



SV74 Carbon Steel Safety Valve

Description

The SV74 steel series safety valves are built in conformance to Section I and VIII of the ASME Boiler and Pressure Vessel Code. They are primarily intended for use on power boilers and unfired pressure vessels where ASME Section I and VIII stamped valves are required.

Applications

Protection of steam systems downstream of pressure regulating stations, on inlet to such equipment as air coils, heat exchangers and process vessels. Also for use on flash recovery vessels on condensate return systems to protect vessels. Air systems to protect accumulation vessels and air equipment from overpressurisation. Steam boilers and generators.

Available types

The SV74 is available with carbon steel body and stainless steel trim in orifice sizes from 'F' to 'R'. It has an open bonnet and easing lever and flanged connections.


Certification

A manufacturers' Typical Test Report is provided as standard for each valve which will include valve set and hydraulic test pressure. Also available on request is material certification in accordance with EN 10204 3.1.

Standards and approvals

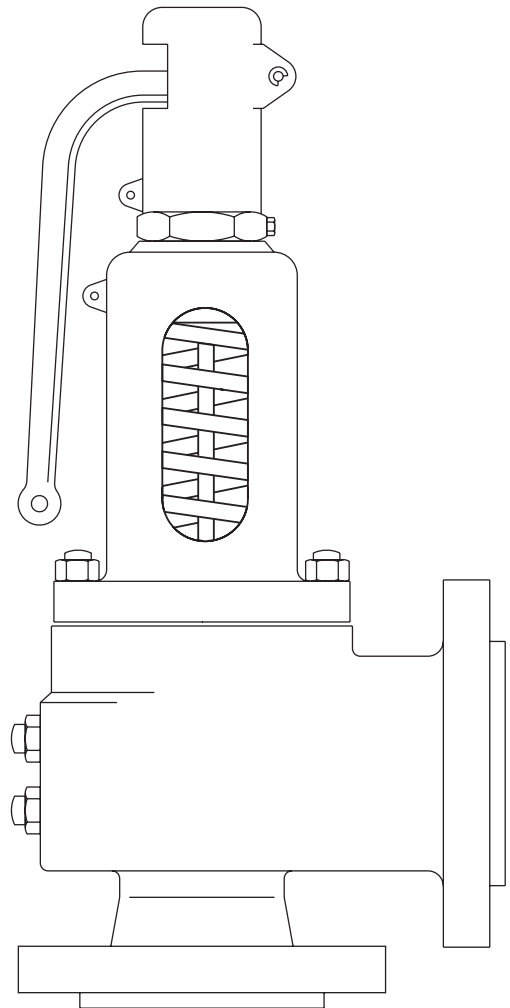
Approved by National Board of Boiler and Pressure Vessel Inspectors to ASME Boiler and Pressure Vessel Code Sections I and VIII. Seat tightness is in accordance with ASME/API STD 527-1992.

If National Board 'V' or 'UV' stamp is required, then this must be specified at the time of ordering.

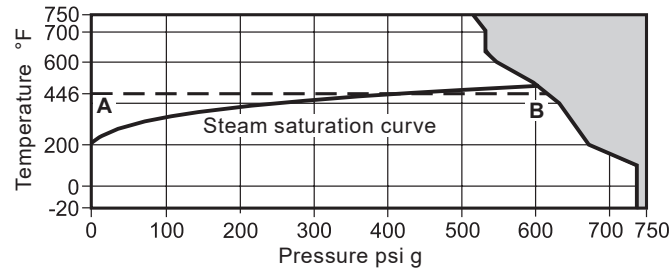
The SV74 fully complies with the requirements of the EU Pressure Equipment Directive/UK Pressure Equipment (Safety) Regulations and carries the  mark when so required.

