



# Sizing Safety Valves

## Sizing Safety Valves — SV73 & SV74 Steam Capacities

1. Lbs/Hr Steam, 90% of actual capacity at 3% accumulation in accordance with A.S.M.E. Code, Section I.
2. Lbs/Hr Steam, 90% of actual capacity at 10% accumulation in accordance with A.S.M.E. Code, Section VIII.

ORIFICE Area (sq.in.)	ORIFICE F 0.328		ORIFICE G 0.538		ORIFICE H 0.842		ORIFICE J 1.374		ORIFICE K 1.967		ORIFICE L 3.055		ORIFICE M 3.845		ORIFICE N 4.634		ORIFICE P 6.830		ORIFICE Q 11.811		ORIFICE R 17.123	
	Section I Stim	Section VIII Stim	Section I Stim	Section VIII Stim	Section I Stim	Section VIII Stim	Section I Stim	Section VIII Stim	Section I Stim	Section VIII Stim	Section I Stim	Section VIII Stim	Section I Stim	Section VIII Stim	Section I Stim	Section VIII Stim	Section I Stim	Section VIII Stim	Section I Stim	Section VIII Stim	Section I Stim	Section VIII Stim
15	460	474	754	778	1180	1217	1925	1986	2756	2843	4280	4415	5387	5557	6492	6697	9569	9871	16547	17069	23989	24746
20	532	547	873	897	1366	1403	2229	2289	3191	3277	4955	5090	6237	6407	7516	7721	11078	11380	19157	19679	27773	28530
25	605	619	992	1015	1552	1589	2532	2593	3625	3712	5630	5765	7086	7256	8540	8745	12587	12889	21767	22289	31551	32314
30	677	692	1110	1134	1738	1775	2836	2897	4060	4147	6305	6440	7936	8106	9564	9769	14097	14399	24377	24899	35341	36098
35	750	771	1229	1265	1924	1980	3140	3231	4495	4625	6980	7183	8786	9040	10588	10896	15606	16039	26987	27770	39125	40280
40	822	851	1348	1396	2110	2184	3443	3565	4929	5103	7656	7928	9635	9975	11612	12022	17115	17719	29597	30641	42908	44422
45	895	931	1467	1527	2296	2389	3747	3899	5364	5581	8331	8668	10485	10910	12636	13148	18625	19379	32207	33512	46692	48584
50	967	1010	1586	1657	2482	2594	4050	4233	5793	6059	9006	9411	11335	11844	13660	14275	20134	21039	34817	36383	50476	52746
55	1039	1090	1705	1788	2668	2798	4354	4567	6363	6637	9681	10153	12184	12779	14684	15401	21643	22700	37427	39254	54260	56908
60	1114	1170	1824	1919	2854	3003	4658	4901	6868	7016	10356	10896	13034	13714	15708	16528	23152	24360	40037	42125	58044	61071
65	1184	1250	1943	2050	3040	3208	4961	5235	7102	7494	11031	11639	13884	14648	16732	17654	24682	26020	42647	44986	61827	65233
70	1258	1329	2064	2180	3230	3413	5271	5569	7546	7972	11720	12381	14750	15583	17777	18780	26201	27680	45309	47867	65687	69395
75	1333	1409	2186	2311	3422	3617	5584	5903	8062	8450	12415	13124	15635	16517	18832	19907	27756	29340	47997	50738	69584	73557
80	1408	1489	2309	2442	3613	3822	5896	6237	8441	8928	13110	13866	16500	17452	19886	21033	29310	31001	50886	53609	73482	77119
85	1482	1569	2431	2573	3805	4027	6029	6371	8689	9206	13806	14609	17376	18387	20941	22160	30865	32661	53375	56480	77379	81882
90	1557	1648	2554	2704	3997	4231	6322	6664	9337	9884	14501	15352	18251	19321	21996	23286	32419	34321	56062	59351	81276	86044
95	1632	1728	2676	2834	4188	4436	6835	7238	9784	10362	15198	16094	19126	20256	23051	24413	33974	35981	58750	62222	85173	90206
100	1706	1808	2799	2965	4380	4641	7147	7572	10232	10841	15892	16837	20001	21191	24105	25539	35529	37641	61439	65093	89071	94388
105	1781	1887	2921	3096	4572	4845	7460	7906	10686	11319	16587	17579	20876	22125	25160	26665	37083	39302	64127	67964	92968	98530
110	1856	1967	3044	3227	4763	5050	7782	8240	11127	11797	17282	18322	21751	23060	26215	27792	38638	40962	68815	73035	96865	102692
115	1930	2047	3165	3357	4955	5255	8086	8574	11575	12275	17978	19065	22827	23994	27270	28918	40192	42622	69504	73706	100763	106855
120	2005	2127	3288	3488	5147	5459	8398	8908	12023	12753	18673	19807	23502	24929	28324	30045	41747	44282	72192	76577	104660	111017
125	2080	2206	3411	3619	5338	5664	8711	9242	12471	13231	19368	20550	24377	25864	29379	31171	43301	45943	74880	79448	108557	115179
