



V-CONTROL BALL VALVE FLOW COEFFICIENT C<sub>v</sub> CHARTS

Standard Port 3/4" to 2-1/2" Standard Port 2" to 12"												
Percent and angle of Ball Rotation												
Valve Size	V-Port Angle	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
3/4"	15°	0	0.02	0.08	0.20	0.28	0.44	0.71	0.86	1.2	1.52	1.81
3/4"	30°	0	0.02	0.11	0.24	0.41	0.67	1	1.39	1.94	2.55	3.04
3/4"	60°	0	0.02	0.13	0.36	0.55	0.97	1.55	2.23	3.56	5.01	6.74
3/4"	90°	0	0.02	0.38	0.60	0.75	1.42	2.29	3.38	5.53	8.31	10.46
1"	15°	0	0.02	0.14	0.42	0.66	1.04	1.7	2.13	2.87	3.68	4.32
1"	30°	0	0.02	0.21	0.56	0.96	1.58	2.39	3.43	4.62	6.15	7.26
1"	60°	0	0.02	0.30	0.78	1.24	2.27	3.59	5.28	8.29	11.6	15.5
1"	90°	0	0.02	0.48	1.23	2.30	3.50	5.4	7.7	10.8	12.1	19.7
1-1/4"	15°	0	0.02	0.20	0.60	0.95	1.50	2.44	3.06	4.13	5.29	6.21
1-1/4"	30°	0	0.02	0.30	0.81	1.38	2.27	3.44	4.93	6.64	8.94	10.44
1-1/4"	60°	0	0.02	0.43	1.12	1.78	3.26	5.16	7.59	11.92	16.68	22.28
1-1/4"	90°	0	0.02	0.69	1.77	3.31	5.03	7.76	11.07	15.53	17.39	28.32
1-1/2"	15°	0	0.02	0.23	0.71	1.42	2.35	3.44	5.04	6.92	9.24	11.06
1-1/2"	30°	0	0.02	0.41	1.16	2.12	3.51	5.22	7.56	10.28	13.71	16.28
1-1/2"	60°	0	0.02	0.57	1.74	2.99	5.59	9.07	13.16	19.8	28.42	37.51
1-1/2"	90°	0	0.02	0.66	2.48	4.59	8.74	14.55	20.63	30.07	44.25	57.75
2"	15°	0	0.02	0.33	1.02	2.03	3.36	4.92	7.2	9.88	13.2	15.8
2"	30°	0	0.02	0.55	1.72	3.65	6.00	8.26	12.1	16.6	22.2	29.00
2"	60°	0	0.02	0.70	2.64	4.90	9.32	15.5	22.2	32.1	47.2	61.6
2"	90°	0	0.02	0.88	3.30	6.13	11.65	19.4	27.5	40.1	59	77
2-1/2"	15°	0	0.02	0.47	1.50	3	4.80	7.2	10.37	14.42	19.38	23.39
2-1/2"	30°	0	0.02	0.80	2.55	5.07	8.27	12.02	17.82	24.57	32.42	37.65
2-1/2"	60°	0	0.03	1.02	3.92	7.01	13.89	22.91	32.87	46.55	70.26	91.52
2-1/2"	90°	0	0.03	1.28	4.91	9.15	17.12	28.52	37.46	58.68	86.87	112.82
3"	15°	0	0.04	0.56	1.85	4.17	6	8.41	12.2	16.71	19.92	24
3"	30°	0	0.05	0.75	2.60	5.95	10	16.78	24.38	33.62	43.72	53.83
3"	60°	0	0.07	0.95	4.20	9.91	18.40	29.02	46.12	66.88	93.91	121.06
3"	90°	0	0.08	1.20	5.45	13.21	25.75	43.41	66.23	100.91	148.65	225
4"	15°	0	0.05	0.22	1.58	2.48	4.52	8.21	11.94	18.61	27.94	41.5
4"	30°	0	0.07	0.44	1.89	4.62	9.18	16.13	23.51	36.63	55.22	81.74
4"	60°	0	0.10	1.03	4.59	11.34	24.68	37.37	54.47	84.86	127.91	189.92
4"	90°	0	0.14	1.85	8.27	20.41	37.05	66.98	98.04	150.5	230.34	340.86
6"	15°	0	0.06	0.32	2.26	3.56	6.48	11.78	17.14	26.7	40.09	59.54
6"	30°	0	0.10	0.64	2.71	6.62	13.17	23.14	33.74	52.56	79.23	117.28
6"	60°	0	0.15	1.47	6.59	16.27	35.41	53.61	78.15	121.75	183.52	272.5
6"	90°	0	0.20	2.66	11.86	29.28	53.16	96.09	140.67	215.93	330.48	489.06
8"	15°	0	0.15	0.74	5.26	8.28	15.05	27.36	39.81	62.02	93.14	138.32
8"	30°	0	0.23	1.48	6.29	15.39	30.59	53.77	78.38	122.11	184.07	272.46
8"	60°	0	0.34	3.42	15.30	37.79	82.27	124.55	181.56	282.85	426.36	633.08
8"	90°	0	0.46	6.18	27.55	68.02	123.50	223.25	326.8	501.66	767.79	1136.2
10"	15°	0	0.30	1.44	10.25	16.13	29.30	53.28	77.52	120.77	182.04	269.36
10"	30°	0	0.44	2.89	12.88	31.75	57.72	104.71	152.63	237.8	358.46	530.58
10"	60°	0	0.67	6.66	29.79	73.59	160.21	242.53	353.57	550.82	830.28	1232.8
10"	90°	0	0.89	12.03	53.65	150.00	300.00	500.00	725.00	1020.00	1495.2	2212.7
12"	15°	0	0.58	2.77	19.73	31.05	56.40	102.56	149.23	232.48	350.43	518.52
12"	30°	0	0.85	5.56	24.79	61.12	111.11	201.57	293.81	457.77	690.04	1021.37
12"	60°	0	1.29	12.82	57.35	141.66	308.40	466.87	680.62	1060.33	1598.29	2373.14
12"	90°	0	1.71	23.16	103.28	250.00	550.00	900.00	1325.00	1880.55	2878.26	4259.45
Fl		0	0.96	0.95	0.94	0.93	0.92	0.90	0.89	0.86	0.82	0.75
Xt		0	0.98	0.77	0.71	0.67	0.64	0.63	0.62	0.55	0.43	0.40

