

**Valve Selection Chart - Steam
Application Information**

Steam Capacity in Pounds per Hour

Inlet Pressure (PSI)	2 #		5 #		10 #		15 #		25 #		40 #		50 #		75 #		100 #	
Pressure Drop	.2 #	1.6 #	.5 #	4 #	1 #	8 #	1.5 #	12 #	2.5 #	12.5 #	4 #	20 #	5 #	25 #	7.5 #	30 #	10 #	40 #
C _v																		
.2	1.1	3	1.9	4.7	3	6.9	3.9	8.7	5.8	11	8.5	16	10	19	15	25	19	33
.4	2.2	6	3.7	9.5	6	14	7.8	18	12	22	17	32	21	38	30	51	39	66
.6	3.3	9	5.6	14	8.7	21	12	26	17	33	26	47	31	57	45	76	58	99
.8	4.4	12	7.4	19	12	28	16	35	23	44	34	63	42	76	60	102	78	131
1.0	5.5	15	9.3	24	15	35	20	44	29	55	43	79	52	95	74	127	97	164
1.2	6.6	18	11	28	17	42	23	52	35	66	51	95	62	113	89	152	117	197
1.4	7.7	21	13	33	20	49	27	61	41	77	60	111	73	132	104	178	136	230
1.6	8.8	24	15	38	23	56	31	70	46	89	68	126	83	151	119	203	156	263
1.8	9.9	27	17	43	26	63	35	79	52	100	77	142	93	170	134	228	175	295
2.0	11	30	19	48	29	69	39	87	58	111	85	158	104	189	149	254	194	328
2.2	12	33	21	52	32	76	43	96	64	122	94	174	114	208	164	279	214	361
2.4	13	36	22	57	35	83	47	105	70	133	102	190	124	227	179	305	233	394
2.6	14	38	24	62	38	90	51	114	75	144	111	206	135	246	193	330	253	427
2.8	15	41	26	67	41	97	55	122	81	155	120	221	145	265	208	355	272	460
3.0	16	44	28	71	44	104	59	131	87	166	128	237	155	284	223	381	292	492
3.5	19	52	33	83	51	121	68	153	101	194	150	277	181	331	260	444	340	574
4.0	22	59	37	95	58	139	78	175	116	221	171	316	207	378	298	508	389	656
4.5	24	67	42	107	66	156	88	197	130	249	192	356	233	425	335	571	437	739
5.0	27	74	46	119	73	174	98	219	145	277	214	395	259	473	372	635	486	821
5.5	30	81	51	131	80	191	107	240	159	304	235	435	285	520	409	698	535	903
6.0	33	89	56	143	88	208	117	262	174	332	256	475	311	567	446	761	583	985
6.5	36	96	60	155	95	226	127	284	188	359	278	514	337	614	484	825	632	1,067
7.0	38	104	65	167	102	243	137	306	203	387	299	554	363	662	523	888	680	1,149
7.5	41	111	70	179	110	260	146	328	217	415	320	593	389	709	560	952	729	1,231
8.0	44	118	74	190	117	278	156	350	232	442	342	633	414	756	595	1,015	778	1,313
8.5	47	126	79	202	124	295	166	372	246	470	363	672	440	803	632	1,079	826	1,395
9.0	49	133	84	214	131	312	176	393	261	498	384	712	466	851	670	1,142	875	1,477
9.5	52	141	88	226	138	330	185	415	275	525	406	751	492	898	707	1,206	923	1,559
10	55	148	93	238	146	347	195	437	290	553	427	791	518	945	744	1,269	972	1,641
11	61	163	102	262	161	382	215	481	319	608	470	870	570	1,040	818	1,396	1,069	1,805
12	66	178	112	286	175	416	234	524	347	664	512	949	622	1,134	893	1,523	1,166	1,969
13	71	192	121	309	190	451	254	568	376	719	555	1,030	673	1,229	967	1,650	1,263	2,133
14	77	207	130	333	204	486	273	612	405	774	598	1,107	725	1,323	1,042	1,777	1,360	2,297
15	83	222	140	358	219	521	293	656	434	830	641	1,186	777	1,418	1,116	1,904	1,458	2,462
17	94	252	158	405	248	590	332	743	492	940	726	1,344	881	1,607	1,267	2,157	1,652	2,790
19	105	281	177	452	277	659	371	830	550	1,051	811	1,503	984	1,796	1,414	2,411	1,846	3,118
21	116	311	195	500	307	729	410	918	608	1,161	897	1,662	1,088	1,985	1,562	2,665	2,041	3,446
23	127	340	214	547	336	798	449	1,005	665	1,272	982	1,820	1,191	2,174	1,711	2,919	2,235	3,774
25	138	370	233	595	365	868	487	1,093	725	1,383	1,068	1,978	1,295	2,363	1,860	3,173	2,430	4,103
27	149	400	251	642	394	937	527	1,180	782	1,493	1,153	2,136	1,399	2,552	2,011	3,426	2,624	4,431

