

# Cv – Flow Coefficient

Valve flow coefficient –  $C_v$  – indicates valve capacity. It is the flow in gallons per minute of water at 60°F through the valve with 1 psi pressure drop at a stated upstream pressure. In most on/off valve applications, a high  $C_v$  is important. The high  $C_v$  of a full-port sleeve results in low pressure losses through the valve, which increases capacity and reduces pumping costs. High  $C_v$  is a disadvantage in throttling or control applications, however, where the valve is used to absorb pressure.

To maintain a pressure drop across a full-port sleeve, the valve must be positioned in a partially closed position. This results in increased sleeve wear and reduces the control range of the sleeve. If the valve has to be positioned at 50% open to obtain the correct pressure drop at maximum flow, the control range is cut in half, as the valve position above 50% is useless. Red Valve Cone Sleeves solve this problem with a flow restriction that is designed into the sleeve. This allows the valve to operate at positions closer to 100% open.

## How To Use The Flow Coefficient – $C_v$ – Charts

- ▶ From the example on page 17, note line size. In the example on page 17 line size is 3".
- ▶ Select proper valve size from the lefthand column of the  $C_v$  charts below. In the example, valve size is 3"; from the lefthand column, locate valve size 3".
- ▶ Note calculated  $C_v$ . From the example, calculated  $C_v$  is 54.8.
- ▶ Locate from among the three charts, under 100% open, the closest value to calculated  $C_v$ . Closest value for the example is 58.
- ▶ Use this value to determine sleeve trim. In the example, 58 is the  $C_v$  value for a 3" x 1-1/2" Cone Sleeve.

**Note:** For modulating service select  $C_v$  values between 20% and 80% to allow for good control.

### Cv Standard and Double-Wall Sleeve – Series 5200

VALVE SIZE (")	VALVE OPENING-% OF TOTAL TRAVEL									
	10	20	30	40	50	60	70	80	90	100
1	9	18	28	41	50	61	64	65	66	67
1-1/2	19	40	62	91	112	137	143	145	147	148
2	34	70	109	159	196	240	252	255	257	260
2-1/2	53	108	169	247	304	372	390	395	398	402
3	74	152	237	347	427	523	548	554	560	565
4	110	235	389	532	656	759	791	803	811	817
6	160	358	601	941	1214	1417	1513	1567	1609	1643
8	284	635	1065	1670	2155	2514	2682	2779	2853	2913
10	444	993	1666	2613	3370	3931	4168	4345	4460	4552
12	724	1619	2716	4260	5494	6411	6841	7085	7272	7422
14	967	2163	3629	5691	7340	8565	9142	9464	9710	9911
16	1263	2824	4740	7433	9587	11186	11939	12360	12682	12944
18	1611	3604	6049	9485	12234	14275	15236	15773	16184	16519
20	2384	5332	8949	14033	18100	21119	22542	23337	23944	24440
24	2951	6601	11079	17373	22407	26145	27906	28890	29641	30255

For larger sizes up to 72", consult factory.

### Cv Standard and Double-Wall Sleeve – Series 5400

VALVE SIZE (")	VALVE OPENING-% OF TOTAL TRAVEL									
	10	20	30	40	50	60	70	80	90	100
4	110	235	389	532	656	759	791	803	811	817
6	229	552	1038	1390	1527	1594	1643	1670	1691	1700
8	405	979	1843	2466	2706	2827	2913	2961	2998	3014
10	634	1531	2883	3856	4233	4420	4552	4629	4686	4710
12	1034	2496	4701	6288	6902	7207	7422	7548	7641	7680
14	1381	3335	6280	8400	9224	9624	9911	10083	10209	10260
16	1804	4355	8202	10971	12047	12569	12944	13170	13333	13400
18	2302	5558	10467	14000	15373	16040	16519	16806	17015	17100
20	3405	8223	15486	20713	22745	23731	24440	24865	25174	25300
24	4215	10180	19171	25642	28157	29378	30255	30781	31164	31320
30	6737	16270	30641	40983	45003	46954	48356	49197	49809	50058
36	9882	23866	44945	60116	66013	68875	70931	72164	73062	73428
42	15103	36477	68694	91881	100893	105268	108411	110296	111668	112227
48	23457	56654	106690	142703	156699	163494	168375	171302	173434	174302
54	34423	83137	156564	209411	229951	239922	247084	251380	254508	255782

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# Cv – Flow Coefficient (cont.)

