.33
20	Lbs.	275	396
	Kg.	124.74	179.62
24	Lbs.	440	610
	Kg.	199.58	276.70
30	Lbs.	740	1050
	Kg.	335.66	476.27
36	Lbs.	1660	N/A
	Kg.	754	
42	Lbs.	2145	N/A
	Kg.	975	
48	Lbs.	3023	N/A
	Kg.	1374	

## Cv Values-Valve Sizing Coefficients (US-GPM @ 1ΔP)

Size	10°	20°	30°	40°	50°	60°	70°	80°	90°
36"	260	3050	6730	12740	20220	32500	52500	79600	87500
42"	350	4095	9040	17108	27150	43640	70500	106890	117500
48"	455	5365	11840	22400	30600	51200	92300	140000	154000

## \*Dimensions

	36"		42"		48"	
	Inches	mm	Inches	mm	Inches	mm
A	28.35	720.09	33.78	858.01	37	940.7
B	25.83	656.08	30.6	777.24	34	864
C	8 1/8	206.38	10	254	10.88	276.4
D	4.65	118.11	5.9	149.86	5.9	150
E	2.36	59.94	2.6	66.04	2.76	70
F	0.71	18.03	0.71	18.03	0.87	22
G	10	254	10	254	11.73	298
H	2.95	74.93	3.35	85.09	4.13	105
J	28	28	32	32	44	44
K	1 5/8	41.28	1 5/8	41.28	1.62	41.3
L	42 3/4	1058.85	49.5	1257.75	56	1422.4
M	.79 Sq.	20 Sq.	.87 Sq.	22 Sq.	1.1 Sq.	28 Sq.
N	46	1168.4	53	1346.59	56.49	1511
P	34.04	864.61	40.55	1029.97	45.67	1160
Q	11.81	299.97	11.81	299.97	13.78	350
R	1.5 - 6	-	.5 - 6	-	.5 - 6	-
S	1 1/4	31.75	1 1/4	31.75	-	-