VALVE SIZE SELECTION-SATURATED STEAM

To size valves when steam is saturated and quantity, inlet pressure, and pressure drop are known

- Set straight edge on inlet pressure scale (P-1), and pressure drop scale (ΔP) and mark intersection of straight edge on base line.
- Set straight edge on base line mark and steam quantity on ($\#/hour$) scale.
- Read flow coefficient at intersection of straight edge and flow coefficient scale (C_v).
- Select flow having same or greater coefficient. Valve C_v 's are shown on valve data sheets.

Note: When C_v required is between two valve sizes and closer to smaller valve size, re-size for C_v using critical pressure (1/2 absolute) as pressure drop. If this new C_v is smaller than small valve C_v , use small valve size. If new C_v is larger than smaller of two valve sizes, use larger valve size.

VALVE SIZE SELECTION-NON-SATURATED STEAM

To size valve when steam quality is less than 100%, and quantity, inlet pressure, and pressure drop are known:

- Set straight edge on steam quantity, ($\#/hour$) scale and steam quality on inlet steam condition scale.
- Pivot straight edge at pivot line to 100% on steam inlet condition scale.
- Read corrected steam quantity on ($\#/hour$) scale.
- Using corrected steam quantity, proceed with steps A,B,C,D for saturated steam.

FINDING PROP. CONTROL VALVE SIZE

EXAMPLE: Given inlet steam pressure of 5 PSIG and a load requiring 220 $\#/hour$, find C_v for proportional control valve using 80% pressure drop.

- Set straight edge on inlet pressure scale (5 PSI) and pressure drop scale (4 PSI). Mark intersection of straight edge with base line (see dotted lines).
- Set straight edge on base line mark and steam quantity on $\#/hour$ scale (220 $\#/hour$).
- Read valve C_v on intersection on straight edge and C_v scale. $C_v=9$.
- Select valve from data sheet. Assuming a VB-202 Valve C_v of 9 is closer to 1" size ($C_v=8$) than 1-1/4" size ($C_v=15$). Re-sizing for C_v at critical pressure drop, as directed by instruction under step D for saturated steam results in a required C_v of 6.4. Select 1" valve since its C_v of 8 is larger than 6.4

VALVE SIZE SELECTION-SUPER-HEATED STEAM

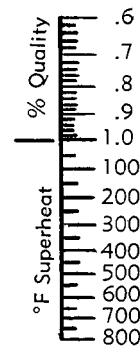
To size valve when steam is super-heated and quantity, inlet pressure, and pressure drop are known:

- Set straight edge on steam quantity ($\#/hour$) scale and on degrees super heat on inlet steam condition scale.
- Pivot straight edge on pivot line to 0° super heat on steam inlet condition scale.
- Read corrected steam quantity on ($\#/hour$) scale.
- Using corrected steam quantity, proceed with steps A,B,C,D for saturated steam.

CRITICAL PRESSURE

Do not size steam valves on higher system pressures using a pressure drop greater than 1/2 of the absolute inlet pressure. [Absolute pressure (PSIA) = Gauge Pressure (PSIG) + Atmospheric Pressure (14.7 PSI)] Critical pressure equals 1/2 of the absolute pressure, and pressure drops larger than the critical pressure will not cause a corresponding increase in steam flow through the valve.