Sizes and end connections

½" x 2" to 6" x 8"	Inlet	Flanged ASME class 300 RF
	Outlet	Flanged ASME class 150 RF



Pressure/temperature limits

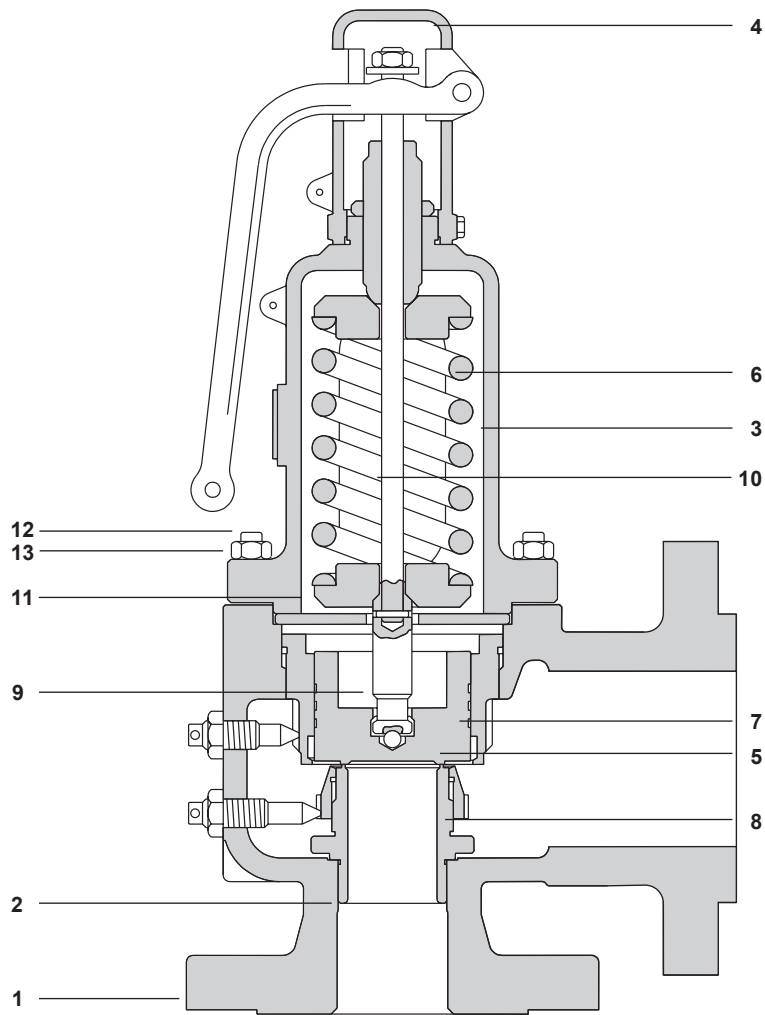


The product **must not** be used in this region.

A - B To avoid spring damage, do not exceed an operating temperature of 446 °F.

Body design conditions		ASME 300		
Set pressure range	Maximum	300 psi g		
	Minimum	5 psi g		
Design temperature	Maximum	750 °F		
	Minimum	-20 °F		
Operating temperature	Maximum	446 °F		
Performance data	Overpressure	ASME I	Steam	3%
		ASME VIII	Steam	10%
			Air/gas	10%
	Blowdown limits	ASME I	Steam	2 - 6%
		ASME VIII	Steam	7%
			Air/gas	7%
	Derated coefficient of discharge values		Steam	0.955
			Air/gas	0.955
Maximum permitted backpressure up to:		10% of set pressure		
Tested at a maximum inlet cold hydraulic test pressure of:		1015 psi g		

