



TI-P709-01
CTLS Issue 2

SV47H SG Iron Safety Valve

Description

SV47H Safety Valves are high-capacity valves with standard orifices from J to R. They have a modern design with two adjusting rings, allowing precise blowdown adjustment. Designed for use in boilers, organic fluid vaporizers and pressure vessels.

Available types

SV47H Safety Valves have flanged inlet connections in accordance with ASME B16.42 and a test lever. For orifices J, K, and L there is the option of threaded outlet connections (NPT) in accordance with ANSI Standard B1.20.1. The materials of construction are selected to meet the temperature and pressure characteristics of the process fluid.

Applications

Effective overpressure protection for boilers and generators, for steam systems downstream of pressure regulating stations, at the inlet of equipment such as heat exchangers and process vessels. Also for use in steam flash recovery tanks and in condensate return systems to protect accumulation vessels and equipment.

Construction standard

SV47H Safety Valves are designed and built in accordance with the ASME Sec.I, Sec.XIII and Sec.VIII and the materials of construction meet the requirements of these codes. Production tests are carried out in accordance with the requirements of items PG-73.5, 3.6 and UG-136(d) of these codes.

Certificates

A certificate of conformity is supplied with each valve including valve set pressure and hydrostatic test. Material certification is provided in accordance with BS-EN 10204 3.1 for all primary pressure containing parts.

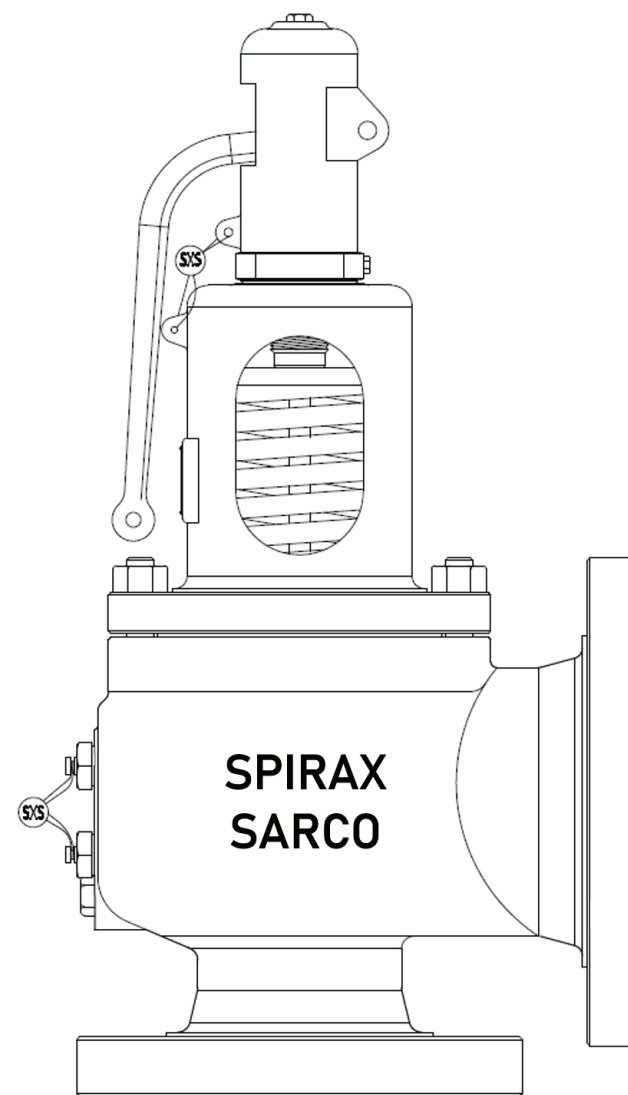
Installation and maintenance

Consult the latest revision of the IM-S41-04 Installation and Maintenance Manual.

Operating limits

Pressure

Set Pressure	Maximum	20.7 bar g / 300 psi g
	Minimum	1 bar g / 15 psi g
Maximum back pressure		2.1 bar g / 30 psi g
Hydrostatic test pressure		1.5 x design pressure