130	2154	2286	3533	3750	5530	5869	9024	9576	12918	13709	20064	21292	25252	26798	30434	32287	44856	47603	77568	82318	112455	119341
135	2229	2366	3656	3881	5722	6073	9337	9910	13366	14188	20759	22033	26127	27733	31488	33424	46410	49263	80257	85189	116352	123503
140	2304	2446	3778	4014	5913	6278	9649	10244	13814	14666	21454	22778	27002	28688	32543	34550	47965	50923	82945	88060	120249	127666
145	2378	2525	3901	4142	6015	6483	9962	10578	14261	15144	22150	23520	27873	29602	33598	35677	49520	52583	85633	90931	124147	131828
150	2453	2605	4023	4274	6206	6687	10275	10912	14709	15622	22945	24363	28765	30537	34683	36803	50174	54244	88321	93802	128044	135990
155	2528	2685	4146	4404	6488	6982	10587	11246	15157	16100	23540	25005	29628	31471	35707	37929	52629	55904	91010	96673	131941	140152
160	2602	2765	4268	4534	6680	7097	10900	11580	15605	16578	24236	25748	30503	32406	36762	39056	51483	57564	96398	99544	135839	144314
165	2677	2844	4391	4665	6871	7301	11213	11914	16052	17058	24931	26491	31378	33341	37817	40182	55738	59224	93686	102415	139736	148476
170	2752	2924	4513	4796	7063	7506	11526	12248	16500	17534	26322	27936	33128	35210	39926	42435	58847	62545	101763	108157	147531	156803
175	2826	3004	4635	4927	7255	7711	11838	12582	16948	18013	26322	27936	33128	35210	40981	43582	60401	64205	104451	110298	151428	160963
180	2901	3083	4758	5058	7446	7915	12151	12916	17395	18491	27107	28718	34003	36145	40881	43682	62040	66054	107139	113899	155225	165125
185	2975	3163	4880	5188	7638	8120	12464	13250	17843	18969	27712	29461	34879	37079	42036	44888	61956	65865	107139	113899	155225	165125
190	3050	3243	5003	5319	7830	8325	12777	13584	18291	19447	28408	30203	35754	38014	43090	46024	63611	67525	109828	116770	159222	169287
195	3125	3323	5125	5450	8021	8529	13089	13918	18738	19925	29103	30946	36629	38948	44145	46941	65065	69185	112516	119641	163120	173450
200	3199	3402	5248	5581	8213	8734	13402	14252	19186	20403	29798	31689	37504	39883	45200	48067	66620	70846	115204	122512	167017	177612
205	3274	3482	5370	5711	8405	8939	13715	14586	19634	20881	30494	32431	38379	40818	46255	49194	68174	72506	117892	125383	170914	181774
210	3349	3562	5493	5842	8596	9143	14028	14920	20082	21350	31189	33174	39254	41752	47309	50320	69729	74166	120581	128254	174812	185936
215	3423	3642	5615	5973	8788	9348	14340	15254	20529	21838	31884	33916	40130	42687	48364	51446	71283	75826	123269	131125	178709	190098
220	3498	3721	5738	6104	8980	9553	14653	15588	20977	22316	32580	34659	41005	43622	49419	52573	72838	77486	125957	133996	182606	194260
225	3573	3801	5860	6234	9171	9757	14966	16026	21425	22794	33275	35402	41880	44556	50474	53699	74392	79147	128645	136887	186504	198423
230	3647	3881	5982	6365	9363	9962	15278	16356	21872	23272	33970	36144	42755	45491	51528	54826	75947	80807	131334	139738	190401	202585
235	3722	3960	6105	6496	9554	10167	15591	16590	22300	23750	34666	36887	43630	46425	52583	55952	77502	82467	134022	142609	194298	206747
240	3797	4040	6227	6627	9746	10371	15904	16024	22768	24278	35361	37629	44505	47360	53638	57078	79056	84127	136710	145480	198196	210909
245	3871	4120	6350	6758	9938	10576	16217	17258	23215	24706	36056	38372	45380	48295	54693	58205	80611	85787	139399	148351	202093	215071
250	3946	4200	6472	6888	10129	10761	16529	17592	23663	25184	36752	39115	46256	49229	55747	59305	82165	87448	142087	151222	205990	219574
255	4021	4279	6595	7019	10321	10965	16842	17926	24111	25663	37447	39857	47131	50164	56802	60458	83720	89108	144775	154093	-	-
260	4095	4359	6717	7150	10513	11190	17155	18260	24559	26141	38143	40800	48881	52033	58911	62711	86829	92428	147463	156964	-	-
265	4170	4439	6840	7281	10704	11395	17468	18594	25006	26619	38933	42085	49756	52968	59966	63711	88939	94088	150152	159835	-	-
270	4245	4519	6962	7411	10896	11599	17780	18928	25454	27097	39538	42805	50633	539								

