

SV7 Safety Valves

For use with steam and air



spirax
/sarco

Spirax Sarco safety valves- pro

The SV7 safety valve range from Spirax Sarco has been designed to protect against excess pressure across a broad spectrum of industrial processes. Suitable for use with steam and air, SV7 safety valves provide a comprehensive and competitive solution to most applications.

Spirax Sarco safety valves are modern in design, available in a wide range of inlet sizes and body materials and are approved by National Board to ASME Section I and VIII.

Protecting People

A company's most valued asset is secure in the knowledge that their safety has been put first.

Protecting Plant

Safeguard plant against major damage from excess pressure and ensure continued efficient production.

Protecting Profit

Major shutdowns interfere with production and lose customers. A continuous supply of products protects a company's image and profits.

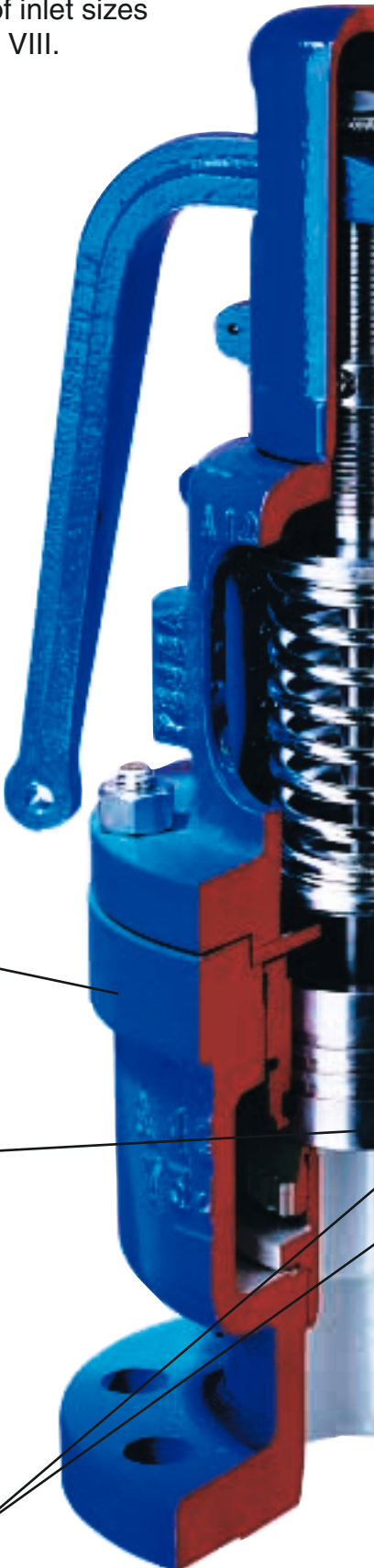
Quality Comes As Standard

Safety valves protect people, plant, and profit so there should be no compromise on quality when selecting a valve.

The SV7 range of safety valves from Spirax Sarco meet the exacting standards laid down by ASME Sections I and VIII, and their performance has been witnessed and approved by The National Board of Boiler and Pressure Vessel Inspectors.

The quality of shut-off tightness is a critical feature of any safety valve. Each Spirax Sarco safety valve is tested to ensure that the integrity of shut-off complies to the oil and petrochemical industry standard, as laid down by the American Petrochemical Institute, API 527.

SV73 and SV74 Safety Valves



Cast iron and steel construction.

High capacity semi-nozzle design available in eleven orifice sizes.

Two control rings assure maximum performance and adjustability.

The Spirax Sarco safety valve range

Model	SV73	SV74	SV75
Type	ASME I ASME VIII	ASME I ASME VIII	ASME I ASME VIII
Inlet sizes	1-1/2" to 6"	1-1/2" to 6"	1/2" to 2-1/2"
Set pressure	15 - 250 psi	15 - 300 psi	15 - 250 psi
Connections	Screwed NPT/ Flanged ANSI	Flanged ANSI	Screwed NPT
Body material	Cast iron	Carbon steel	Cast bronze



Aluminized carbon steel spring gives stability at high temperatures and eliminates spring relaxation.

Stainless steel springs are standard.

Tapped body drain allows piping of condensate away from equipment.

All valve trim of stainless steel construction, lapped to optical flatness.

Inlet sizes 1-1/2" to 6".

SV75 Safety Valves



High-capacity full nozzle design available in 6 orifice sizes.