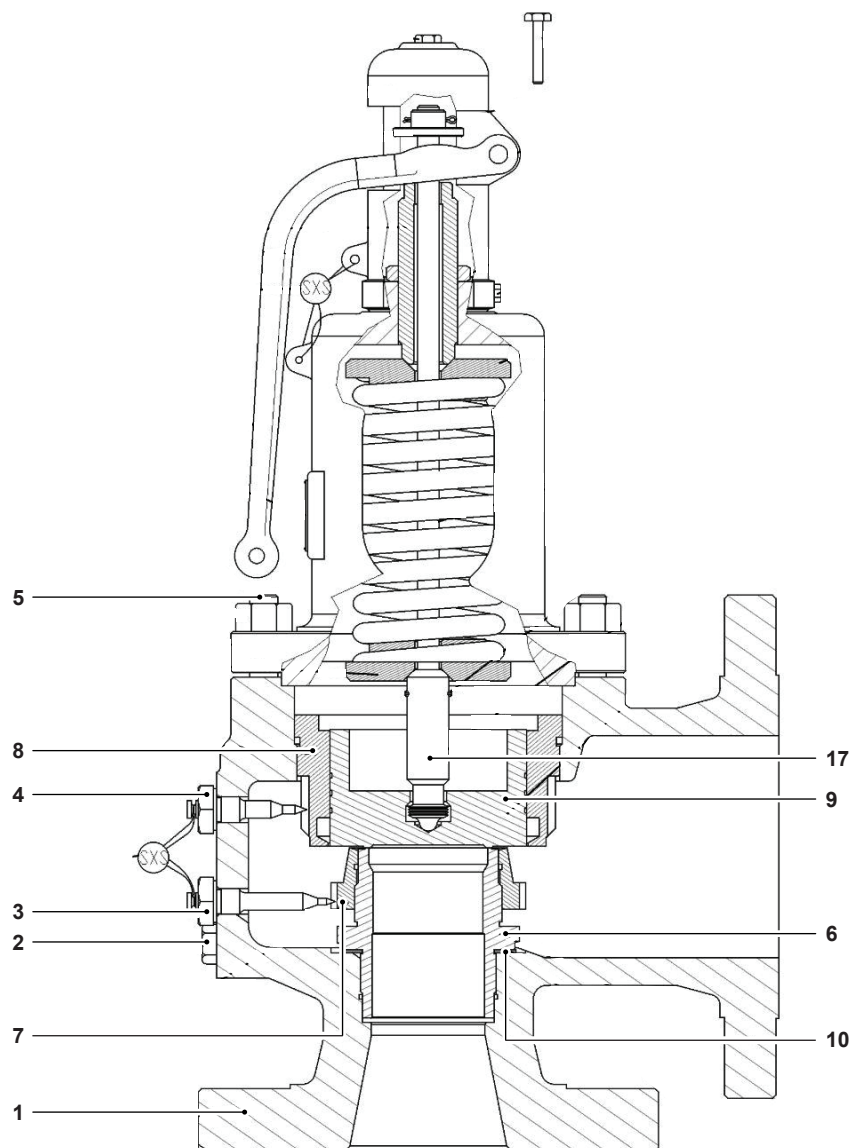


Temperature

Body material	Specification	
SG Iron	SA-395 Gr. 60-40-18	Minimum -29 °C / 20 °F
		Maximum 343 °C / 650 °F