Fl = Liquid Pressure Recovery Factor Xt= Pressure Drop Ratio Factor (Gas)





V-CONTROL BALL VALVE FLOW COEFFICIENT C<sub>v</sub> CHARTS

Full Port 1/2" to 4" and 1/2" to 12"												
		Percent and Angle of Ball Rotation										
Valve Size	V-Port Angle	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1/2"	15°	0	0.04	0.17	0.43	0.68	0.98	1.62	2.09	2.84	3.61	4.18
1/2"	30°	0	0.04	0.23	0.47	0.77	1.19	1.83	2.47	3.43	4.65	5.55
1/2"	60°	0	0.04	0.28	0.73	1.11	1.83	2.92	4.29	7.00	9.43	12.78
1/2"	90°	0	0.06	0.47	0.85	1.28	2.05	3.24	4.74	8.26	11.61	14.72
3/4"	15°	0	0.05	0.20	0.51	0.88	1.30	2.13	2.75	3.74	4.75	5.51
3/4"	30°	0	0.07	0.30	0.61	0.99	1.57	2.42	3.25	4.52	6.12	7.30
3/4"	60°	0	0.07	0.35	0.93	1.46	2.42	3.85	5.64	9.21	12.41	16.25
3/4"	90°	0	0.08	0.59	1.11	1.69	2.69	4.27	6.24	10.85	15.28	19.37
1"	15°	0	0.06	0.30	0.93	1.49	2.31	3.75	4.67	6.47	8.46	9.84
1"	30°	0	0.08	0.45	1.25	2.06	3.54	5.30	7.70	10.49	12.84	15.48
1"	60°	0	0.09	0.68	1.74	2.78	5.13	8.00	11.88	18.71	23.22	32.81
1"	90°	0	0.11	0.93	2.78	5.09	7.74	12.20	17.33	22.50	31.40	43.89
1-1/4"	15°	0	0.03	0.27	0.83	1.64	2.78	4.07	5.88	7.99	10.81	12.82
1-1/4"	30°	0	0.05	0.48	1.37	2.47	4.12	6.08	8.82	11.76	14.87	17.37
1-1/4"	60°	0	0.07	0.67	2.04	3.41	6.47	10.80	15.39	22.35	33.37	43.45
1-1/4"	90°	0	0.08	0.78	2.92	5.41	10.23	17.28	25.50	35.60	51.76	65.81
1-1/2"	15°	0	0.05	0.37	1.15	2.26	3.82	5.59	8.08	10.99	14.86	17.62
1-1/2"	30°	0	0.07	0.65	1.88	3.39	5.66	8.36	12.12	16.17	20.44	23.88
1-1/2"	60°	0	0.09	0.92	2.81	4.69	8.89	14.85	21.16	30.73	45.88	59.74
1-1/2"	90°	0	0.10	1.07	4.01	7.44	14.06	22.60	31.90	48.03	71.17	90.49
2"	15°	0	0.06	0.69	2.23	4.45	7.24	10.68	15.38	21.39	28.75	34.69
2"	30°	0	0.09	1.18	3.79	7.53	12.26	17.83	26.44	36.45	48.09	55.85
2"	60°	0	0.11	1.51	5.80	10.39	20.60	33.98	48.75	69.04	104.23	135.75
2"	90°	0	0.16	1.89	7.28	13.58	25.38	42.30	55.56	87.04	129.75	167.34
2-1/2"	15°	0	0.07	0.77	2.40	5.23	8.06	11.73	16.42	22.31	27.24	31.30
2-1/2"	30°	0	0.09	1.15	4.42	7.91	13.39	20.05	30.43	41.92	56.30	76.95
2-1/2"	60°	0	0.13	1.46	5.91	11.90	23.24	37.92	59.31	83.29	113.65	162.50