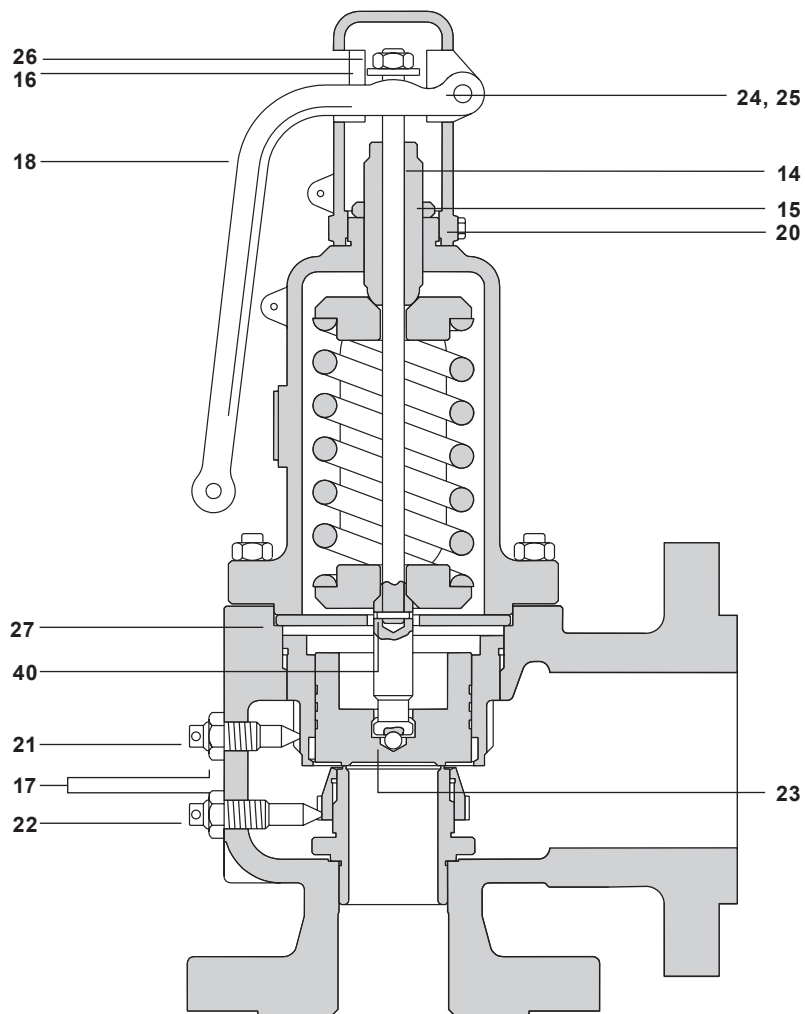
Materials



No.	Part	Material	
1	Body	Carbon steel	ASME SA 216 Gr. WCB
2	Seat	F to H orifice	Stainless steel ASTM A182/A182M-18 F6A Class 3
		J to R orifice	Stainless steel ASTM A351 Grade CF8
3	Bonnet	Carbon steel	ASME SA 216 Gr. WCB
4	Cap	Cast iron	ASTM A126 Class B
5	Disc	F to H orifice	Stainless steel ASTM A182/A182M-18 F6A Class 3
		J to R orifice	Stainless steel ASTM A217 CA15
6	Spring	Chrome-vanadium alloy steel	
7	Upper adjusting ring	Stainless steel	ASTM A351 Grade CF8
8	Lower adjusting ring	Stainless steel	ASTM A351 Grade CF8
9	Stem (lower)	Stainless steel	ASTM A182/A182M-18 F6A Class 3
10	Stem (upper)	Stainless steel	ASTM A479 Type 410
11	Spring washers (2 off)	Steel	ASTM A105
12	Bonnet stud	Steel	ASTM A193 Grade B7
13	Bonnet nut	Steel	ASTM A194 Grade 2H

Materials continued on next page

Materials (continued)



No.	Part	Material	
14	Adjusting screw	Stainless steel	ASTM A479 Type 410
15	Adjusting screw nut	Carbon steel	
16	Release ring	Carbon steel	
17	Lock-nuts (2 off)	Carbon steel	
18	Lever	Grey iron	
20	Cap set screw	Carbon steel	
21	Upper adjusting ring pin	Stainless steel	
22	Lower adjusting ring pin	Stainless steel	
23	Disc ball	Stainless steel	
24	Pin washer	Carbon steel	
25	Lever pin	Carbon steel	
26	Lock-nut	Carbon steel	
27	Guide plate	Carbon steel	
40	Stem pin	Carbon steel	

Capacities

1. lb/h steam, 90% of actual capacity at 3% accumulation in accordance with ASME Code, Section I.
2. lb/h steam, 90% of actual capacity at 10% accumulation in accordance with ASME Code, Section VIII.

