

Valve Sizing Constants — Cv

The tables below show the Cv — valve coefficient of flow — for the various types of valve bodies both lined and unlined.

Screwed/Socket End Metal											Flanged End—Rubber Lined														Flanged End—Plastic Lined										
% Open	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	% Open	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"	8"	10"	12"	14"	% Open	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"	
10	0.1	0.3	0.5	1.1	1.7	2.8	4	8.8	10	18	10	1	1.5	2.4	3.9	7	11	16	28	53	114	174	225	326	10	0.9	1.4	2.4	4.2	7.8	11	19.8	34	78	112
20	0.3	0.6	1.2	2.7	4.1	6.8	10	22	26	45	20	2.5	3.8	5.9	9.5	17	28	40	68	131	281	428	552	799	20	2.1	3.5	5.9	10.3	19.2	27	49	82	193	275
30	0.5	1	2	4.5	6.8	11.3	17	36	43	75	30	4.1	6.3	9.9	16	29	46	67	113	218	468	713	920	1332	30	3.5	5.8	9.9	17.1	32	45	81	137	321	459
40	0.7	1.4	2.6	6.0	9	15	22	48	57	100	40	5.5	8.4	13.2	21	38	61	89	151	290	624	950	1226	1776	40	4.7	7.8	13.2	22.8	43	60	108	183	428	612
50	0.8	1.7	3.2	7.3	11	18.3	27	58	69	122	50	6.7	10.2	16.1	26	47	74	108	184	353	759	1156	1492	2161	50	5.7	9.5	16.1	27.7	52	73	131	223	520	745
60	0.9	1.9	3.7	8.3	12.5	20.8	31	66	79	139	60	7.7	11.6	18.3	29	53	85	123	209	402	863	1315	1697	2457	60	6.5	10.8	18.3	31.5	59	83	149	253	592	847
70	1	2.1	4	9.1	13.7	22.8	34	73	86	152	70	8.4	12.7	20	32	58	93	135	229	440	946	1441	1860	2694	70	7.1	11.8	20	34.6	65	91	164	278	649	928
80	1.1	2.2	4.2	9.6	14.4	24	35.5	77	91	160	80	8.8	13.4	21	33.6	61	98	142	242	465	998	1521	1962	2842	80	7.5	12.5	21.1	36.5	68	96	173	293	684	979
90	1.1	2.3	4.3	9.8	14.7	24.5	36.3	78	93	164	90	9	13.7	21.6	34	63	100	145	247	474	1019	1552	2003	2901	90	7.6	12.7	21.6	37	70	98	176	299	699	1000
100	1.1	2.3	4.4	10	15	25	37	80	95	167	100	9.2	14	22	35	64	102	148	252	484	1040	1584	2044	2960	100	7.8	13	22	38	71	100	180	305	713	1020

Flanged End—Unlined											Flanged End—Glass/Halar Lined																		
% Open	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"	% Open	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"	8"	10"	12"	14"				
10	0.6	1.3	1.9	3	4.8	9	14	20	35	67	143	218	281	407	10	0.6	1.3	2	3.2	5	9.2	14.6	21	36	70	150	229	295	427
20	1.5	3.1	4.7	7.4	12	22	34	50	85	163	351	535	690	999	20	1.6	3.2	5	7.8	12.3	22.7	36	52	89	171	367	561	724	1049
30	2.5	5.2	7.9	12.4	19	36	57	83	142	272	585	891	1150	1665	30	2.6	5.4	8.3	13.1	20.4	38	60	87	149	286	612	936	1207	1748
40	3.3	6.9	10.6	16.5	26	48	76	111	189	363	780	1188	1533	2220	40	3.5	7.2	11.1	17.4	27.2	50	80	116	199	381	816	1247	1610	2331
50	4	8.4	12.8	20	32	58	93	135	230	442	949	1445	1865	2701	50	4.2	8.8	13.5	21.2	33.1	61	97	142	242	464	993	1518	1959	2836
60	4.6	9.5	14.6	22.8	36	66	105	154	261	502	1079	1643	2121	3071	60	4.8	10	15.4	24.1	37.7	70	110	161	275	527	1129	1726	2227	3225
70	5	10.5	16	25	39	73	116	168	287	551	1183	1802	2325	3367	70	5.3	10.9	16.8	26.4	41.3	76	121	177	301	578	1238	1892	2442	3535
80	5.3	11	16.9	26.4	41	77	122	178	302	581	1248	1901	2453	3552	80	5.6	11.5	17.8	27.8	43.6	81	128	186	318	610	1306	1996	2576	3730
90	5.4	11.3	17.2	26.9	42	78	124	181	309	593	1274	1940	2504	3626	90	5.7	11.8	18.1	28.4	44.5	82	130	190	324	622	1333	2037	2629	3807
100	5.5	11.5	17.6	27.5	43.2	80	127	185	315	605	1300	1980	2555	3700	100	5.8	12	18.5	29	45.4	84	133	194	331	635	1360	2079	2683	3865