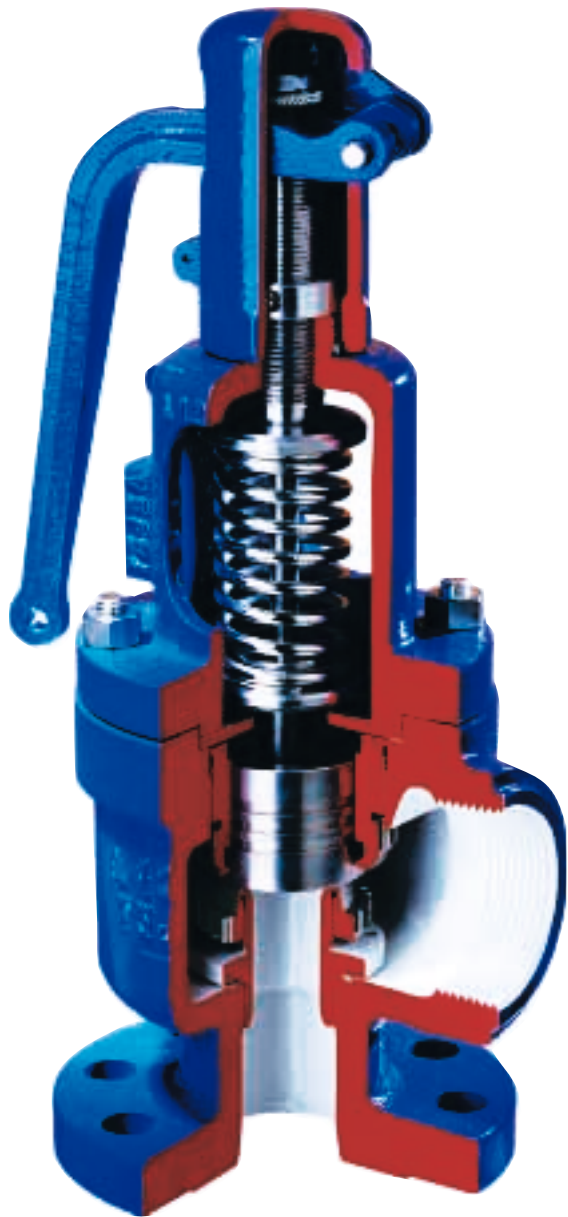
Inlet Sizes 1/2" to 2-1/2" NPT.

User benefits

- Off-the-shelf availability.
- Independently approved performance.
- API 527 shut-off tightness.
- Spirax Sarco's guarantee of world-wide technical support, knowledge, and service.

Technical Information

SV73/74 Safety Valves



Description

The SV73 series valves are built in conformance to Section I and VIII of the ASME boiler and pressure vessel code. They are constructed from cast iron with stainless steel trim. They are primarily intended for use on power boilers and unfired pressure vessels where ASME Section I and VIII stamped valves are required.

The SV74 series valves are built in conformance to Section I and VIII of the ASME boiler and pressure vessel code. They are constructed from cast steel with stainless steel trim. They are primarily intended for use on power boilers and unfired pressure vessels where ASME Section I and VIII stamped valves are required.

Sizes and pipe connections

SV73

1-1/2" x 2-1/2" to 3" x 4"	inlet/outlet screwed female NPT.
1-1/2" x 2-1/2" to 3" x 4"	inlet flanged ANSI class 250, outlet screwed female NPT.
3" x 4" to 6" x 8"	inlet flanged ANSI class 250, outlet flanged ANSI class 250.

SV74

1-1/2" x 2" to 6" x 8"	inlet flanged ANSI class 300, outlet flanged ANSI class 150.
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Limiting conditions for steam, air, and gas service

SV73

PMO - Maximum operating pressure	250 psig	(17 bar g)
TMO - Maximum operating temperature	406°F	(208°C)

SV74

PMO - Maximum operating pressure	300 psig	(20.7 bar g)
TMO - Maximum operating temperature	422°F	(217°C)