Temperature limits based on ASME B16.42

Materials

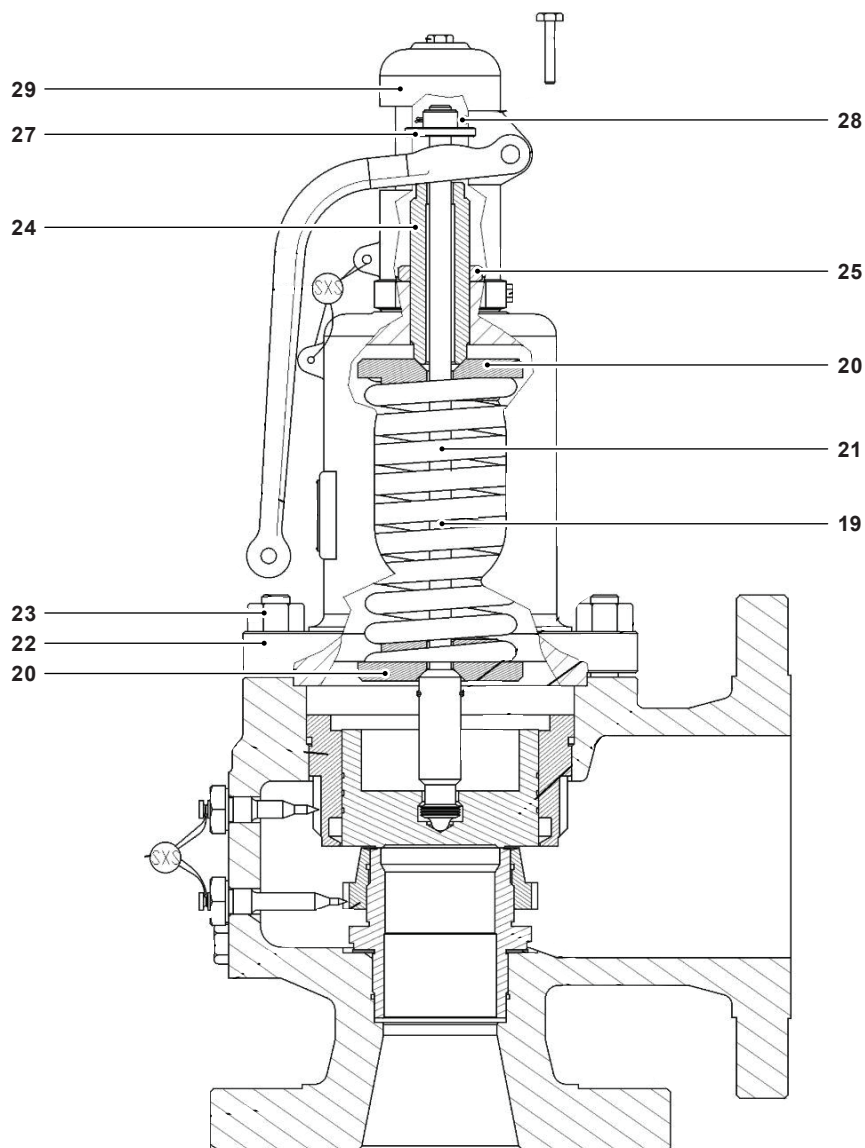


No.	Part	Material
1	Body	SA 395 Gr. 60-40-18
2	Drain Plug	Carbon Steel
3	Lock Screw - Lower	Stainless Steel
4	Lock Screw - Upper	Stainless Steel
5	Body Stud	SA 193 Gr. B7
6	Seat Gasket	Graphite
7	Adjusting Ring - Lower	316 St. St.
8	Adjusting Ring - Upper	316 St. St.
9	Disc	Hardened St. St. (17-4-PH)
10	Seat	316 St. St.
17	Stem Retainer	Hardened St. St. (17-4-PH)

Other materials under request

Materials continued on next page

Materials (continued)