INLET STEAM CONDITION



PRESSURE DROP RECOMMENDATIONS:

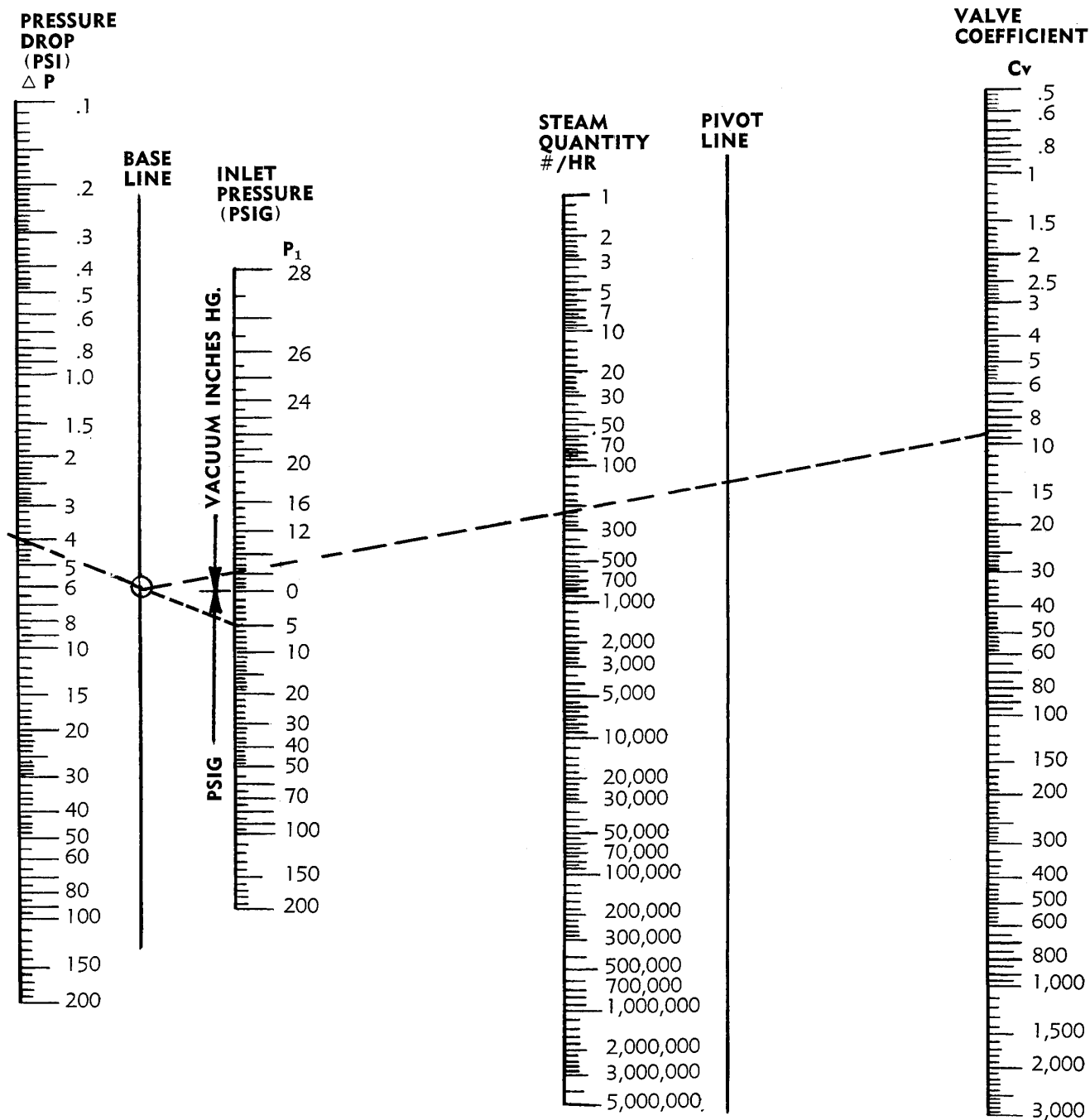
For two-position zone valves and direct radiation valves, a minimum pressure drop of 10% of inlet pressure is recommended.