Materials of Construction

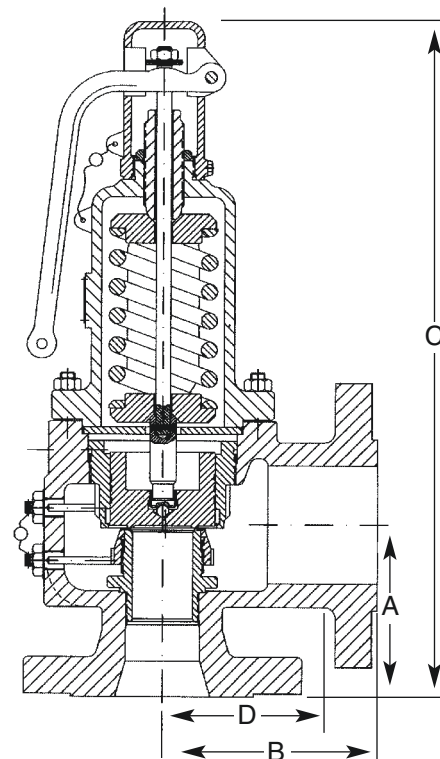
Part	SV73	SV74
Seat	ASTM A351 Grade CF8	ASTM A479 Type 304
Body	ASTM A126 Class B	ASTM 216 Gr WCB
Bonnet	ASTM A126 Class B	ASTM 216 Gr WCB
Cap	Grey Iron	Grey Iron
Disc	ASTM A217 CA15	ASTM A479 Type 410

Orifice sizes, dimensions and weights

(approximate) in inches (mm) and lbs (kg)

SV73

Valve inlet size connection		Valve outlet size connection		Orifice	A	B	C	D	Weight (Kg)
1-1/2"	NPT	2-1/2"	NPT	J	4-1/4 (108)	-	15-3/4 (400)	3-1/2 (89)	28.0 (15.0)
2"	NPT	3"	NPT	K	4-5/8 (117)	-	17-3/8 (454)	4.0 (102)	42.0 (19.0)
2-1/2"	NPT	4"	NPT	L	5-1/2 (140)	-	19-1/2 (490)	4-7/8 (124)	65.0 (29.5)
3"	NPT	4"	NPT	M	5-5/8 (143)	-	24-1/2 (516)	5-1/8 (130)	75.0 (34.0)
1-1/2"	ANSI 250	2-1/2"	NPT	J	4-1/4 (108)	-	15-3/4 (400)	3-1/2 (89)	37.5 (17.0)
2"	ANSI 250	2-1/2"	NPT	J	4-1/4 (108)	-	15-3/4 (400)	3-1/2 (89)	38.5 (17.5)
2"	ANSI 250	3"	NPT	K	4-5/8 (117)	-	17-7/8 (454)	4.0 (102)	47.5 (21.5)
2-1/2"	ANSI 250	3"	NPT	K	4-5/8 (117)	-	17-7/8 (454)	4.0 (102)	48.5 (22.0)
2-1/2"	ANSI 250	4"	NPT	L	5-1/2 (140)	-	19-1/2 (495)	4-7/8 (124)	74.0 (33.5)
3"	ANSI 250	4"	NPT	L	5-5/8 (140)	-	19-1/2 (495)	4-7/8 (124)	75.0 (34.0)
3"	ANSI 250	4"	NPT	M	5-1/2 (143)	-	24-1/4 (516)	5-1/8 (130)	84.0 (38.0)
3"	ANSI 250	4"	ANSI 125	L	5-1/2 (140)	5-1/2 (140)	19-1/2 (495)	-	81.5 (37.0)
3"	ANSI 250	4"	ANSI 125	M	5-3/8 (143)	5-1/2 (140)	24-1/4 (516)	-	91.5 (41.5)
4"	ANSI 250	6"	ANSI 125	N	6-3/4 (171)	7-1/4 (184)	26-1/8 (654)	-	137.0 (62.0)
4"	ANSI 250	6"	ANSI 125	P	6-3/4 (171)	7-1/4 (184)	28-1/2 (725)	-	167.5 (76.0)
6"	ANSI 250	8"	ANSI 125	Q	9-1/4 (276)	9-1/4 (276)	34-1/2 (870)	-	331.0 (150.0)
6"	ANSI 250	8"	ANSI 125	R	10-7/8 (276)	10.0 (254)	43-7/8 (1115)	-	381.5 (173.0)