# Sizing Safety Valves

## Superheated Steam Correction Factors for Safety Valves

For capacities of superheated steam, multiply saturated steam capacity by correction factor below.

Gauge Pressure PSI	Saturated Temp. °F	TOTAL STEAM TEMPERATURE IN DEGREES FAHRENHEIT																					
		340	360	380	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	720	740	760
15	250	.99	.99	.98	.98	.97	.96	.95	.94	.93	.92	.91	.90	.89	.88	.87	.86	.86	.85	.84	.83	.83	.82
20	259	.99	.99	.98	.98	.97	.96	.95	.94	.93	.92	.91	.90	.89	.88	.87	.86	.86	.85	.84	.83	.83	.82
40	287	1.00	.99	.99	.98	.97	.96	.95	.94	.93	.92	.91	.90	.89	.88	.87	.86	.86	.85	.84	.84	.83	.82
60	308	1.00	.99	.99	.98	.97	.96	.95	.94	.93	.92	.91	.90	.89	.88	.87	.86	.86	.85	.84	.84	.83	.82
80	324	1.00	1.00	.99	.99	.98	.97	.96	.94	.93	.92	.91	.90	.89	.88	.87	.86	.86	.85	.84	.84	.83	.82
100	338	-	1.00	1.00	.99	.98	.97	.96	.95	.94	.93	.92	.91	.90	.89	.88	.87	.86	.85	.85	.84	.83	.82
120	350	-	1.00	1.00	.99	.98	.97	.96	.95	.94	.93	.92	.91	.90	.89	.88	.87	.86	.85	.85	.84	.83	.82
140	361	-	-	1.00	1.00	.99	.97	.96	.95	.94	.93	.92	.91	.90	.89	.88	.87	.86	.85	.85	.84	.83	.82
160	371	-	-	-	1.00	.99	.98	.97	.96	.95	.94	.93	.92	.91	.90	.89	.88	.87	.86	.85	.84	.83	.82
180	380	-	-	-	1.00	.99	.98	.97	.96	.95	.94	.93	.92	.91	.90	.89	.88	.87	.86	.85	.84	.83	.83
200	388	-	-	-	1.00	.99	.99	.97	.96	.95	.94	.93	.92	.91	.90	.89	.88	.87	.86	.85	.84	.83	.83
220	395	-	-	-	1.00	1.00	.99	.98	.96	.95	.94	.93	.92	.91	.90	.89	.88	.87	.86	.85	.84	.84	.83
240	403	-	-	-	-	1.00	.99	.98	.97	.95	.94	.93	.92	.91	.90	.89	.88	.87	.86	.85	.84	.84	.83
260	409	-	-	-	-	1.00	.99	.98	.97	.96	.94	.93	.92	.91	.90	.89	.88	.87	.86	.85	.85	.84	.83
280	416	-	-	-	-	1.00	1.00	.99	.97	.96	.95	.93	.92	.91	.90	.89	.88	.87	.86	.85	.85	.84	.83
300	422	-	-	-	-	-	1.00	.99	.98	.96	.95	.93	.92	.91	.90	.89	.88	.87	.86	.86	.85	.84	.83
350	436	-	-	-	-	-	1.00	1.00	.99	.97	.96	.94	.93	.92	.91	.90	.89	.88	.87	.86	.85	.84	.83
400	448	-	-	-	-	-	-	1.00	.99	.98	.96	.95	.93	.92	.91	.90	.89	.88	.87	.86	.85	.84	.84
450	460	-	-	-	-	-	-	-	1.00	.99	.97	.96	.94	.93	.92	.91	.89	.88	.87	.86	.86	.84	.84
500	470	-	-	-	-	-	-	-	-	1.00	.99	.98	.96	.94	.93	.92	.91	.90	.89	.88	.87	.86	.84
550	480	-	-	-	-	-	-	-	-	-	1.00	.99	.97	.95	.94	.92	.91	.90	.89	.88	.87	.86	.84
600	489	-	-	-	-	-	-	-	-	-	-	1.00	.99	.98	.96	.94	.93	.92	.90	.89	.88	.87	.84
650	497	-	-	-	-	-	-	-	-	-	-	-	1.00	.99	.97	.95	.94	.92	.91	.90	.89	.87	.85
700	506	-	-	-	-	-	-	-	-	-	-	-	-	1.00	.99	.97	.96	.94	.93	.91	.90	.89	.85
750	513	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	1.00	.98	.96	.95	.93	.92	.90	.85
800	520	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	.99	.97	.95	.94	.92	.91	.85
850	527	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	.99	.98	.96	.94	.93	.85
900	533	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	1.00	.99	.97	.95	.85
950	540	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	.99	.97	.95	.85
1000	546	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	.99	.98	.85

