KFlo 500 Series Butterfly Valve CV Values

When a fluid passes a valve's point of minimum area (known as the vena contracta) the fluid velocity increases and the pressure drops. If the speed through the valve is high enough, the pressure in the liquid may drop to a level where the fluid starts to bubble or flash. The pressure recovers sufficiently and the bubbles collapse upon themselves in a phenomenon known as cavitation. This collapse can be violent in the low-pressure, turbulent, flow-separation regions inside valves, and its resulting energy release can cause significant noise and vibration. In addition, these bubble "implosions" can have shock waves up to 100,000 psi, and if they contact a solid surface like the valve's interior, pitting will occur.

Cavitation's intensity and its effects on a system can vary. At its least offensive, it produces a slight crackling sound that doesn't harm the valve or system. At its most destructive, it can cause noise levels exceeding 100 dB, a level that can damage hearing. In addition, vibrations from cavitation can cause significant erosion within the valve body, as well as damage to the system's mechanical integrity, leading to seat leakage and valve failure.

The intensity of cavitation varies with valve type, size, operating pressure and details of the piping installation. If one knows a valve's flow and pressure conditions, it's possible to predict its potential cavitation intensity, and thereby reduce or eliminate the effects. In order to compare the cavitation performance of similiar valves, the comparison should be based upon a flow coefficient, known as Cv. The formula for determining a valve's Cv is shown at top right.

Mathematical Formula for Cv

The flow characteristic of given valve is defined by the valve's Cv value. Cv is defined as the maximum flow (expressed in gallons per minute, or gpm) of water at 60 degrees F, which produces a 1 psi pressure drop across the valve.

For Water: $Cv=Q/\sqrt{\blacktriangle P}$ where Q= flow rate in gpm
and ▲ P= pressure drop across valve in psi

For Fluids other than water:
$Cv=Q/\sqrt{\blacktriangle P/G}$ where G=specific gravity of the fluid (water=1.0)
and ▲ P= pressure drop across valve in psi

For example, if the valve must pass water at a flow rate of 300gpm, and the maximum allowable pressure drop is 3psi, the Cv of the valve must be equal to or greater than 173.2.
$Cv=300gpm/\sqrt{3psi} = 173.2$

500 Series Cv Values at Varying Degrees Open

Degs. Open	Valve Size									
	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"
5	2	3	7	16	23	35	51	71	90	115
10	3	6	14	32	47	70	103	144	182	231
15	6	13	29	64	96	142	209	292	369	468
20	10	21	48	107	160	237	349	486	615	780
25	16	32	74	164	243	362	532	742	938	1189
30	22	45	105	232	346	514	755	1054	1333	1690
35	30	61	141	313	465	692	1017	1419	1795	2276
40	41	83	191	424	630	937	1377	1921	2431	3082
45	53	108	249	553	822	1222	1796	2506	3170	4019
50	74	150	345	766	1075	1599	2350	3278	4147	5258
55	95	192	444	984	1395	2074	3048	4252	5380	6820
60	117	238	548	1216	1802	2681	3940	5496	6953	8814
65	142	287	663	1472	2323	3454	5076	7082	8959	11358
70	169	344	794	1761	3002	4464	6560	9152	11579	14678
75	195	395	911	2022	3719	5532	8129	11341	14348	18189
80	212	430	992	2201	4158	6184	9089	12679	16041	20336
85	224	454	1047	2324	4318	6422	9438	13166	16657	21116
90	228	463	1069	2372	4380	6515	9574	13356	16898	21421

Certified Dimensions Available Upon Request.

600 FOWLER AVE., BERWICK, PA 18603 • T: (570) 752-4524 F: (570) 752-4962 • E: SALES@CRISPINVALVE.COM