



Worcester Controls Selection/Sizing Information

There are many control valve sizing formulas used by the process industries, some very complicated and cumbersome, some simple. Flowserve has decided to provide solid, field proven sizing information separate from this brochure. If using your personal calculator, use the Flowserve formulas found in Technical Paper #6 (WCAWP3017). Ask for Worcester Controls PC-compatible Control

Valve Sizing Program. Available on 3½" floppy disks or downloadable from our website: www.flowserve.com, the program is based on ISA formulas and includes instructions.

Below is Cv information for standard seats. Please contact Flowserve if you need special Cv or information regarding the Cv of a special opening.

Flow Coefficient - Cv - Characterized Seat Control Valves

Valve Size	Line Size	Percent of Rated Travel (Degree of Rotation)										
		0 (0)	10 (9)	20 (18)	30 (27)	40 (36)	50 (45)	60 (54)	70 (63)	80 (72)	90 (81)	100 (90)
½" (¼" wide slot)	½	0	.02	.025	.035	.06	.08	.09	.10	.11	.125	.14
	¾	0	.02	.03	.07	.12	.16	.20	.24	.28	.32	.36
¼" ½" (½" wide slot)	¼	0	.02	.03	.07	.10	.14	.18	.21	.25	.29	.32
	1	0	.02	.03	.06	.10	.13	.16	.18	.21	.27	.30
¼" ½" (¼" wide slot)	½	0	.02	.07	.20	.33	.46	.60	.73	.86	.99	1.10
	¾	0	.02	.06	.18	.29	.41	.53	.65	.77	.88	.98
	1	0	.02	.06	.17	.27	.38	.50	.61	.71	.82	.91
½" 15°V	½	0	.02	.07	.19	.30	.45	.73	.94	1.29	1.64	1.91
	¾	0	.02	.06	.16	.26	.40	.64	.83	1.14	1.44	1.68
	1	0	.02	.06	.13	.20	.30	.48	.62	.85	1.08	1.26
¼" ½" 30°V	½	0	.02	.10	.20	.34	.55	.83	1.11	1.59	2.08	2.50
	¾	0	.02	.09	.18	.30	.49	.74	.99	1.41	1.85	2.22
	1	0	.02	.08	.17	.28	.46	.69	.92	1.32	1.73	2.07
¼" ½" 60°V	½	0	.02	.12	.33	.90	.84	1.35	1.95	3.10	4.37	5.92
	¾	0	.02	.10	.29	.44	.75	1.20	1.74	2.76	3.90	5.27
	1	0	.02	.10	.27	.41	.70	1.12	1.62	2.57	3.63	4.91
½" 90°V	½	0	.02	.25	.39	.49	.92	1.49	2.20	3.60	5.40	6.80
	¾	0	.02	.23	.35	.44	.83	1.34	1.98	3.24	4.86	6.12
	1	0	.02	.21	.32	.41	.76	1.24	1.83	2.99	4.48	5.64
½" 120°V	½	0	.02	.27	.43	.66	1.00	1.70	2.40	4.00	6.00	7.50
	¾	0	.02	.04	.08	.13	.18	.23	.27	.32	.37	.41
¾" (½" wide slot)	1	0	.02	.03	.08	.12	.17	.21	.23	.27	.34	.39
	1½	0	.02	.02	.07	.11	.15	.20	.19	.22	.32	.36
	¾	0	.02	.08	.23	.38	.52	.68	.83	.98	1.13	1.25
¾" (¼" wide slot)	1	0	.02	.07	.20	.32	.46	.59	.73	.87	.99	1.10
	1½	0	.02	.06	.18	.28	.41	.52	.64	.76	.86	.97
¾" (⅙" wide slot)	¼	0	.02	.14	.39	.65	.90	1.18	1.44	1.69	1.94	2.16
	1	0	.02	.12	.33	.55	.77	1.00	1.22	1.44	1.65	1.84
	1½	0	.02	.10	.28	.47	.65	.85	1.03	1.22	1.40	1.57
<i>Cv is defined as the flow of liquid in gallons per minute through a valve with a pressure drop of 1 psi across the valve.</i>												
FL		0	.96	.95	.94	.93	.92	.90	.88	.86	.82	.75
Xt		0	.98	.77	.71	.67	.64	.63	.62	.55	.43	.40
<i>FL = Liquid Pressure Recovery Factor Xt = Pressure Drop Ratio Factor (Gas)</i>												