## Cv Cone Sleeve – Series 5200

VALVE SIZE (")		PORT SIZE (")	VALVE OPENING-% OF TOTAL TRAVEL									
			10	20	30	40	50	60	70	80	90	100
1	x	1/3	.10	.44	.88	1.52	1.92	2.46	2.80	3.00	3.24	3.44
1	x	1/2	.2	.9	1.8	3.1	3.9	5	5.7	6.1	6.6	7
1	x	3/4	1.1	2.8	5.6	7.7	11.7	14.5	17	18.9	21	23.3
1-1/2	x	1/2	.31	1.56	2.49	3.74	4.67	4.98	5.60	6.23	6.54	6.85
1-1/2	x	1/4	1	5	8	12	15	16	18	20	21	22
1-1/2	x	1	3	6	10	16	20	28	32	36	37	38
2	x	3/4	.50	2.00	4.00	7.00	9.00	11.50	13.00	14.00	15.00	16.00
2	x	1	1	4	8	14	18	23	26	28	30	32
2	x	1-1/2	4	7	15	26	43	57	65	72	78	84
2-1/2	x	1	.74	1.29	2.78	4.81	7.92	10.53	11.98	13.30	14.38	15.50
2-1/2	x	1-1/2	2.2	3.8	8.2	14.2	23.4	31.1	35.4	39.3	42.5	45.8
2-1/2	x	2	10.7	24	49.3	63.4	79.7	93	118	132	137	153
3	x	1	.89	1.78	3.56	6.52	10.38	12.46	14.83	16.01	16.61	17.20
3	x	1-1/2	3	6	12	22	35	42	50	54	56	58
3	x	2	8	17	32	51	70	92	118	131	143	152
4	x	1-1/2	1.47	2.94	5.88	10.30	19.61	25.99	30.89	34.33	37.76	40.70
4	x	2	3	6	12	21	40	53	63	70	77	83
4	x	3	15	32	63	131	159	197	231	253	286	315
6	x	3	10	17	35	79	101	115	134	148	170	187
6	x	4	23	41	85	190	242	277	322	357	410	450
6	x	5	46	94	174	311	484	618	748	862	948	1028
8	x	4	14	27	54	95	180	239	284	315	347	374
8	x	5	32	57	121	216	346	453	517	573	624	673
8	x	6	58	143	280	396	578	747	884	998	1102	1215
10	x	5	22	38	80	178	226	259	301	334	384	421
10	x	6	34	59	127	220	363	482	549	609	659	710
10	x	8	123	271	523	741	914	1091	1263	1514	1709	1787
12	x	6	25	51	101	177	337	447	532	590	649	700
12	x	8	86	153	317	709	904	1034	1202	1333	1531	1680
12	x	10	144	296	548	975	1519	1942	2349	2707	2979	3229
14	x	8	67	142	267	426	585	768	985	1094	1194	1269
14	x	10	144	303	553	877	1216	1589	2019	2378	2604	2803
14	x	12	193	397	693	1156	1940	2548	3107	3637	4109	4431
16	x	8	54	114	215	343	470	618	793	880	961	1021
16	x	12	205	433	778	1226	1713	2228	2817	3438	3771	4078
16	x	14	271	558	1003	1731	2819	3619	4394	5103	5695	6138
18	x	12	146	260	539	1205	1536	1757	2043	2265	2602	2855
18	x	14	283	596	1082	1712	2381	3181	4040	4707	5158	5567
18	x	16	454	949	1640	2674	4243	5232	6435	7671	8731	9431
20	x	14	305	646	1213	1936	2657	3493	4478	4972	5427	5768
20	x	16	504	1060	1900	2995	4189	5536	7124	8446	9264	10019
20	x	18	480	987	1735	2919	4865	6347	7730	9030	10186	10964
24	x	16	381	678	1405	3142	4007	4583	5327	5908	6786	7446
24	x	18	543	1152	2213	4433	5792	7058	8340	9318	1030	11447
24	x	20	692	1452	2553	4002	5644	7333	9596	11507	12840	13915
30	x	18	440	934	1754	2800	3840	5280	6472	7188	7845	8337
30	x	20	611	1088	2254	5041	6428	7352	8546	9478	10886	11945
30	x	24	1646	3647	7058	9946	12278	14638	17024	29760	22934	23903
36	x	20	511	1081	2030	3239	4446	5843	7490	8318	9079	9649.2
36	x	24	894	1592	3299	7379	9408	10761	12509	13873	15933	17484
36	x	30	1906	3929	7291	13012	20185	25795	31189	35919	39471	42799

For larger sizes up to 72", consult factory.