Steam saturation temperature °F	Orifice	F		G		H		J		K		L	
	Area Sq. In.	0.328		0.537		0.841		1.374		1.968		3.054	
	Set pressure psi g	Real flow		Real flow		Real flow		Real flow		Real flow		Real flow	
		lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
		3%	10%	3%	10%	3%	10%	3%	10%	3%	10%	3%	10%
250	15	438	453	716	741	1122	1161	1833	1897	2625	2717	4074	4216
259	20	512	533	839	872	1314	1366	2146	2231	3074	3196	4770	4959
267	25	587	612	961	1003	1505	1570	2459	2566	3522	3675	5466	5702
274	30	662	692	1083	1133	1697	1775	2772	2900	3971	4153	6162	6446
281	35	737	772	1206	1264	1888	1980	3085	3234	4419	4632	6858	7189
287	40	811	852	1328	1395	2080	2184	3398	3569	4868	5111	7554	7932
292	45	886	932	1451	1525	2272	2389	3711	3903	5316	5590	8250	8675
298	50	961	1012	1573	1656	2463	2594	4025	4237	5764	6069	8945	9418
303	55	1035	1091	1695	1787	2655	2798	4338	4572	6213	6548	9641	10162
307	60	1110	1171	1818	1917	2847	3003	4651	4906	6661	7027	10337	10905
312	65	1185	1251	1940	2048	3038	3208	4964	5240	7110	7506	11033	11648
316	70	1260	1331	2062	2179	3230	3412	5277	5575	7558	7985	11729	12391
320	75	1334	1411	2185	2309	3422	3617	5590	5909	8007	8464	12425	13134
324	80	1409	1490	2307	2440	3613	3822	5903	6244	8455	8943	13121	13878
328	85	1484	1570	2429	2571	3805	4026	6216	6578	8904	9422	13817	14261
331	90	1559	1650	2552	2702	3996	4231	6529	6912	9352	9901	14513	15364
335	95	1633	1730	2674	2832	4188	4436	6842	7247	9800	10379	15209	16107
338	100	1708	1810	2797	2963	4380	4640	7155	7581	10249	10858	15905	16850
341	105	1783	1890	2919	3094	4571	4845	7469	7915	10697	11337	16600	17594
344	110	1858	1969	3041	3224	4763	5050	7782	8250	11146	11816	17296	18337
347	115	1932	2049	3164	3355	4955	5254	8093	8584	11594	12295	17992	19080
350	120	2007	2129	3286	3486	5146	5459	8408	8918	12043	12774	18688	19823
353	125	2082	2209	3408	3616	5338	5663	8721	9253	12491	13253	19384	20566
356	130	2157	2289	3531	3747	5530	5868	9034	9587	12940	13732	20080	21310
358	135	2231	2368	3652	3878	5721	6073	9347	9922	13388	14211	20776	22053
361	140	2306	2448	3775	4008	5913	6277	9660	10256	13836	14690	21472	22796
363	145	2381	2528	3898	4139	6104	6482	9973	10590	14285	15169	22168	23539
366	150	2456	2608	4020	4270	6296	6687	10286	10925	14733	15648	22864	24282
368	155	2530	2688	4143	4400	6488	6891	10599	11259	15182	16127	23559	25026
371	160	2605	2768	4265	4531	6679	7096	10913	11593	15630	16605	24255	25769
373	165	2680	2847	4387	4662	6871	7301	11226	11928	16079	17084	24951	26512
375	170	2755	2927	4510	4792	7063	7505	11539	12262	16527	17563	25647	27255
377	175	2829	3007	4632	4923	7254	7710	11852	12597	16976	18042	26343	27998
380	180	2904	3087	4754	5054	7446	7915	12165	12931	17424	18521	27039	28742
382	185	2979	3167	4877	5184	7638	8119	12478	13265	17872	19000	27735	29485
384	190	3053	3246	4999	5315	7829	8324	12791	13600	18321	19479	28431	30228
386	195	3128	3326	5122	5446	8021	8529	13104	13934	18769	19958	29127	30971
388	200	3203	3406	5244	5577	8212	8733	13417	14268	19218	20437	29823	31714
392	210	3352	3566	5489	5838	8816	9143	14043	14937	20115	21395	31214	33201
396	220	3502	3725	5733	6099	8979	9552	14670	15606	20416	22352	32606	34687
399	230	3651	3885	5978	6361	9362	9961	15296	16275	21908	23310	33998	36174
403	240	3801	4045	6223	6622	9746	10371	15922	16943	22805	24268	35390	37660
406	250	3950	4204	6468	6883	10129	10780	16548	17612	23702	25226	36782	39146
409	260	4100	4364	6712	7145	10512	11189	17174	18281	24599	26184	38174	40633
413	270	4249	4524	6957	7406	10895	11599	17801	18950	25496	27142	39565	42119
416	280	4399	4683	7202	7667	11279	12008	18427	19618	26393	28100	40957	43606
417	290	4548	4843	7446	7929	11662	12417	19053	20287	27290	29057	42349	45092
422	300	4698	5003	7691	8190	12045	12827	19679	20956	28187	30015	43741	46578