Proportional control valves should be sized using a pressure drop through the valve of 80% gauge inlet pressure (PSIG) for low pressure steam systems. (Low pressure is generally defined as systems carrying 15 PSIG or less.)

For steam pressures over 15#, recommended pressure drop is 50% of inlet gauge pressure.

Steam Capacity in Pounds per Hour

Inlet Pressure (PSI)	2 #		5 #		10 #		15 #		25 #		40 #		50 #		75 #		100 #	
Pressure Drop	.2 #	1.6 #	.5 #	4 #	1 #	8 #	1.5 #	12 #	2.5 #	12.5 #	4 #	20 #	5 #	25 #	7.5 #	30 #	10 #	40 #
C _v																		
29	160	429	270	690	423	1,006	566	1,267	840	1,604	1,238	2,294	1,502	2,731	2,158	3,680	2,819	4,759
31	171	459	288	737	453	1,076	605	1,355	897	1,714	1,324	2,452	1,606	2,920	2,306	3,934	3,013	5,087
33	182	488	307	785	482	1,145	644	1,442	955	1,825	1,409	2,611	1,709	3,109	2,455	4,188	3,208	5,415
35	193	518	326	833	511	1,215	683	1,530	1,013	1,936	1,495	2,769	1,813	3,298	2,604	4,442	3,402	5,744
37	204	548	344	880	540	1,284	722	1,617	1,071	2,046	1,580	2,927	1,917	3,487	2,755	4,695	3,596	6,072
39	215	577	363	928	569	1,353	761	1,704	1,129	2,157	1,665	3,085	2,020	3,676	2,902	4,949	3,791	6,400
41	226	607	381	975	599	1,423	800	1,792	1,187	2,267	1,751	3,243	2,124	3,865	3,050	5,203	3,985	6,728
43	237	636	400	1,023	628	1,492	839	1,879	1,245	2,378	1,836	3,401	2,227	4,054	3,190	5,457	4,180	7,056
45	248	666	419	1,071	657	1,562	878	1,967	1,303	2,489	1,922	3,560	2,331	4,243	3,348	5,711	4,366	7,385
47	259	696	437	1,119	686	1,631	917	2,054	1,361	2,599	2,007	3,718	2,435	4,432	3,490	5,964	4,568	7,713
49	270	725	456	1,166	715	1,700	956	2,141	1,419	2,710	2,092	3,876	2,538	4,621	3,640	6,218	4,762	8,041
50	275	740	465	1,190	730	1,735	975	2,185	1,448	2,765	2,135	3,954	2,590	4,725	3,720	6,345	4,860	8,205
55	303	814	512	1,309	803	1,909	1,073	2,404	1,592	3,042	2,349	4,349	2,849	5,198	4,092	6,980	5,346	9,026
60	330	888	558	1,428	876	2,082	1,170	2,622	1,737	3,318	2,562	4,745	3,108	5,670	4,464	7,614	5,832	9,846
65	358	962	605	1,547	949	2,256	1,268	2,841	1,882	3,595	2,776	5,140	3,367	6,143	4,836	8,249	6,318	10,667
70	385	1,036	651	1,666	1,022	2,429	1,365	3,059	2,026	3,871	2,989	5,536	3,626	6,615	5,228	8,883	6,809	11,487
75	413	1,110	698	1,785	1,095	2,602	1,463	3,278	2,171	4,148	3,203	5,931	3,885	7,088	5,600	9,518	7,290	12,308
80	440	1,184	744	1,904	1,168	2,776	1,560	3,496	2,316	4,424	3,416	6,327	4,144	7,560	5,952	10,152	7,776	13,128
85	468	1,258	791	2,023	1,241	2,950	1,658	3,715	2,461	4,701	3,630	6,722	4,403	8,033	6,324	10,787	8,262	13,949
90	495	1,332	837	2,142	1,314	3,123	1,755	3,933	2,606	4,977	3,843	7,118	4,662	8,505	6,696	11,421	8,748	14,769