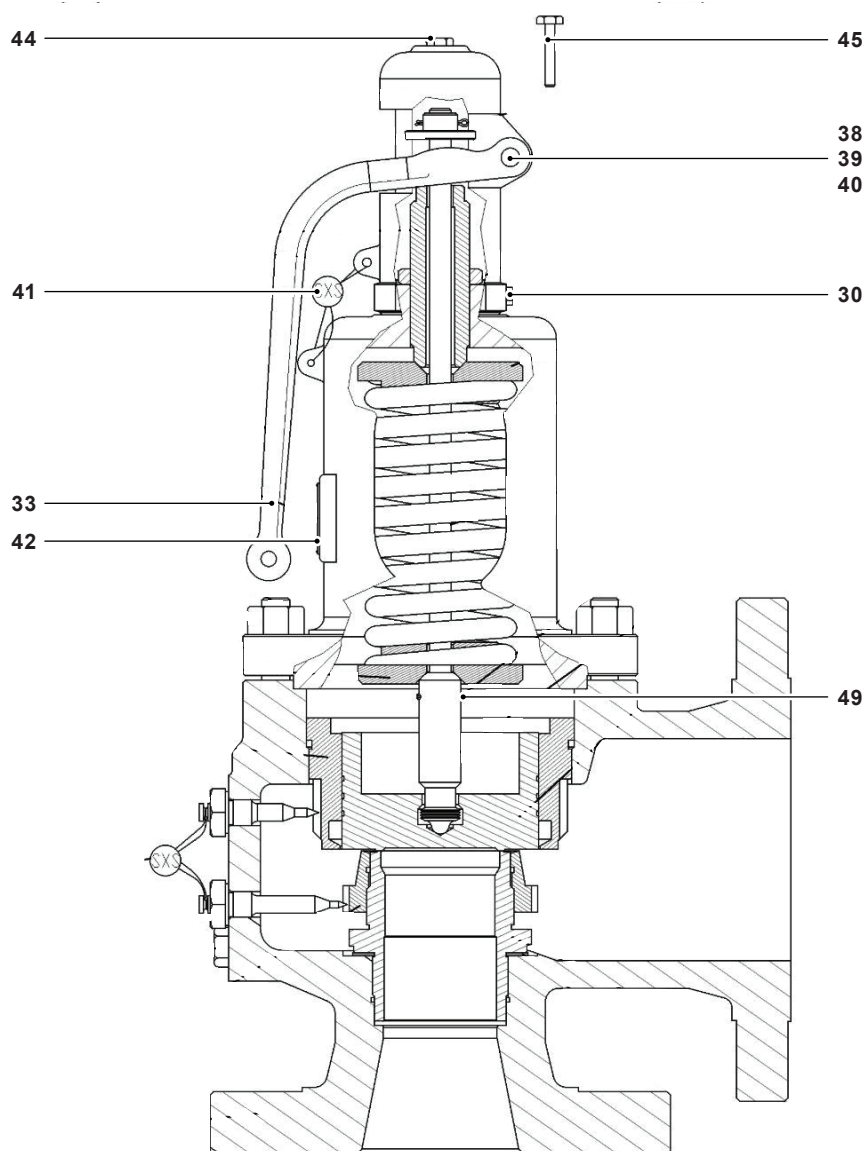


No.	Part	Material
19	Stem	304 St. St.
20	Spring Washer	Carbon Steel
21	Spring	up to 232°C / 450°F Carbon Steel 233°C to 343°C / 451°F to 650°F High Temperature Alloy Steel
22	Bonnet	SA 395 Gr. 60-40-18
23	Hex Nut (Body)	SA 194 Gr. 2H
24	Spring Adjusting Screw	304 St. St.
25	Adjusting Screw Locknut	304 St. St.
27	Stem Test Nut	Carbon Steel
28	Cotter Pin	Carbon Steel
29	Cap	Cast Iron

Other materials under request

Materials continued on next page

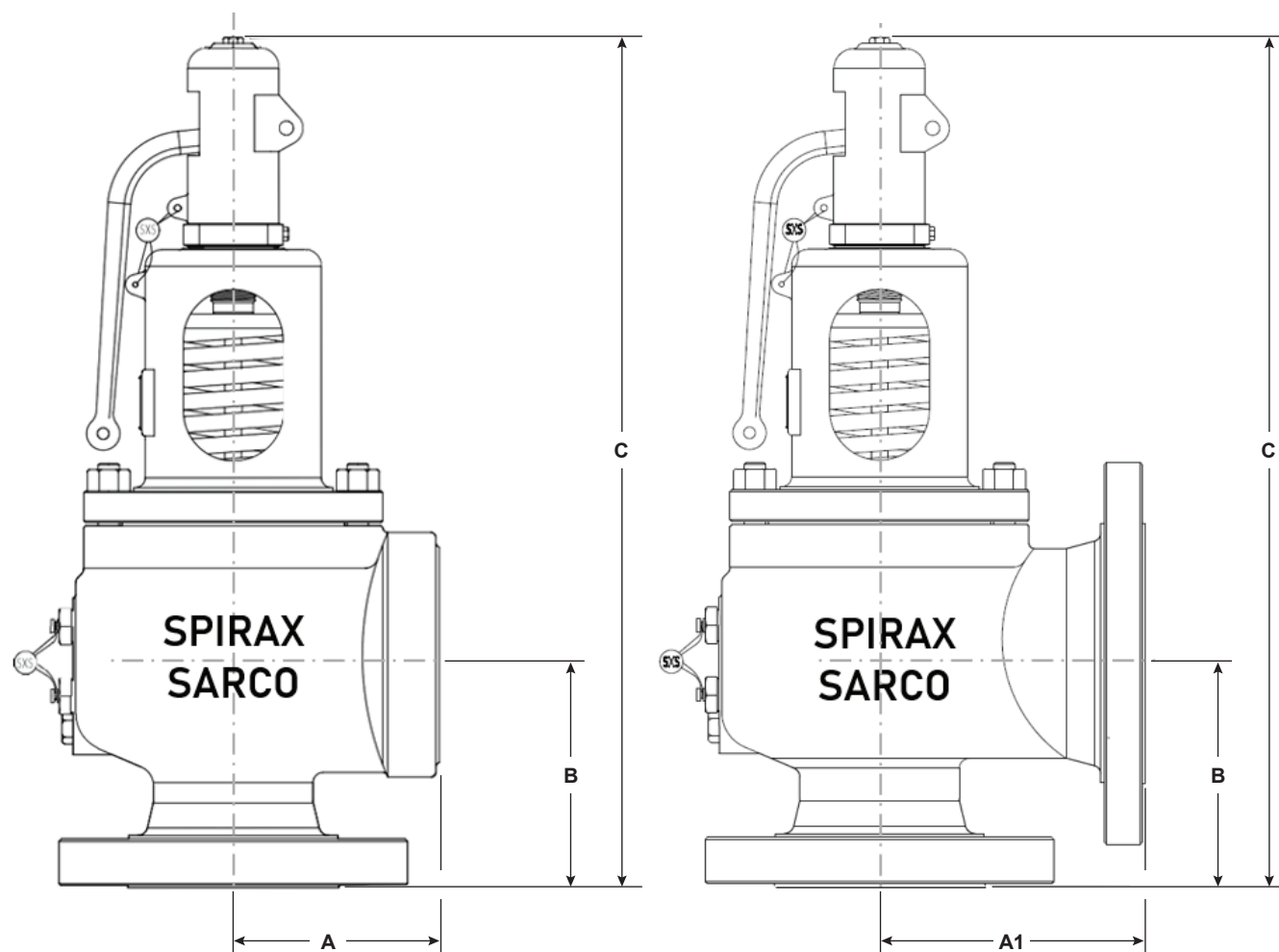
Materials (continued)