Capacities continued on next page

Capacities (continued)

1. lb/h steam, 90% of actual capacity at 3% accumulation in accordance with ASME Code, Section I.

2. lb/h steam, 90% of actual capacity at 10% accumulation in accordance with ASME Code, Section VIII.

Steam saturation temperature °F	Orifice	M		N		P		Q		R	
	Area Sq. In.	3.846		4.633		6.830		11.811		17.123	
	Set pressure psi g	Real flow		Real flow		Real flow		Real flow		Real flow	
		lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h	lb/h
		3%	10%	3%	10%	3%	10%	3%	10%	3%	10%
250	15	5 131	5 308	6 181	6 395	9 111	9 427	15 756	16 302	22 842	23 634
259	20	6 007	6 244	7 236	7 522	10 668	11 089	18 447	19 176	26 744	27 800
267	25	6 883	7 180	8 292	8 649	12 224	12 751	21 139	22 050	30 646	31 966
274	30	7 760	8 116	9 348	9 776	13 780	14 413	23 830	24 923	34 548	36 133
281	35	8 636	9 052	10 403	10 904	15 337	16 074	26 521	27 797	38 449	40 299
287	40	9 513	9 987	11 459	12 031	16 893	17 736	29 213	30 671	42 351	44 465
292	45	10 389	10 923	12 515	13 158	18 449	19 398	31 904	33 545	46 253	48 631
298	50	11 265	11 859	13 570	14 286	20 006	21 060	34 595	36 418	50 155	52 797
303	55	12 142	12 795	14 626	15 413	21 562	22 722	37 287	39 292	54 057	56 964
307	60	13 018	13 730	15 682	16 540	23 118	24 383	39 978	42 166	57 958	61 130
312	65	13 894	14 666	16 738	17 667	24 675	26 045	42 670	45 040	61 860	65 296
316	70	14 771	15 602	17 793	18 795	26 231	27 707	45 361	47 913	65 762	69 462
320	75	15 647	16 538	18 849	19 922	27 567	29 369	48 052	50 787	69 664	73 629
324	80	16 524	17 474	19 905	21 049	29 344	31 031	50 744	53 661	73 565	77 795
328	85	17 400	18 409	20 960	22 176	30 900	32 693	53 435	56 535	77 467	81 961
331	90	18 276	19 345	22 016	23 304	32 456	34 354	56 126	59 408	81 369	86 127
335	95	19 153	20 281	23 072	24 431	34 013	36 016	58 818	62 282	85 271	90 294
338	100	20 029	21 217	24 128	25 558	35 569	37 678	61 509	65 156	89 173	94 460
341	105	20 905	22 152	25 183	26 685	37 125	39 340	64 200	68 030	93 074	98 626
344	110	21 782	23 088	26 239	27 813	38 682	41 002	66 892	70 903	96 976	102 792
347	115	22 658	24 024	27 295	28 940	40 238	42 663	69 583	73 777	100 878	106 958
350	120	23 535	24 960	28 350	30 067	41 001	44 325	72 274	76 651	104 780	111 125