2-1/2"	90°	0	0.17	1.83	7.29	16.45	31.16	53.53	77.89	118.29	177.32	239.45
3"	15°	0	0.08	0.89	2.96	6.65	9.58	13.42	19.47	26.67	31.79	38.31
3"	30°	0	0.12	1.20	4.15	9.49	15.96	26.78	38.91	53.31	69.77	85.91
3"	60°	0	0.15	2.89	6.70	15.82	29.36	46.32	73.60	106.74	149.88	193.20
3"	90°	0	0.20	4.12	8.65	21.09	41.09	69.27	105.91	161.04	237.23	359.21
4"	15°	0	0.11	1.40	3.73	8.86	16.76	27.91	41.85	59.24	75.49	96.37
4"	30°	0	0.16	1.75	7.84	18.59	35.21	58.60	87.89	124.41	158.53	196.35
4"	60°	0	0.26	2.20	12.44	33.67	62.98	106.26	160.49	233.96	329.50	437.29
4"	90°	0	0.35	4.37	19.68	50.29	91.83	157.43	240.51	365.15	546.62	830.86
6"	15°	0	0.20	2.50	6.64	15.77	29.85	49.70	74.54	105.51	134.44	171.62
6"	30°	0	0.29	3.12	13.97	33.11	62.70	104.37	156.53	221.56	282.33	349.69
6"	60°	0	0.46	5.41	22.15	59.97	112.16	189.24	285.82	416.68	586.83	800.80
6"	90°	0	0.66	7.79	35.05	89.56	163.55	280.37	428.34	650.32	973.50	1479.70
8"	15°	0	0.34	4.23	11.32	26.84	50.80	84.58	126.84	195.00	345.50	692.07
8"	30°	0	0.49	5.32	23.77	56.35	106.70	177.62	266.39	377.06	480.47	595.11
8"	60°	0	0.79	6.66	23.81	102.06	190.87	322.06	486.41	709.11	998.69	1325.38
8"	90°	0	1.05	13.26	59.64	152.42	278.33	477.14	728.96	1106.69	1656.77	2518.18
10"	15°	0	0.53	6.62	17.69	41.94	79.38	132.15	198.20	350.00	545.00	856.36
10"	30°	0	0.77	8.31	37.14	88.05	166.73	277.53	416.24	589.16	750.74	929.87
10"	60°	0	1.23	10.41	37.20	159.47	298.23	503.22	760.02	1107.99	1560.45	2070.90
10"	90°	0	1.64	20.72	93.20	238.16	434.90	745.53	1139.00	1729.20	2588.70	3934.65
12"	15°	0	0.74	9.26	24.76	58.72	111.13	185.01	277.47	564.00	1101.07	1638.90
12"	30°	0	1.07	11.63	52.00	123.27	233.42	388.54	582.73	824.82	1051.03	1301.81
12"	60°	0	1.72	14.57	52.08	223.25	417.52	704.51	1064.03	1551.19	2184.63	2899.26
12"	90°	0	2.29	29.00	130.47	333.42	608.85	1043.74	1594.59	2420.88	3624.18	5508.51

Fl	0	0.96	0.95	0.94	0.93	0.92	0.90	0.89	0.86	0.82	0.75
Xt	0	0.98	0.77	0.71	0.67	0.64	0.63	0.62	0.55	0.43	0.40

Fl = Liquid Pressure Recovery Factor Xt= Pressure Drop Ratio Factor (Gas)