No.	Part	Material
30	Cap Screw	Carbon Steel
33	Test Lever	Cast Iron
38	Pin washer	Carbon Steel
39	Lever Pin	Carbon Steel
40	Cotter Pin	Carbon Steel
41	Seal	Lead
42	Nameplate	316 St. St.
44	Cap Plug	Carbon Steel
45	Test Gag	Carbon Steel
49	Stem Pin	Carbon Steel

Other materials under request

Dimensions/weights (approximate) in mm (inches) and kg (lbs)



Orifice	Size		Ratings		A		A1		B		C		Weight	
	Inlet	Outlet			mm	in	mm	in	mm	in	mm	in	kg	lb
J	1½"	2½"	300#	NPT	89	3.50			108	4.25	413	16.26	17	8
	2												18	8
K	2"	3"			102	4.02			117	4.61	466	18.35	22	10
	2½"												23	10
L	3"	4"			124	4.88			140	5.51	507	19.96	32	15
	3"												160	6.30
M	3"					165	6.50	143	5.63	607	23.90	50	23	
N	4"	6"		150#			184	7.25	172	6.77	670	26.38	85	39
P							210	8.27	172	6.77	727	28.62	94	43
Q					238	9.37	235	9.25	889	35.0	161	73		
R	6"	8"					254	10.0	276	10.87	1025	40.35	287	130

Capacity Table - Steam - 3% Overpressure - kg/h (ASME Section I)

Set pressure (bar g)	Orifice Designation / Current Area (cm ²)							
	J	K	L	M	N	P	Q	R
	8.867	12.69	19.71	24.81	29.90	44.06	76.20	110.47
1.0	857	1226	1904	2397	2888	4256	7361	10671
1.5	1055	1511	2346	2953	3559	5245	9070	13150
2.0	1254	1795	2788	3510	4230	6233	10780	15628
2.5	1453	2080	3231	4066	4901	7222	12489	18106
3.0	1652	2365	3673	4623	5571	8210	14199	20585
3.5	1851	2649	4115	5180	6242	9198	15908	23063
4.0	2050	2934	4557	5736	6913	10187	17618	25541
4.5	2249	3219	4999	6293	7584	11175	19327	28019
5.0	2452	3509	5450	6860	8268	12183	21071	30547
5.5	2657	3802	5906	7434	8959	13202	22832	33100
6.0	2862	4095	6361	8007	9650	14220	24592	35652
6.5	3067	4389	6817	8580	10341	15238	26353	38205
7.0	3271	4682	7272	9154	11032	16256	28114	40758
7.5	3476	4975	7727	9727	11722	17274	29875	43310
8.0	3681	5268	8183	10300	12413	18292	31635	45863
8.5	3886	5562	8638	10873	13104	19310	33396	48416
9.0	4091	5855	9094	11447	13795	20328	35157	50968
9.5	4296	6148	9549	12020	14486	21346	36918	53521
10	4501	6441	10005	12593	15177	22364	38678	56073
12	5320	7614	11826	14886	17941	26437	45721	66284
14	6140	8787	13648	17180	20704	30509	52764	76494
16	6959	9960	15470	19473	23468	34581	59807	86705
18	7779	11133	17292	21766	26231	38654	66850	96915
20	8599	12306	19113	24059	28995	42726	73893	107126
20.7	8885	12716	19751	24862	29962	44152	76358	110699

For sizing using current areas (ASME), the discharge coefficient K for steam is 0.853.

Capacity Table - Steam - 3% Overpressure – lb/h (ASME Section I)

Set pressure (psi g)	Orifice Designation / Current Area (in ²)							
	J	K	L	M	N	P	Q	R
	1.375	1.968	3.054	3.846	4.634	6.830	11.812	17.121
15	1915	2741	4253	5356	6453	9511	16449	23842
20	2217	3173	4924	6201	7471	11011	19043	27603
25	2519	3605	5595	7045	8489	12512	21638	31363
30	2821	4037	6265	7890	9507	14012	24232	35124
35	3123	4470	6936	8735	10525	15512	26827	38884
40	3425	4902	7607	9580	11542	17012	29421	42645
50	4029	5766	8949	11269	13578	20013	34610	50166
60	4633	6631	10290	12959	15614	23013	39799	57687
70	5243	7504	11645	14665	17670	26043	45040	65284
80	5865	8395	13027	16405	19767	29134	50385	73031
90	6487	9285	14409	18146	21863	32224	55729	80777
100	7109	10176	15791	19886	23960	35315	61074	88524
110	7732	11066	17173	21626	26057	38405	66419	96271
120	8354	11956	18554	23366	28154	41495	71763	104018
130	8976	12847	19936	25106	30250	44586	77108	111765
140	9598	13737	21318	26847	32347	47676	82452	119511
150	10220	14628	22700	28587	34444	50767	87797	127258
160	10842	15518	24082	30327	36541	53857	93142	135005
180	12087	17299	26846	33807	40734	60038	103831	150499
190	12709	18190	28227	35548	42831	63128	109176	158245
200	13331	19080	29609	37288	44928	66218	114520	165992
230	15197	21752	33755	42509	51218	75490	130554	189233
260	17064	24423	37900	47729	57508	84761	146588	212473
270	17686	25314	39282	49469	59605	87851	151933	220220
300	19552	27985	43428	54690	65895	97122	167966	243460

