

Flow Data

C_v Values for Valves

Liquid Flow:

$$Q = C_v \sqrt{\frac{\Delta P}{S}} \quad \text{or} \quad \Delta P = S \left(\frac{Q}{C_v} \right)^2$$

where... Q = flow rate (gallons per minute)
 ΔP = pressure drop across valve (psi)
 S = specific gravity of media

This equation is good for turbulent flow and for liquids with viscosities near that of water.
 (C_v is defined as the flow in GPM that a valve will carry with a pressure drop of 1.0 psi when the media is water at 60°F.) (The specific gravity of water is 1 (one).)

Gas Flow:

$$Q = 1360 C_v \sqrt{\frac{\Delta P \times P_1}{ST}}$$

where... Q = gas flow (SCFH—std. cu. ft/hr)
 S = specific gravity of gas (air = 1.0)
 T = temp—degrees Rankine (°F + 460)
 ΔP = pressure drop across valve (psi)
 P₁ = upstream pressure (psia) absolute

NOTE: ΔP must be less than .5 P₁. (Flow is critical when ΔP is greater than .5 P₁.)

VALVE SIZE																									(THROTTLING FACTORS) For throttling use with disc partially open. Multiply C _v by factor. NOTE: Gate valves are not throttled.															
Size (mm.)	4	8	10	15	20	25	32	40	50	65	80	90	100	125	150	200	250	300	350	400	450	500	600	750	900	0	10	20	30	40	50	60	70	80	90	100				
Size (in.)	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24	30	36	0	10	20	30	40	50	60	70	80	90	100				
GATES																																								
S/T-29	.5	2	4.9	9.1	22	40	65	95	175																															
S/T-111, 113, 131, 133, 134, 136, 154, 174, 176	—	5.6	10.7	17.6	32	54	97	135	230	337	536	710	960	1,525	2,250																									
T/F-617, 619, 667, 669, 607, 609																																								
F-637, 639									215	335	510	710	945	1,525	2,250	4,150	6,700	9,925	13,800	18,375	23,600	29,600	43,570																	
GLOBES																																								
S/T-211, 235, 256																																								
275-Y	.61	1.16	2.2	3.64	6.65	11.1	20	28	48	70	111	—	198													0	.35	.65	.90	.93	.96	.98	.99	1.00	1.00	1.00				
T-275-B	—	1.16	2.21	3.64	6.65	11.1	20	28	48	70	111															0	.03	.035	.06	.1	.16	.24	.32	.47	.68	1.00				
F-718, F-738									45	70	105	—	195	315	465	860	1,390										0	.35	.65	.90	.93	.96	.98	.99	1.00	1.00	1.00			
CHECKS																																								
S/T-413, 433, 473 (Swing)	—	1.3	2.5	4.8	14.3	24	43	60	102	150	238	315	435	675	1,000																									
S/T-480 (Poppet)	—	—	3.70	6.86	16.3	30	49	72	130																															
F-908 (Swing)										243	356	—	665	1,073	1,584	2,937	4,730	6,985																						
T/F-918, 968, 938 (Swing)									137	221	327	—	605	975	1,440	2,670	4,300	6,350																						
KW-900-W									60	105	184	—	354	577	801	1,500	2,357	3,742																						
F-910, 960 (Poppet)										110	155	—	278	431	625	1,115	1,770	2,500	3,400	4,400	5,600	6,900	10,000	15,400	22,400															
W-910, 960 (Poppet)									66	88	130	—	228	350	520	900	1,450																							
G-920-W									77	129	209	—	358	573	898	1,740	3,180	5,270																						
W-920-W									71	108	178	—	330	560	840	1,600	2,700	4,000																						
BALL																																								
F-510, 530	—	—	—	11	25	45	—	137	217	—	482	—	790	—	1,144	2,164	3,507	5,516									0	.10	.20	.30	.40	.45	.50	.60	.70	.80	.90			
F-515, 535	—	—	—	25	50	85	—	259	440	840	1,400	—	2,350	—	5,200	10,200	14,400	25,300									0	.01	.05	.16	.30	.37	.45	.58	.71	.87	1.00			
F-565	—	—	—	—	—	75	—	235	400	—	1,180	—	2,040	—	—											0	.01	.05	.16	.30	.37	.45	.58	.71	.87	1.00				
T-560-BR/CS/S6	—	4.0	4.0	5	12	22	35	52	95	—	—	—	—	—	—											0	.01	.05	.16	.30	.37	.45	.58	.71	.87	1.00				
T-570	—	—	—	7	12	25	38	52	95	—	—	—	—	—	—											0	.01	.05	.16	.30	.37	.45	.58	.71	.87	1.00				
T/S-580	—	—	—	5.8	13.9	27	44	64	100	—	—	—	—	—	—											0	.01	.05	.16	.30	.37	.45	.58	.71	.87	1.00				
T/S-580-70	—	—	—	—	—	—	38.5	76	101.4	183	390	—	—	—	—											0	.01	.05	.16	.30	.37	.45	.58	.71	.87	1.00				
T/S-585-70	—	4.2	6.2	15.3	30.4	48.8	103	143	245	—	—	—	—	—	—											0	.01	.05	.16	.30	.37	.45	.58	.71	.87	1.00				
TM-585-70-66	—	—	—	15.3	30.4	48.8	103	143	245	—	—	—	—	—	—											0	.01	.05	.16	.30	.37	.45	.58	.71	.87	1.00				
AT-585-70-66	—	—	—	—	—	—	—	—	183	—	—	—	—	—	—											0	.01	.05	.16	.30	.37	.45	.58	.71	.87	1.00				
T-580-70-W3	—	—	—	—	—	—	21.6	38	48.5	—	—	—	—	—	—											0	.01	.05	.16	.30	.37	.45	.58	.71	.87	1.00				
T/S-585-70-W3	—	—	—	6	12	19.5	—	—	—	—	—	—	—	—	—											0	.01	.05	.16	.30	.37	.45	.58	.71	.87	1.00				
T-580 (CS-S6)	—	6	12	15	23	36	44	64	114	—	—	—	—	—	—											0	.01	.05	.16	.30	.37	.45	.58	.71	.87	1.00				
T/S-590-Y	—	—	—	—	—	—	44	64	100	183	390	—	—	—	—											0	.01	.05	.16	.30	.37	.45	.58	.71	.87	1.00				
T/S-595-Y	—	5.9	11.4	18.7	34	57	103	143	245	310	—	—	—	—	—											0	.01	.05	.16	.30	.37	.45	.58	.71	.87	1.00				
TM/KM-595 (CS-S6)	—	6	12	19	37	64	103	143	245	—	—	—	—	—	—											0	.01	.05	.16	.30	.37	.45	.58	.71	.87	1.00				
T/K-595 (CS-S6)	—	6	12	19	37	64	103	143	245	—	—	—	—	—	—											0	.01	.05	.16	.30	.37	.45	.58	.71	.87	1.00				
BUTTERFLY																																								
LD/WD-1000, 2000, 3000									166	247	340	—	660	1,080	1,613	3,759	5,300	7,969	11,917	16,383	21,705	27,908	43,116	60,922	86,375	0	.03	.06	.12	.18	.22	.27	.40	.56	.80	1.00				
GD-4765, 4775 FC-2700, FD-5700									145	195	290	—	600	930	1,600	3,450	5,800	8,950																						

NOTE: Flow data for angle valves use globe Cv times 1.25:
 Bronze Angles - 311, 335, 375, 376-AP
 Iron Angles - 818, 869, 831