Flow Coefficient - Cv - Characterized Seat Control Valves

Valve Size	Line Size	Percent of Rated Travel (Degree of Rotation)										
		0 (0)	10 (9)	20 (18)	30 (27)	40 (36)	50 (45)	60 (54)	70 (63)	80 (72)	90 (81)	100 (90)
¾" 15°V	¾	0	.02	.08	.20	.28	.44	.71	.86	1.20	1.52	1.81
	1	0	.02	.07	.18	.27	.43	.70	.85	1.18	1.49	1.76
	1½	0	.02	.06	.16	.23	.37	.60	.74	1.00	1.29	1.52
¾" 30°V	¾	0	.02	.11	.24	.41	.67	1.00	1.39	1.94	2.55	3.04
	1	0	.02	.09	.21	.35	.59	.88	1.23	1.69	2.24	2.66
	1½	0	.02	.08	.19	.31	.51	.78	1.08	1.47	1.96	2.33
¾" 60°V	¾	0	.02	.13	.36	.55	.97	1.55	2.25	3.56	5.01	6.74
	1	0	.02	.13	.34	.51	.91	1.44	2.10	3.32	4.66	6.28
	1½	0	.02	.13	.31	.48	.84	1.35	1.95	3.09	4.34	5.85
¾" 90°V	¾	0	.02	.38	.60	.75	1.42	2.29	3.38	5.53	8.31	10.46
	1	0	.02	.33	.53	.66	1.25	2.02	2.97	4.87	7.31	9.20
	1¼	0	.02	.32	.50	.63	1.19	1.92	2.84	4.65	6.98	8.79
1" (½" wide slot)	1	0	.02	.06	.14	.22	.29	.37	.45	.53	.60	.68
	1½	0	.02	.06	.13	.19	.26	.33	.40	.47	.54	.61
	2	0	.02	.05	.12	.18	.24	.31	.33	.39	.50	.57
1" (¼" wide slot)	1	0	.02	.13	.38	.63	.87	1.14	1.39	1.63	1.88	2.09
	1½	0	.02	.11	.34	.55	.78	1.01	1.23	1.46	1.67	1.86
	2	0	.02	.11	.32	.51	.72	.95	1.16	1.35	1.56	1.73
1" (⅙" wide slot)	1	0	.02	.23	.66	1.09	1.52	1.99	2.42	2.85	3.28	3.64
	1½	0	.02	.20	.57	.95	1.32	1.73	2.10	2.48	2.85	3.17
	2	0	.02	.19	.54	.89	1.25	1.63	1.98	2.34	2.69	2.98
1" 15°V	1	0	.02	.14	.42	.66	1.04	1.70	2.13	2.87	3.68	4.32
	1¼	0	.02	.12	.37	.57	.90	1.48	1.85	2.50	3.20	3.76
	1½	0	.02	.11	.33	.52	.82	1.34	1.68	2.27	2.91	3.41
1" 30°V	1	0	.02	.21	.56	.96	1.58	2.39	3.43	4.62	6.15	7.26
	1½	0	.02	.16	.44	.75	1.23	1.86	2.68	3.60	4.80	5.66
	2	0	.02	.15	.40	.69	1.14	1.72	2.47	3.33	4.43	5.23
1" 60°V	1	0	.02	.30	.78	1.24	2.27	3.59	5.28	8.29	11.60	15.50
	1½	0	.02	.23	.61	.97	1.77	2.80	4.12	6.47	9.05	12.10
	2	0	.02	.22	.56	.89	1.63	2.58	3.80	5.97	8.35	11.20
1" 90°V	1	0	.02	.48	1.23	2.30	3.50	5.40	7.70	10.80	12.10	19.70
	1¼	0	.02	.42	1.08	2.02	3.08	4.75	6.78	9.50	10.65	17.34
	1½	0	.02	.38	.98	1.84	2.80	4.32	6.16	8.64	9.68	15.76
1" 120°V	1	0	.02	1.10	1.80	2.60	4.00	6.50	9.80	15.80	24.20	29.80

Cv is defined as the flow of liquid in gallons per minute through a valve with a pressure drop of 1 psi across the valve.