For sizing using current areas (ASME), the discharge coefficient K for steam is 0.853.

Capacity Table - Steam - 10% Overpressure - kg/h (ASME Section VIII)

Set pressure (bar g)	Orifice Designation / Current Area (cm ²)							
	J	K	L	M	N	P	Q	R
	8.867	12.69	19.71	24.81	29.90	44.06	76.20	110.47
1.0	883	1264	1963	2471	2978	4389	7590	11004
1.5	1082	1549	2405	3028	3649	5377	9299	13482
2.0	1281	1833	2848	3584	4320	6366	11009	15960
2.5	1497	2143	3328	4189	5048	7439	12865	18651
3.0	1716	2456	3814	4801	5786	8526	14746	21378
3.5	1935	2769	4301	5413	6524	9614	16626	24104
4.0	2154	3082	4787	6026	7262	10701	18507	26830
4.5	2372	3395	5273	6638	8000	11788	20387	29556
5.0	2591	3708	5760	7250	8737	12875	22267	32282
5.5	2810	4021	6246	7862	9475	13963	24148	35008
6.0	3029	4335	6733	8475	10213	15050	26028	37734
6.5	3248	4648	7219	9087	10951	16137	27909	40460
7.0	3466	4961	7705	9699	11689	17225	29789	43186
7.5	3685	5274	8192	10311	12427	18312	31670	45912
8.0	3904	5587	8678	10924	13165	19399	33550	48639
8.5	4123	5900	9164	11536	13902	20486	35430	51365
9.0	4342	6214	9651	12148	14640	21574	37311	54091
9.5	4560	6527	10137	12760	15378	22661	39191	56817
10	4779	6840	10624	13373	16116	23748	41072	59543
12	5655	8092	12569	15821	19067	28097	48593	70447
14	6530	9345	14515	18270	22019	32446	56115	81352
16	7405	10598	16460	20719	24970	36796	63636	92256
18	8280	11850	18406	23168	27922	41145	71158	103161
20	9156	13103	20351	25617	30873	45494	78680	114065
20.7	9462	13541	21032	26475	31906	47016	81312	117882

For sizing using current areas (ASME), the discharge coefficient K for steam is 0.853.

Capacity Table - Steam - 10% Overpressure - lb/h (ASME Section VIII)

Set pressure (psi g)	Orifice Designation / Current Area (in ²)							
	J	K	L	M	N	P	Q	R
	1.375	1.968	3.054	3.846	4.634	6.830	11.812	17.121
15	1975	2827	4387	5525	6657	9811	16968	24594
20	2277	3259	5058	6370	7675	11311	19562	28355
25	2579	3692	5729	7214	8692	12812	22157	32115
30	2881	4124	6399	8059	9710	14312	24751	35876
35	3213	4599	7137	8988	10830	15962	27605	40013
40	3546	5075	7875	9918	11950	17612	30459	44149
50	4210	6026	9351	11776	14189	20913	36167	52423
60	4875	6977	10827	13634	16428	24213	41875	60696
70	5539	7928	12303	15493	18667	27514	47583	68969
80	6203	8879	13778	17351	20907	30814	53291	77242
90	6868	9830	15254	19210	23146	34114	58998	85516
100	7532	10781	16730	21068	25385	37415	64706	93789
110	8197	11732	18206	22927	27624	40715	70414	102062
120	8861	12683	19681	24785	29864	44016	76122	110336
130	9526	13634	21157	26644	32103	47316	81830	118609
140	10190	14585	22633	28502	34342	50616	87538	126882
150	10854	15536	24109	30361	36581	53917	93245	135155
160	11519	16487	25584	32219	38821	57217	98953	143429
180	12848	18389	28536	35936	43299	63818	110369	159975
190	13512	19340	30012	37795	45538	67119	116077	168249
200	14177	20291	31488	39653	47778	70419	121785	176522
230	16170	23144	35915	45229	54496	80320	138908	201342
260	18163	25996	40342	50804	61213	90222	156032	226162
270	18828	26947	41818	52663	63453	93522	161740	234435
300	20821	29800	46245	58238	70170	103423	178863	259255

For sizing using current areas (ASME), the discharge coefficient K for steam is 0.853.