### Sizing Formulas

#### STEAM – LBS./HR. – SEC. I

$$A = \frac{W_p}{51.45 K_d P F_{sh} F_p}$$

#### STEAM – LBS./HR. – SEC. VIII

$$A = \frac{W_p}{51.5 K_d P F_{sh} F_p}$$

#### AIR – SCFM

$$A = \frac{W_c}{18.33 K_d P F_t F_p} \text{ or } A = \frac{W_c \sqrt{T}}{418 K_d P F_p}$$

A = AREA, SQ. IN.

W<sub>p</sub> = FLOW, LBS./HR.

W<sub>c</sub> = FLOW, SCFM

K<sub>d</sub> = Effective coefficient of discharge for use in these formulas. (.859 for SV73 & SV74)

P = Set pressure + Overpressure + 14.7

F<sub>p</sub> = Constant back pressure correction factor.

F<sub>sh</sub> = Superheat correction factor.

T = Absolute temperature, °F + 460.

F<sub>t</sub> =  $\sqrt{\frac{520}{T}}$

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# Sizing Safety Valves

## Sizing Safety Valves — SV73 & SV74 Air Capacities (SCFM)

ORIFICE Area (sq.in.)	ORIFICE F 0.328	ORIFICE G 0.538	ORIFICE H 0.842	ORIFICE J 1.374	ORIFICE K 1.967	ORIFICE L 3.055	ORIFICE M 3.845	ORIFICE N 4.634	ORIFICE P 6.830	ORIFICE Q 11.811	ORIFICE R 17.123
Set Pressure	Section VIII Stm	Section VIII Stm	Section VIII Stm	Section VIII Stm	Section VIII Stm	Section VIII Stm	Section VIII Stm	Section VIII Stm	Section VIII Stm	Section VIII Stm	Section VIII Stm
15	315	403	505	671	960	1490	1876	2260	3331	5752	8351
20	363	465	583	776	1107	1717	2163	2606	3841	6632	9628
25	411	527	659	876	1253	1945	2450	2951	4350	7511	10905
30	460	588	736	978	1400	2173	2737	3297	4860	8391	12181
35	508	650	814	1091	1562	2424	3052	3677	5290	9358	13586
40	556	712	891	1204	1723	2674	3368	4057	5980	10326	14991
45	604	773	968	1316	1885	2925	3683	4437	6541	11293	16395
50	652	835	1045	1429	2046	3175	3999	4817	7101	12261	17800
55	701	897	1122	1542	2208	3426	4314	5196	7661	13228	19204
60	749	958	1200	1655	2369	3676	4630	5598	8222	14195	20609
65	797	1020	1277	1768	2530	3927	4945	5998	8782	15163	22013
70	845	1082	1354	1880	2692	4178	5261	6338	9342	16130	23418
75	893	1143	1431	1993	2853	4428	5577	6718	9903	17098	24823
80	941	1205	1508	2106	3015	4679	5892	7098	10463	18065	26227
85	990	1267	1585	2219	3176	4929	6208	7479	11023	19033	27632
90	1038	1329	1663	2331	3338	5180	6523	7859	11584	20000	29036
95	1086	1390	1740	2444	3499	5430	6839	8239	12144	20968	30441
100	1134	1452	1817	2557	3661	5681	7154	8619	12704	21935	31845
105	1182	1514	1894	2670	3824	5931	7470	8999	13265	22903	33250
110	1230	1575	1971	2782	3984	6182	7785	9379	13825	23870	34655