353	125	24 411	25 896	29 406	31 194	43 351	45 987	74 966	79 525	108 681	115 291
356	130	25 287	26 831	30 462	32 322	44 907	47 649	77 657	82 398	112 583	119 457
358	135	26 164	27 767	31 518	33 449	46 463	49 311	80 348	85 272	116 485	123 623
361	140	27 040	28 703	32 573	34 576	48 020	50 973	83 040	88 146	120 387	127 790
363	145	27 916	29 639	33 629	35 704	49 576	52 634	85 731	91 020	124 288	131 956
366	150	28 793	30 574	34 685	36 831	51 132	54 296	88 422	93 893	128 190	136 122
368	155	29 669	31 510	35 740	37 958	52 689	55 958	91 114	96 767	132 092	140 288
371	160	30 546	32 446	36 796	39 085	54 245	57 620	93 805	99 641	135 994	144 454
373	165	31 422	33 382	37 852	40 212	55 801	59 282	96 496	102 515	139 896	148 621
375	170	32 298	34 317	38 907	41 340	57 358	60 943	99 188	105 388	143 797	152 787
377	175	33 175	35 253	39 963	42 467	58 914	62 605	101 879	108 262	147 699	156 953
380	180	34 051	36 189	41 019	43 594	60 470	64 267	104 570	111 136	151 601	161 119
382	185	34 927	37 125	42 075	44 722	62 027	65 929	107 262	114 010	155 503	165 286
384	190	35 804	38 061	43 130	45 849	63 583	67 591	109 953	116 883	159 404	169 452
386	195	36 680	38 996	44 186	46 976	65 139	69 253	112 644	119 757	163 306	173 618
388	200	37 557	39 932	45 242	48 103	66 696	70 914	115 336	122 631	167 208	177 784
392	210	39 309	41 804	47 353	50 358	69 808	74 238	120 718	128 378	175 012	186 117
396	220	41 062	43 675	49 465	52 612	72 921	77 562	126 101	134 126	182 815	194 449
399	230	42 815	45 547	51 576	54 867	76 034	80 885	131 484	139 874	190 619	202 782
403	240	44 568	47 418	53 687	57 122	79 146	84 209	136 866	145 621	198 422	211 114
406	250	46 320	49 290	55 799	59 376	82 259	87 533	142 249	151 369	206 226	219 447
409	260	48 073	51 161	57 910	61 631	85 372	90 856	147 632	157 116	214 029	227 779
413	270	49 826	53 033	60 022	63 885	88 484	94 180	153 014	162 864	221 833	236 111
416	280	51 579	54 905	62 133	66 140	91 597	97 503	158 397	168 611	229 636	244 444
417	290	53 331	56 776	64 245	68 394	94 710	100 827	163 780	174 359	237 440	252 776
422	300	55 084	58 648	66 356	70 649	97 822	104 151	169 163	180 106	245 243	261 109

Safety valve sizing information

Formulas:

For steam service: $A = \frac{\dot{m}_s}{0.9 (51.45 P K_d K_{sh})}$

For organic fluid vaporizers - lb/h: $A = \frac{\dot{m} \sqrt{T} \sqrt{Z}}{0.9 C K_d P \sqrt{M}}$

Where:

A	=	Required orifice area in square inches
P	=	Relieving pressure in pounds per square inch absolute = set pressure (psi g) + overpressure + 14.7 where the overpressure is 3% or 2 psi, whichever is the greater. P = 1.03 x set pressure + 14.7 or P = set pressure + 2 psi + 14.7.
T	=	Inlet temperature, °F. Absolute (°F plus 460).
\dot{m}_s	=	Required steam capacity in pounds per hour.
\dot{m}	=	Required vapor capacity in pounds per hour.
K_d	=	Coefficient of discharge, 0.955 for steam, air and vapour service.
K_{sh}	=	Steam superheat correction factor. See Table 1 below.
M	=	Average molecular weight of vapour.
C	=	Gas or vapour flow constant.
Z	=	Compressibility factor corresponding to T and P. If this factor is not available, compressibility correction can be safely ignored using a value of Z = 1.0.

Table 1 K_{sh} superheat correction factor

Total steam temperature °F	Set pressure psi g															
	15	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300
	Saturated steam temperature °F															
	250	259	287	308	324	338	350	361	371	380	388	395	403	409	416	422
280	1.00	1.00														
300	1.00	1.00	1.00													
320	1.00	1.00	1.00	1.00												
340	0.99	0.99	1.00	1.00	1.00											
360	0.99	0.99	0.99	0.99	1.00	1.00	1.00									
380	0.98	0.98	0.99	0.99	0.99	1.00	1.00	1.00	1.00							
400	0.98	0.98	0.98	0.98	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00				
420	0.97	0.97	0.97	0.97	0.98	0.98	0.98	0.99	0.99	0.99	0.99	1.00	1.00	1.00	1.00	
440	0.96	0.96	0.96	0.96	0.97	0.97	0.97	0.98	0.98	0.98	0.99	0.99	0.99	0.99	1.00	1.00
460	0.95	0.95	0.95	0.95	0.96	0.96	0.96	0.96	0.97	0.97	0.97	0.98	0.98	0.98	0.99	0.99

Do not exceed the maximum operating temperature of 446 °F.