Capacity table - AIR - 10% Overpressure - Nm³/h (0 °C and 1.013 bar)

Set pressure (bar g)	Orifice Designation / Current Area (cm ²)							
	J	K	L	M	N	P	Q	R
	8.867	12.69	19.71	24.81	29.90	44.06	76.20	110.47
1.0	1149	1644	2553	3214	3873	5708	9871	14311
1.5	1407	2014	3128	3938	4746	6993	12095	17534
2.0	1666	2384	3703	4662	5618	8279	14318	20757
2.5	1947	2787	4328	5448	6566	9675	16732	24258
3.0	2232	3194	4961	6244	7525	11089	19178	27803
3.5	2516	3601	5593	7040	8485	12503	21624	31349
4.0	2801	4008	6226	7837	9444	13917	24069	34894
4.5	3085	4416	6858	8633	10404	15331	26515	38440
5.0	3370	4823	7491	9429	11364	16745	28960	41985
5.5	3655	5230	8124	10226	12323	18159	31406	45530
6.0	3939	5637	8756	11022	13283	19574	33852	49076
6.5	4224	6045	9389	11818	14243	20988	36297	52621
7.0	4508	6452	10021	12614	15202	22402	38743	56167
7.5	4793	6859	10654	13411	16162	23816	41188	59712
8.0	5077	7267	11286	14207	17121	25230	43634	63258
8.5	5362	7674	11919	15003	18081	26644	46080	66803
9.0	5647	8081	12552	15799	19041	28058	48525	70349
9.5	5931	8488	13184	16596	20000	29472	50971	73894
10	6216	8896	13817	17392	20960	30886	53416	77440
12	7354	10525	16347	20577	24799	36543	63199	91622
14	8492	12154	18877	23762	28637	42199	72981	105804
16	9631	13783	21408	26947	32476	47855	82764	119986
18	10769	15412	23938	30132	36314	53512	92546	134168
20	11907	17041	26468	33317	40153	59168	102329	148350
20.7	12306	17612	27354	34432	41496	61148	105752	153313

For sizing using current areas (ASME), the discharge coefficient K for steam is 0.853.

Capacity Table - AIR - 10% Overpressure - SCFM (60 °F and 14.7 psi)

Set pressure (psi g)	Orifice Designation / Current Area (in ²)							
	J	K	L	M	N	P	Q	R
	1.375	1.968	3.054	3.846	4.634	6.830	11.812	17.121
15	703	1007	1562	1967	2371	3494	6043	8758
20	811	1161	1801	2268	2733	4028	6966	10098
25	918	1315	2040	2569	3096	4562	7890	11437
30	1026	1469	2279	2870	3458	5097	8814	12776
35	1144	1638	2542	3201	3857	5684	9831	14249
40	1263	1807	2805	3532	4255	6272	10847	15722
50	1499	2146	3330	4194	5053	7447	12880	18669
60	1736	2485	3856	4855	5850	8623	14912	21615
70	1973	2823	4381	5517	6648	9798	16945	24561
80	2209	3162	4907	6179	7445	10973	18978	27507
90	2446	3501	5432	6841	8243	12149	21010	30454
100	2682	3839	5958	7503	9040	13324	23043	33400
110	2919	4178	6483	8165	9837	14499	25076	36346
120	3156	4517	7009	8826	10635	15675	27108	39292
130	3392	4855	7534	9488	11432	16850	29141	42239
140	3629	5194	8060	10150	12230	18025	31174	45185
150	3865	5533	8585	10812	13027	19201	33206	48131
160	4102	5871	9111	11474	13825	20376	35239	51077
180	4575	6548	10162	12797	15420	22727	39304	56970
190	4812	6887	10688	13459	16217	23902	41337	59916
200	5049	7226	11213	14121	17014	25077	43370	62862
230	5758	8242	12790	16107	19407	28603	49468	71701
260	6468	9258	14366	18092	21799	32129	55566	80540
270	6705	9596	14892	18754	22597	33305	57598	83486
300	7415	10612	16469	20740	24989	36831	63696	92325

For sizing using current areas (ASME), the discharge coefficient K for air, gases and vapours is 0.853