115	1279	1637	2049	2895	4145	6433	8101	9759	14385	24838	36059
120	1327	1699	2126	3008	4307	6683	8416	10140	14946	25805	37464
125	1375	1760	2203	3121	4468	6934	8732	10520	15506	26773	38868
130	1423	1822	2280	3234	4629	7184	9047	10900	16066	27740	40273
135	1471	1884	2357	3346	4791	7435	9363	11280	16627	28708	41677
140	1520	1945	2435	3459	4952	7685	9679	11660	17187	29675	43082
145	1568	2007	2512	3572	5114	7936	9994	12040	17747	30643	44487
150	1616	2069	2589	3685	5275	8186	10310	12420	18308	31610	45891
155	1664	2130	2666	3797	5437	8437	10625	12801	18868	32578	47296
160	1712	2192	2743	3910	5598	8688	10941	13181	19428	33545	48700
165	1760	2254	2820	4023	5760	8938	11256	13561	19989	34512	50105
170	1809	2315	2898	4136	5921	9189	11572	13941	20549	35480	51509
175	1857	2377	2975	4249	6083	9439	11887	14321	21109	36447	52914
180	1905	2439	3052	4361	6244	9690	12203	14701	21676	37415	54319
185	1953	2500	3129	4474	6405	9940	12518	15081	22230	38382	55723
190	2001	2562	3206	4587	6567	10191	12834	15462	22790	39350	57128
195	2049	2624	3284	4700	6728	10441	13150	15842	23351	40317	58532
200	2098	2685	3361	4812	6890	10692	13465	16222	23911	41285	59937
205	2146	2747	3438	4925	7051	10943	13781	16602	24471	42252	61341
210	2194	2809	3515	5038	7213	11193	14096	16982	25032	43220	62746
215	2242	2870	3592	5151	7374	11444	14412	17362	25592	44187	64151
220	2290	2932	3670	5264	7536	11694	14727	17742	26152	45155	65555
225	2338	2994	3747	5376	7697	11945	15043	18123	26713	46122	66960
230	2387	3055	3824	5489	7859	12195	15358	18503	27273	47090	68364
235	2435	3117	3901	5602	8020	12446	15674	18883	27833	48057	69769
240	2483	3179	3978	5715	8181	12697	15989	19263	28394	49025	71173
245	2531	3240	4055	5827	8343	12947	16305	19643	28954	49992	72578
250	2579	3302	4133	5940	8504	13198	16621	20023	29514	50960	73983
255	2628	3364	4210	6053	8666	13448	16936	20404	30075	51927	75387
260	2676	3426	4287	6166	8827	13699	17252	20784	30635	52894	76792
265	2724	3487	4364	6279	8989	13949	17567	21164	31195	53862	78196
270	2772	3549	4441	6391	9150	14200	17883	21544	31756	54829	79601
275	2820	3611	4519	6504	9312	14450	18198	21924	32316	55797	81005
280	2869	3672	4596	6617	9473	14701	18514	22304	32876	56764	82410
285	2917	3734	4673	6730	9635	14952	18829	22684	33437	57732	83815
290	2965	3796	4750	6842	9796	15202	19145	23065	33997	58699	85219
295	3013	3857	4827	6955	9958	15453	19460	23445	34557	59667	86624
300	3061	3919	4905	7068	10119	15703	19776	23825	35118	60634	88028