Fluid Velocity: Fluid velocity is a very important design consideration; and in order to assure maximum life of body and diaphragm when handling abrasives, it is recommended that velocity be kept to a maximum of 35 feet per second. Higher velocity can be tolerated when handling non-abrasives, however, consideration should be given to the possibility of hydraulic shock.

Fluid velocity formula;

$$V = .321 \frac{Q}{A}$$

where V = Velocity-ft./sec.
 Q = Flow-GPM
 A = Area over weir

Area Over Weir

Square Root Table

No	Square Root	No	Square Root	No	Square Root
1	1.0000	21	4.5826	41	6.4031
2	1.4142	22	4.6904	42	6.4807
3	1.7321	23	4.7958	43	6.5574
4	2.0000	24	4.8990	44	6.6332
5	2.2361	25	5.0000	45	6.7082
6	2.4495	26	5.0990	46	6.7823
7	2.6458	27	5.1962	47	6.8557
8	2.8284	28	5.2915	48	6.9282
9	3.0000	29	5.3852	49	7.0000
10	3.1623	30	5.4772	50	7.0711
11	3.3166	31	5.5678	51	7.1414
12	3.4641	32	5.6569	52	7.2111
13	3.6056	33	5.7446	53	7.2801
14	3.7417	34	5.8310	54	7.3485
15	3.8730	35	5.9161	55	7.4162
16	4.0000	36	6.0000	56	7.4833
17	4.1231	37	6.0828	57	7.5498
18	4.2426	38	6.1644	58	7.6158
19	4.3589	39	6.2450	59	7.6811
20	4.4721	40	6.3246	60	7.7460

AREA OVER THE WEIR-SQUARE INCHES

Valve Size	% OPEN									
	10	20	30	40	50	60	70	80	90	100
1/2	.03	.06	.08	.10	.12	.14	.16	.18	.19	.20
3/4	.06	.10	.15	.19	.24	.27	.30	.34	.37	.39
1	.10	.18	.25	.32	.39	.45	.51	.56	.61	.64
1 1/4	.15	.28	.38	.49	.60	.70	.77	.85	.93	.97
1 1/2	.23	.42	.61	.80	.96	1.10	1.25	1.38	1.50	1.58
2	.40	.72	1.06	1.32	1.63	1.88	2.10	2.32	2.52	2.66
2 1/2	.56	1.06	1.53	1.96	2.36	2.74	3.08	3.40	3.63	3.88
3	.86	1.62	2.32	2.95	3.56	4.18	4.66	5.12	5.58	5.90
4	1.40	2.66	3.78	4.84	5.80	6.80	7.62	8.40	9.09	9.60
6	3.20	5.90	8.20	10.50	12.60	14.62	16.41	18.25	19.72	21.00
8	5.92	11.41	16.25	20.62	25.00	29.00	32.80	36.00	38.80	41.00