Correction Factor (Ks) for Superheated Steam

Set Pressure		Saturated Steam Temperature		Temperature											
bar g	psi g	°C	°F	°C											
				160	170	180	190	200	210	230	240	250	260	270	280
				°F											
				320	340	360	380	400	420	440	460	480	500	520	540
1.0	15	122	250	1.00	0.99	0.99	0.98	0.98	0.97	0.96	0.95	0.94	0.93	0.92	0.91
1.5	20	128	259	1.00	0.99	0.99	0.98	0.98	0.97	0.96	0.95	0.94	0.93	0.92	0.91
2.0	30	134	274	1.00	0.99	0.99	0.98	0.98	0.97	0.96	0.95	0.94	0.93	0.92	0.91
3.0	45	144	292	1.00	0.99	0.99	0.99	0.98	0.97	0.96	0.95	0.94	0.93	0.92	0.91
4.0	60	152	308	1.00	1.00	0.99	0.99	0.98	0.97	0.96	0.95	0.94	0.93	0.92	0.91
5.0	70	160	316		1.00	0.99	0.99	0.98	0.97	0.96	0.95	0.94	0.93	0.92	0.91
5.5	80	162	324		1.00	1.00	0.99	0.98	0.98	0.97	0.96	0.94	0.93	0.92	0.91
7.0	100	171	338			1.00	1.00	0.99	0.98	0.97	0.96	0.95	0.94	0.93	0.92
8.5	120	178	350				1.00	1.00	0.99	0.98	0.96	0.95	0.94	0.93	0.92
9.5	140	182	361					1.00	0.99	0.98	0.96	0.95	0.94	0.93	0.92
12	175	192	378					1.00	0.99	0.98	0.97	0.95	0.94	0.93	0.92
14	205	198	390					1.00	0.99	0.99	0.97	0.96	0.95	0.93	0.92
16	230	205	400					1.00	0.99	0.99	0.98	0.97	0.95	0.94	0.93
18	260	210	410						1.00	0.99	0.98	0.97	0.96	0.94	0.93
21	305	217	423							1.00	1.00	0.99	0.97	0.95	0.94

Correction Factor (Ks) for Superheated Steam table continued on next page

Correction Factor (Ks) for Superheated Steam (continued)

Set Pressure		Saturated Steam Temperature		Temperature										
bar g	psi g	°C	°F	°C										
				290	300	320	330	340	350	360	370	380	390	400
				°F										
				560	580	600	620	640	660	680	700	720	740	750
1.0	15	122	250	0.90	0.89	0.88	0.87	0.86	0.86	0.85	0.84	0.83	0.83	0.82
1.5	20	128	259	0.90	0.89	0.88	0.87	0.86	0.86	0.85	0.84	0.83	0.83	0.82
2.0	30	134	274	0.90	0.89	0.88	0.87	0.86	0.86	0.85	0.84	0.84	0.83	0.82
3.0	45	144	292	0.90	0.89	0.88	0.87	0.87	0.86	0.85	0.84	0.84	0.83	0.82
4.0	60	152	308	0.90	0.89	0.88	0.87	0.87	0.86	0.85	0.84	0.84	0.83	0.82
5.0	70	160	316	0.90	0.89	0.88	0.87	0.87	0.86	0.85	0.84	0.84	0.83	0.82
5.5	80	162	324	0.90	0.89	0.89	0.88	0.87	0.86	0.85	0.84	0.84	0.83	0.82
7.0	100	171	338	0.91	0.90	0.89	0.88	0.87	0.86	0.85	0.85	0.84	0.83	0.82
8.5	120	178	350	0.91	0.90	0.89	0.88	0.87	0.86	0.85	0.85	0.84	0.83	0.82
9.5	140	182	361	0.91	0.90	0.89	0.88	0.87	0.86	0.85	0.85	0.84	0.83	0.82
12	175	192	378	0.91	0.90	0.89	0.88	0.87	0.86	0.86	0.85	0.84	0.83	0.82
14	205	198	390	0.91	0.91	0.89	0.88	0.87	0.86	0.86	0.85	0.84	0.84	0.83
16	230	205	400	0.92	0.91	0.90	0.89	0.87	0.87	0.86	0.85	0.84	0.84	0.83
18	260	210	410	0.92	0.91	0.90	0.89	0.88	0.87	0.86	0.85	0.85	0.84	0.83
21	305	217	423	0.93	0.91	0.90	0.89	0.88	0.87	0.86	0.86	0.85	0.84	0.83

For superheated steam capacity, multiply saturated steam capacity by the correction factor (Ks).

How to order

The following information is required for the correct sizing and selection of SV47H Safety Valves:

- 1) Fluid
- 2) Required Capacity (Flow)
- 3) Operating Pressure and Set Pressure
- 4) Operating Temperature and Relieving Temperature
- 5) Back pressure
- 6) Overpressure
- 7) Molecular Weight (Gases)

Spirax Sarco provides on its website the PSV Calc software for the calculation, sizing, and selection of Safety and Relief Valves.