SV74

Valve inlet size connection		Valve outlet size connection		Orifice	A	B	C	Weight (Kg)
1-1/2"	ANSI 300	2"	ANSI 150	F	4-1/2 (114)	4-1/4 (108)	15-2/3 (385)	42.0 (19.0)
1-1/2"	ANSI 300	2"	ANSI 150	G	4-1/2 (114)	4-1/4 (108)	15-2/3 (385)	42.0 (19.0)
1-1/2"	ANSI 300	2-1/2"	ANSI 150	H	4-3/4 (121)	4-7/8 (124)	16-2/9 (412)	48.5 (22.0)
1-1/2"	ANSI 300	2-1/2"	ANSI 150	J	4-3/4 (121)	4-7/8 (124)	16-2/9 (412)	48.5 (22.0)
2"	ANSI 300	3"	ANSI 150	K	5-1/4 (133)	5-5/8 (143)	18-7/15 (469)	88.0 (40.0)
2-1/2"	ANSI 300	4"	ANSI 150	L	6-1/8 (156)	6-3/8 (162)	20-1/13 (510)	125.5 (57.0)
3"	ANSI 300	4"	ANSI 150	M	6-1/2 (165)	6-1/2 (165)	24-18/19 (634)	132.3 (60.0)
4"	ANSI 300	6"	ANSI 150	N	7-1/4 (184)	7-1/2 (191)	26-13/20 (677)	183.0 (83.0)
4"	ANSI 300	6"	ANSI 150	P	7-1/8 (181)	8-1/4 (210)	28-3/4 (730)	220.0 (100.0)
6"	ANSI 300	8"	ANSI 150	Q	9-7/8 (251)	9-3/8 (238)	34-7/9 (883)	430.0 (196.0)

Orifice sizes

- F = 0.646 Orifice area sq. in.
- G = 0.827 Orifice area sq. in.
- H = 1.035 Orifice area sq. in.
- J = 1.347 Orifice area sq. in.
- K = 1.967 Orifice area sq. in.
- L = 3.055 Orifice area sq. in.
- M = 3.845 Orifice area sq. in.
- N = 4.634 Orifice area sq. in.
- Q = 11.811 Orifice area sq. in.
- R = 17.123 Orifice area sq. in.

Technical Information

SV75 Safety Valves



Description

Spirax Sarco SV75 is a dependable cast bronze high capacity safety valve ideal for use on all types of boilers, piping systems and unfired pressure vessels.

These rugged safety valves feature a top guided design and patented “soft seat” for dramatically reduced seat leakage. Flow ratings are National Board certified in accordance with ASME Sections I and VIII.

Sizes and pipe connections

SV75

1/2" x 3/4" to 2-1/2" x 2-1/2"	Inlet screwed male NPT
	Outlet screwed female NPT

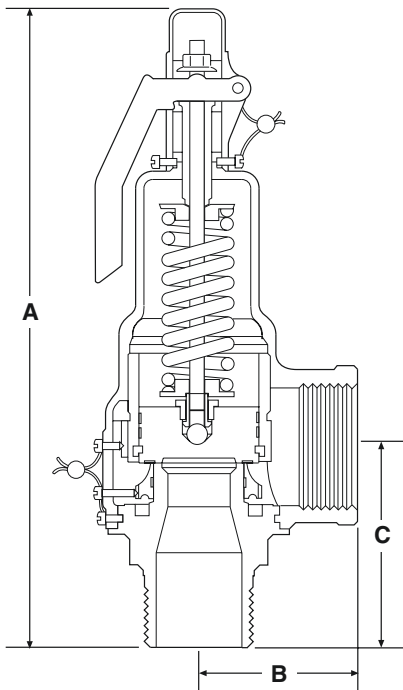
Limiting conditions for steam, air, and gas services

SV73

PMO - Maximum operating pressure	250 psig	(17 barg)
TMO - Maximum operating temperature	406°F	(208°C)

Materials of Construction

Part	SV75
Nozzle	Brass
Body	Bronze
Cap	Bronze
Disc	Brass



Dimensions and Weights (approximate) in inches and lbs

Orifice Designation	Size Inlet x Outlet	A	B	C	Weight
D	1/2" x 3/4"	6-1/2	1-5/8	2-1/8	1.50
D	3/4" x 3/4"	6-1/2	1-5/8	2-1/8	1.75
E	3/4" x 1"	7-1/2	1-3/4	2-3/8	2.5
E	1" x 1"	7-5/8	1-3/4	2-1/2	2.75
F	1" x 1-1/4"	8-1/2	2	2-5/8	3.5
F	1-1/4" x 1-1/4"	1-1/4	8-3/4	2	3.75
G	1-1/4" x 1-1/2"	9-5/8	2-3/8	3-1/8	5.5
G	1-1/2" x 1-1/2"	10	2-3/8	3-3/8	5.75
H	1-1/2" x 2"	10-5/8	2-3/4	3-5/8	7.75
H	2" x 2"	11-5/8	2-3/4	4-1/8	8.0
J	2" x 2-1/2"	13-5/8	3-3/8	4-1/4	15.5
J	2-1/2" x 2-1/2"	14	3-3/8	4-1/2	15.75

Selection and Sizing

Selection of a suitable valve will depend on:

Type of disposal system

For steam, air, or non-toxic gas where discharge is to atmosphere, either an open or closed bonnet with standard lifting lever is normally used.