**ROUND PORT BALL VALVE FLOW COEFFICIENT C<sub>v</sub> CHARTS**

Standard Port - 3/4" to 2-1/2" and 1" to 12"											
Valve Size	Percent and Angle of Ball Rotation										
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
3/4"	0	0.21	0.43	0.70	1.05	1.62	2.64	4.00	6.40	9.60	12.00
1"	0	0.58	1.15	1.90	2.80	4.30	7.00	10.50	17.00	26.00	32.00
1-1/4"	0	0.83	1.65	2.67	4.05	6.50	10.00	15.20	24.60	36.00	46.00
1-1/2"	0	1.48	2.95	4.75	7.20	11.00	18.00	27.00	44.00	65.50	82.00
2"	0	2.16	4.33	6.95	10.50	16.20	26.40	39.60	64.00	96.00	120.00
2-1/2"	0	3.75	7.40	26.30	51.20	80.00	111.40	144.20	177.40	209.80	240.00
3"	0	6.40	12.60	20.20	31.10	47.40	77.80	115.00	187.00	280.00	350.00
4"	0	13.10	26.00	42.10	63.10	97.20	159.00	230.00	385.00	575.00	720.00
6"	0	18.40	36.70	59.00	90.00	138.00	224.00	338.00	545.00	815.00	1020.00
8"	0	34.00	68.00	109.00	165.00	254.00	415.00	620.00	1010.00	1500.00	1880.00
10"	0	55.50	299.50	646.60	1065.20	1534.20	2033.90	2547.30	3057.80	3548.90	4000.00
12"	0	138.70	625.00	1299.20	2105.80	3005.00	3960.10	4939.30	5911.10	6844.40	7700.00

Full Port - 1/2" to 4"											
Valve Size	Percent and Angle of Ball Rotation										
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1/2"	0	0	0.00	0.70	3.70	7.80	12.60	17.90	23.30	28.60	32.00
3/4"	0	0	0.00	2.50	7.70	14.20	21.70	29.70	38.00	46.20	54.00
1"	0	0	1.20	8.60	19.40	32.40	46.70	61.90	77.30	92.40	105.00
1-1/4"	0	0	5.30	20.70	41.30	65.40	91.70	119.30	147.20	174.50	200.00
1-1/2"	0	0	3.40	22.70	50.70	83.90	120.80	159.70	199.40	238.40	275.00
2"	0	0	15.50	54.80	106.60	166.60	232.00	300.40	369.50	437.00	500.00
2-1/2"	0	0	25.80	87.60	168.60	262.10	363.90	470.20	577.50	682.30	780.00
3"	0	0	33.80	123.70	242.70	380.80	531.50	689.30	848.70	1004.50	1150.00
4"	0	7.50	118.90	296.20	516.20	766.50	1035.80	1314.30	1592.70	1861.80	2100.00
6"	0	14.15	224.30	631.80	1149.90	1746.30	2392.50	3064.20	3738.80	4393.30	5000.00
8"	0	63.70	600.70	1416.30	2418.30	3552.30	4768.20	6023.10	7275.90	8485.10	9600.00
10"	0	184.20	1085.20	2381.60	3950.90	5712.40	7591.50	9523.90	11447.00	13298.40	15000.00
12"	0	139.30	1314.00	3046.40	5290.00	7770.70	10430.50	13175.60	15916.10	18561.20	21000.00

	Percent and Angle of Ball Rotation										
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Fl	0	0.92	0.91	0.91	0.90	0.86	0.86	0.72	0.65	0.61	0.50
Xt	0	0.78	0.74	0.71	0.67	0.62	0.56	0.49	0.38	0.26	0.15

Fl = Liquid Pressure Recovery Factor Xt= Pressure Drop Ratio Factor (Gas)

**SLOTTED PORT BALL VALVE FLOW COEFFICIENT C<sub>v</sub> CHARTS**

Standard Port - Slot 1/2" to 1-1/2"												
Valve Size	Slot Width	Percent and Angle of Ball Rotation										
		0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1/2"	1/32"	0	0.02	0.03	0.07	0.12	0.16	0.20	0.24	0.28	0.32	0.36
1/2"	1/16"	0	0.02	0.07	0.20	0.33	0.46	0.60	0.73	0.86	0.99	1.10
3/4"	1/32"	0	0.02	0.04	0.08	0.13	0.18	0.23	0.27	0.32	0.37	0.41
3/4"	1/16"	0	0.02	0.08	0.23	0.38	0.52	0.68	0.83	0.10	1.13	1.25
3/4"	1/8"	0	0.02	0.14	0.39	0.65	0.90	1.18	1.44	1.69	1.94	2.16
1"	1/32"	0	0.02	0.06	0.14	0.22	0.29	0.37	0.45	0.53	0.60	0.68
1"	1/16"	0	0.02	0.13	0.38	0.63	0.87	1.14	1.39	1.63	1.88	2.09
1"	1/8"	0	0.02	0.23	0.66	1.09	1.52	1.99	2.42	2.85	3.28	3.64
1-1/2"	1/32"	0	0.02	0.10	0.22	0.34	0.46	0.58	0.70	0.82	0.94	1.06
1-1/2"	1/16"	0	0.02	0.21	0.59	0.98	1.36	1.78	2.16	2.55	2.93	3.26
1-1/2"	1/8"	0	0.02	0.36	1.05	1.73	2.41	3.15	3.83	4.51	5.20	5.77