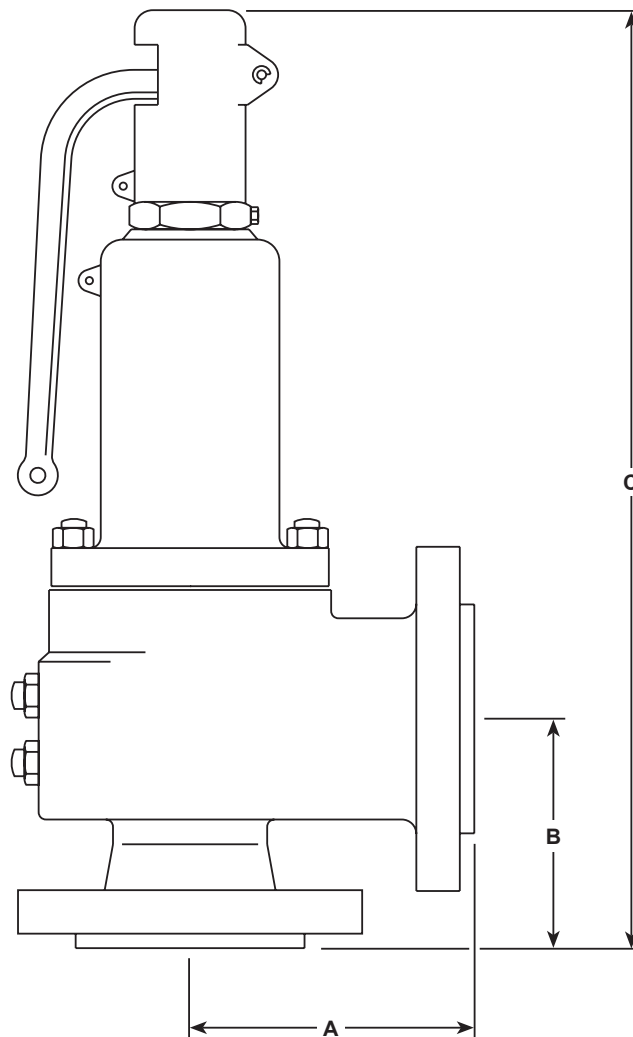
Sizing and selection

Refer to:- <http://www.spiraxsarco.com/prs/product-sizing.asp>

Dimensions, weights and orifice sizes (approximate) in inches and lbs

Valve inlet		Valve outlet		Orifice letter	A ins	B ins	C ins	Weight lbs
Size	Connection	Size	Connection					
1½"	ASME 300	2"	ASME 150	F	4.25	4.5	15.7	31
1½"	ASME 300	2"	ASME 150	G	4.25	4.5	15.7	31
1½"	ASME 300	2½"	ASME 150	H	4.90	4.8	16.2	46
1½"	ASME 300	2½"	ASME 150	J	4.90	4.8	16.2	46
2"	ASME 300	3"	ASME 150	K	5.60	5.1	18.5	62
2½"	ASME 300	4"	ASME 150	L	6.40	6.1	20.1	90
3"	ASME 300	4"	ASME 150	M	6.50	6.5	25.0	117
4"	ASME 300	6"	ASME 150	N	7.50	7.2	26.7	198
4"	ASME 300	6"	ASME 150	P	8.30	7.1	28.7	212
6"	ASME 300	8"	ASME 150	Q	9.40	9.9	34.8	384
6"	ASME 300	8"	ASME 150	R	10.00	10.9	43.9	633

Note: Drain hole connection ½" NPT on all valve sizes



Safety information, installation and maintenance

For full details see the Installation and Maintenance Instructions (IM-S13-33) supplied with the product.

Installation note:

The safety valve should always be fitted with the centre line of the spring housing vertically above the valve.

SV7 safety valve selection guide

Series number	SV7	SV7									
Construction	4 = Cast steel	4									
ASME section	V = ASME Code Section I U = ASME Code section VIII Blank = Valve without code stamp	V									
Size and connection	S = 1½" ASME 300 x 2" ASME 150 T = 1½" ASME 300 x 2½" ASME 150 U = 2" ASME 300 x 3" ASME 150 V = 2½" ASME 300 x 4" ASME 150 W = 3" ASME 300 x 4" ASME 150 X = 4" ASME 300 x 6" ASME 150 Y = 6" ASME 300 x 8" ASME 150	X									
Actual orifice area Sq. In.	F = 0.328 G = 0.537 H = 0.841 J = 1.374 K = 1.968 L = 3.054 M = 3.846 N = 4.633 P = 6.830 Q = 11.811 R = 17.123	P									
Set pressure	Specify set pressure from 5 psi g to 250 psi g	180									
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 15%;">SV7</td> <td style="text-align: center; width: 15%;">3</td> <td style="text-align: center; width: 5%;">-</td> <td style="text-align: center; width: 15%;">V</td> <td style="text-align: center; width: 5%;">-</td> <td style="text-align: center; width: 15%;">A</td> <td style="text-align: center; width: 15%;">Z</td> <td style="text-align: center; width: 5%;">-</td> <td style="text-align: center; width: 15%;">180</td> </tr> </table>		SV7	3	-	V	-	A	Z	-	180	
SV7	3	-	V	-	A	Z	-	180			

How to order

Example 1: 1 off Spirax Sarco SV74-V-XP-180 safety valve having a set pressure of 180 psi g.