# Cv – Flow Coefficient (cont.)

## Cv Cone Sleeve – Series 5400

VALVE SIZE (")		PORT SIZE (")	VALVE OPENING-% OF TOTAL TRAVEL									
			10	20	30	40	50	60	70	80	90	100
4	x	1-1/2	1.47	2.94	5.88	10.3	19.61	25.99	30.89	34.33	37.76	40.7
4	x	2	3	6	12	21	40	53	63	70	77	83
4	x	3	15	32	63	131	159	197	231	253	286	315
6	x	3	9.56	17.04	35.32	78.96	100.56	115.11	133.81	148.35	170.38	187.00
6	x	4	23	41	85	190	242	277	322	357	410	450
6	x	5	54.5	113	231	452	612	766	899	987	1089	1210
8	x	4	13.5	27	54	94.6	180	239	284	315	347	374
8	x	5	32	57	121	216	346	453	517	573	624	673
8	x	6	62	156	311	427	653	810	948	1055	1173	1300
10	x	5	22	38	80	178	226	259	301	334	384	421
10	x	6	33.8	59.2	127	220	363	482	549	609	659	710
10	x	8	140	315	648	834	1047	1222	1547	1732	1805	2010
12	x	6	25	51	101	177	337	447	532	590	649	700
12	x	8	85.9	153	317	709	904	1034	1202	1333	1531	1680
12	x	10	171	355	726	1418	1923	2407	2824	3101	3420	3800
14	x	8	67.18	142.16	266.98	426.03	584.66	768.42	985.12	1093.91	1194.02	1269.00
14	x	10	155	328	616	983	1349	1773	2273	2524	2755	2928
14	x	12	250	520	1063	2077	2816	3525	4136	4541	5008	5565
16	x	8	53.95	114.43	214.85	342.82	470.33	618.16	792.61	880.18	960.75	1021.00
16	x	12	231	490	920	1468	2014	2647	3394	3769	4114	4372
16	x	14	336	699	1428	2791	3784	4737	5558	6102	6730	7478
18	x	12	146	260	539	1205	1536	1757	2043	2265	2602	2855
18	x	14	310	658	1236	1973	2708	3721	4561	5065	5528	5875
18	x	16	573	1218	2343	4324	5534	7195	8619	9503	10562	11437
20	x	14	305	646	1213	1936	2657	3493	4478	4972	5427	5768
20	x	16	570	1209	2271	3626	4973	6838	8382	9308	10159	10797
20	x	18	614	1277	2609	5100	6915	8656	10156	1151	12298	13665
24	x	16	381	678	1405	3142	4007	4583	5327	5908	6786	7446
24	x	18	575	1226	2415	5022	6095	7552	8856	9699	10964	12076
24	x	20	818	1735	3260	5204	7138	9815	12031	13360	14581	15497
30	x	18	440	934	1754	2800	3840	5280	6472	7188	7845	8337
30	x	20	611	1088	2254	5041	6428	7352	8546	9478	10886	11945
30	x	24	1869	4204	8649	11132	13975	16310	20648	23117	24092	26828
36	x	20	511	1081	2030	3239	4446	5843	7490	8318	9079	9649
36	x	24	894	1592	3299	7379	9408	10761	12509	13873	15933	17484
36	x	30	2259	4689	9590	18731	25402	31795	37304	40963	45176	50196
42	x	24	766	1622	3046	4860	6670	8766	11238	12479	13622	14477
42	x	30	1665	3522	6615	10557	14487	19040	24410	27105	29586	31444
42	x	36	3781	7865	16078	31414	42592	53315	62557	68682	75745	84170
48	x	30	1215	2132	4558	8125	13023	17055	19460	21586	23485	25347
48	x	36	2705	5739	10775	17193	23587	31001	39749	44141	48181	51203
48	x	42	6527	13578	27738	54213	73502	92013	107961	118527	130726	130726
54	x	36	2066	3681	7626	17056	21747	24874	28916	32067	36831	40415
54	x	42	4102	8708	16356	26109	35809	49241	60357	67027	73154	77746
54	x	48	10407	22122	42556	78537	100514	130682	156546	172602	191837	191837

For larger sizes up to 72", consult factory.