FL	0	.96	.95	.94	.93	.92	.90	.88	.86	.82	.75
Xt	0	.98	.77	.71	.67	.64	.63	.62	.55	.43	.40

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

Flow Coefficient - Cv - Characterized Seat Control Valves

Valve Size	Line Size	Percent of Rated Travel (Degree of Rotation)										
		0 (0)	10 (9)	20 (18)	30 (27)	40 (36)	50 (45)	60 (54)	70 (63)	80 (72)	90 (81)	100 (90)
1½" (½" wide slot)	1½	0	.02	.10	.22	.34	.46	.58	.70	.82	.94	1.06
	2	0	.02	.09	.20	.31	.42	.54	.59	.69	.88	1.00
	2½	0	.02	.08	.19	.29	.39	.50	.49	.58	.81	.93
1½" (⅛" wide slot)	1½	0	.02	.21	.59	.98	1.36	1.78	2.16	2.55	2.93	3.26
	2	0	.02	.21	.56	.91	1.26	1.68	2.03	2.35	2.73	3.03
	2½	0	.02	.20	.53	.85	1.17	1.58	1.90	2.17	2.55	2.82
1½" (⅜" wide slot)	1½	0	.02	.36	1.05	1.73	2.41	3.15	3.83	4.51	5.20	5.77
	2	0	.02	.31	.88	1.47	2.04	2.68	3.25	3.84	4.41	4.91
	2½	0	.02	.25	.74	1.26	1.73	2.28	2.75	3.27	3.75	4.18
1½" 15°V	1½	0	.02	.23	.71	1.42	2.35	3.44	5.04	6.92	9.24	11.06
	2	0	.02	.19	.59	1.18	1.95	2.86	4.18	5.74	7.67	9.18
	2½	0	.02	.17	.53	1.05	1.74	2.55	3.73	5.12	6.84	8.18
1½" 30°V	1½	0	.02	.41	1.16	2.12	3.51	5.22	7.56	10.28	13.71	16.28
	2	0	.02	.38	1.05	2.00	3.14	4.83	6.80	9.51	12.66	15.04
	2½	0	.02	.36	.96	1.80	2.80	4.47	6.11	8.80	11.68	13.90
1½" 60°V	1½	0	.02	.57	1.74	2.99	5.59	9.07	13.16	19.80	28.42	37.51
	2	0	.02	.53	1.60	2.76	5.15	8.36	12.13	18.27	26.23	34.74
	2½	0	.02	.48	1.47	2.54	4.74	7.70	11.19	16.87	24.21	32.16
1½" 90°V	1½	0	.02	.66	2.48	4.59	8.74	14.55	20.63	30.07	44.25	57.75
	2	0	.02	.55	2.08	3.86	7.34	12.22	17.33	25.26	37.17	48.51
	2½	0	.02	.51	1.84	3.40	6.47	10.77	15.27	22.25	32.75	42.74
2" 15°V	2	0	.02	.33	1.02	2.03	3.36	4.92	7.20	9.88	13.20	15.80
	2½	0	.02	.29	.91	1.81	2.99	4.38	6.41	8.79	11.75	14.06
	3	0	.02	.26	.82	1.62	2.69	3.94	5.76	7.51	10.56	12.64
2" 30°V	2	0	.02	.55	1.72	3.41	5.65	8.26	12.10	16.60	22.20	26.50
	3	0	.02	.45	1.41	2.80	4.63	6.77	9.92	13.60	18.20	21.70
	4	0	.02	.41	1.27	2.52	4.18	6.11	8.95	12.30	16.40	19.60
2" 60°V	2	0	.02	.70	2.64	4.90	9.32	15.50	22.20	32.10	47.20	61.60
	3	0	.02	.57	2.16	4.02	7.64	12.70	18.20	26.30	38.70	50.50
	4	0	.02	.52	1.95	3.63	6.90	11.50	16.40	23.80	34.90	45.60
2" 90°V	2	0	.02	.88	3.30	6.13	11.65	19.40	27.50	40.10	59.00	77.00
	2½	0	.02	.79	2.94	5.46	10.39	17.27	24.48	35.69	52.51	68.53
	3	0	.02	.73	2.74	5.09	10.37	17.27	22.83	33.28	48.97	63.91
2" 120°V	2	0	.02	1.86	5.25	10.30	15.80	25.30	37.10	59.50	91.80	110.80

Cv is defined as the flow of liquid in gallons per minute through a valve with a pressure drop of 1 psi across the valve.