95	523	1,406	884	2,261	1,387	3,297	1,853	4,152	2,750	5,254	4,057	7,513	4,921	8,978	7,068	12,056	9,234	15,590
100	500	1,480	930	2,380	1,460	3,470	1,950	4,370	2,895	5,530	4,270	7,908	5,180	9,450	7,440	12,690	9,720	16,410
110	605	1,628	1,023	2,618	1,606	3,817	2,145	4,807	3,185	6,083	4,697	8,699	5,698	10,395	8,184	13,959	10,692	18,051
120	660	1,776	1,116	2,856	1,752	4,164	2,340	5,244	3,474	6,636	5,124	9,490	6,216	11,340	8,928	15,228	11,664	19,692
130	715	1,924	1,209	3,094	1,898	4,511	2,535	5,681	3,764	7,189	5,551	10,281	6,734	12,285	9,672	16,497	12,636	21,333
140	770	2,072	1,302	3,332	2,044	4,858	2,730	6,118	4,053	7,742	5,978	11,072	7,252	13,230	10,416	17,766	13,608	22,974
150	825	2,220	1,395	3,570	2,190	5,205	2,925	6,555	4,343	8,295	6,405	11,862	7,770	14,175	11,160	19,035	14,580	24,615
160	880	2,368	1,488	3,808	2,336	5,552	3,120	6,992	4,632	8,848	6,832	12,653	8,288	15,120	11,904	20,304	15,552	26,256
170	935	2,516	1,581	4,046	2,482	5,899	3,315	7,429	4,922	9,401	7,259	13,444	8,806	16,065	12,668	21,573	16,524	27,897
180	990	2,664	1,674	4,284	2,628	6,246	3,510	7,866	5,211	9,954	7,686	14,235	9,324	17,010	13,392	22,842	17,496	29,538
190	1,045	2,812	1,767	4,522	2,774	6,593	3,705	8,303	5,501	10,507	8,113	15,026	9,842	17,955	14,136	24,111	18,468	31,179
200	1,100	2,960	1,860	4,760	2,920	6,940	3,900	8,740	5,790	11,060	8,540	15,816	10,360	18,900	14,880	25,380	19,440	32,820
250	1,375	3,700	2,325	5,950	3,650	8,675	4,875	10,925	7,238	13,825	10,675	19,770	12,950	23,625	18,600	31,725	24,300	41,025
300	1,650	4,440	2,790	7,140	4,380	10,410	5,850	13,110	8,685	16,590	12,810	23,724	15,540	28,350	22,320	38,070	29,160	49,230
350	1,925	5,180	3,255	8,330	5,110	12,145	6,825	15,295	10,133	19,355	14,945	27,678	18,130	33,075	26,040	44,415	34,020	57,435
400	2,200	5,920	3,720	9,520	5,840	13,880	7,800	17,480	11,580	22,120	17,080	31,632	20,720	37,800	29,760	50,760	38,880	65,640
450	2,475	6,660	4,185	10,710	6,570	15,615	8,775	19,665	13,028	24,885	19,215	35,586	23,310	42,525	33,480	57,105	43,660	73,845
500	2,750	7,400	4,650	11,900	7,300	17,350	9,750	21,850	14,475	27,650	21,350	39,540	25,900	47,250	37,200	63,450	48,600	82,050
550	3,025	8,140	5,115	13,090	8,030	19,085	10,725	24,035	15,923	30,415	23,485	43,494	28,490	51,975	40,920	69,795	53,460	90,255
600	3,300	8,880	5,580	14,280	8,760	20,820	11,700	26,220	17,370	33,180	25,620	47,448	31,080	56,700	44,640	76,140	58,320	98,460
650	3,575	9,620	6,045	15,470	9,490	22,555	12,675	28,405	18,818	35,945	27,755	51,402	33,670	61,425	48,360	82,485	63,180	106,665
700	3,850	10,360	6,510	16,660	10,220	24,290	13,650	30,590	20,265	38,710	29,890	55,356	36,260	66,150	52,280	88,830	68,040	114,870



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