FL	0	.96	.95	.94	.93	.92	.90	.88	.86	.82	.75
Xt	0	.98	.77	.71	.67	.64	.63	.62	.55	.43	.40

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

Flow Coefficient - Cv - Characterized Seat Control Valves

Valve Size	Line Size	Percent of Rated Travel (Degree of Rotation)										
		0 (0)	10 (9)	20 (18)	30 (27)	40 (36)	50 (45)	60 (54)	70 (63)	80 (72)	90 (81)	100 (90)
3" 15°V	3	0	.02	.56	1.90	4.20	6.10	8.50	12.30	16.90	20.20	24.40
	4	0	.02	.39	1.33	2.94	4.27	5.95	8.61	11.83	14.14	17.08
	6	0	.02	.31	1.05	2.31	3.36	4.68	6.77	9.30	11.11	13.42
3" 30°V	3	0	.02	.75	2.68	6.00	10.20	16.90	24.50	33.90	44.80	54.20
	4	0	.02	.54	1.93	4.32	7.34	12.20	17.60	24.40	32.30	39.00
	6	0	.02	.41	1.47	3.30	5.61	9.30	13.50	18.60	24.60	29.80
3" 60°V	3	0	.02	.95	4.25	10.10	18.60	29.40	46.30	67.20	94.40	124.60
	4	0	.02	.68	3.06	7.27	13.40	21.20	33.30	48.40	68.00	89.70
	6	0	.02	.52	2.34	5.56	10.20	16.20	25.50	37.00	51.90	68.50
3" 90°V	3	0	.02	1.22	5.50	14.00	26.00	44.00	67.00	102.00	151.00	230.00
	4	0	.02	.85	3.85	9.80	18.20	30.80	46.90	71.40	105.70	161.00
	6	0	.02	.67	3.03	7.70	14.30	24.20	36.85	56.10	83.05	126.50
3" 120°V	3	0	.02	2.40	11.50	26.00	39.70	65.00	96.00	157.00	235.00	293.00
4" 15°V	4	0	.02	4.20	10.00	13.90	17.90	21.70	27.90	34.00	41.20	45.00
	6	0	.02	2.77	6.66	9.17	11.81	14.32	18.41	22.44	27.19	29.70
	8	0	.02	2.31	5.50	7.65	9.85	11.94	15.35	18.70	22.66	24.75
4" 30°V	4	0	.02	.80	3.59	8.50	16.10	26.80	40.20	56.60	72.50	89.80
	6	0	.02	.52	2.33	5.53	10.50	17.40	26.10	36.80	47.10	58.40
	8	0	.02	.44	1.97	4.68	8.86	14.70	22.10	31.10	39.90	49.40
4" 60°V	4	0	.02	.90	5.69	15.40	28.80	48.60	73.40	107.00	150.70	200.00
	6	0	.02	.59	3.70	10.00	18.70	31.60	47.70	69.60	98.00	130.00
	8	0	.02	.50	3.13	8.47	15.80	26.70	40.40	58.90	82.90	110.00
4" 90°V	4	0	.02	2.00	9.00	23.00	42.00	72.00	110.00	167.00	250.00	380.00
	6	0	.02	1.28	5.76	14.72	26.88	46.08	70.40	106.88	160.00	243.20
	8	0	.02	1.10	4.95	12.65	23.10	39.60	60.50	91.85	137.50	209.00
4" 120°V	4	0	.02	3.00	14.00	35.00	64.00	110.00	168.00	255.00	383.00	580.00
	6	0	.02	2.00	9.00	22.00	40.00	69.00	106.00	161.00	240.00	365.00

Cv is defined as the flow of liquid in gallons per minute through a valve with a pressure drop of 1 psi across the valve.

FL	0	.96	.95	.94	.93	.92	.90	.88	.86	.82	.75
Xt	0	.98	.77	.71	.67	.64	.63	.62	.55	.43	.40

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

Flowserve Corporation has established industry leadership in the design and manufacture of its products. When properly selected, this Flowserve product is designed to perform its intended function safely during its useful life. However, the purchaser or user of Flowserve products should be aware that Flowserve products might be used in numerous applications under a wide variety of industrial service conditions. Although Flowserve can (and often does) provide general guidelines, it cannot provide specific data and warnings for all possible applications. The purchaser/user must therefore assume the ultimate responsibility for the proper sizing and selection, installation, operation, and maintenance of Flowserve products. The purchaser/user should read and understand the Installation Operation Maintenance (IOM) instructions included with the product, and train its employees and contractors in the safe use of Flowserve products in connection with the specific application.

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For more information about Flowserve Corporation, visit www.flowserve.com or call USA 1-800-225-6989.

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