For applications for gas where a discharge to atmosphere is not acceptable, a closed bonnet must be specified and a sealing bellows or diaphragm, gas tight cap, or sealed lever will be required.

For applications with known variable backpressure (i.e. common manifolds typically seen in the process industry) a balancing bellows type construction is required.

Valve construction

Safety valves for most general applications will be manufactured from bronze, cast iron, or steel for higher temperatures and pressures and have a separate seat ring (semi nozzle). This is the most common type of construction and is used for non-toxic, non-corrosive type media at moderate pressures. For particularly corrosive media or high temperatures, special materials of construction may be required.

Operating characteristic

Performance requirements vary according to application and required standards, therefore the valve must be selected accordingly. For steam boilers, a National Board Section I approved safety valve must be used. For unfired vessel application a National Board Section VIII approved safety valve is required.

Code or standard

Many safety valve applications require the valve to conform to a particular safety valve code or standard and have independent authority approval to guarantee conformance with the required standard.

Sizing a valve

Establish the maximum flowrate

This value must be the maximum possible for the system, for example at full boiler load or maximum possible valve capacity.

Establish the set pressure

The set pressure must be low enough to ensure that the maximum allowable accumulated pressure of the boiler, vessel or system it is protecting is not exceeded.

The set pressure must be high enough to ensure that there is sufficient margin above the normal system operating pressure to allow the valve to close. However, it must be no higher than the maximum allowable working pressure of the system. For safety valves used downstream of pressure reducing valves it is essential to establish the pressure at no load since this may be significantly higher than the working pressure for a direct acting type valve.

Unless operational considerations dictate otherwise, the safety valve set pressure should always be significantly above the system operating pressure with plenty of margin allowed for blowdown. There is sometimes a temptation to set a safety valve just above the normal operating pressure, which can lead to poor shut-off and nuisance operation.

Select a suitable size safety valve

Once the type of valve, required flow, and set pressure is established, the correct size valve can be selected. For medias such as steam and air, published capacity charts are usually quite sufficient to select the correct size safety valve. That is one whose capacity just exceeds the required capacity at the desired overpressure. Where sizing charts are not available or do not cater to the particular fluid or conditions, then the minimum required flow area will need to be calculated and a valve with a larger flow area chosen.

Selecting the Right Pressure Relief Valve

Spirax Sarco is eager to share its technical expertise on safety and safety relief valve selection, the following information should be noted:

- Type of service (water, steam, or air)
- Set pressure (psig)
- Discharge capacity (lb/hr, SCFM, or Btu/hr)
- Connection sizes
- Apparent/expected back pressure conditions
- Fluid temperature
- ASME Code symbols: V, UV, HV

SV73 & 74 Steam Capacities

The following capacity table is for Section VIII Steam only. For Section I steam and air capacities, please refer to Spirax Sarco Technical Information Sheet 3.2121

ORIFICE Area (sq.in.)	ORIFICE F 0.646	ORIFICE G 0.827	ORIFICE H 1.035	ORIFICE J 1.347	ORIFICE K 1.967	ORIFICE L 3.055	ORIFICE M 3.845	ORIFICE N 4.643	ORIFICE P 6.830	ORIFICE Q 11.811	ORIFICE R 17.123
Set Pressure	Section VIII Steam Capacities (lb/hr)										
15	474	778	1217	1986	2843	4415	5557	6697	9871	17069	24746
20	547	897	1403	2289	3277	5090	6407	7721	11380	19679	28530
25	619	1015	1589	2593	3712	5765	7256	8745	12889	22289	32314
30	692	1134	1775	2897	4147	6440	8106	9769	14399	24899	36098
35	771	1265	1980	3231	4625	7183	9040	10896	16059	27770	40260
40	851	1396	2184	3565	5103	7926	9975	12022	17719	30641	44422
45	931	1527	2389	3899	5581	8668	10910	13148	19379	33512	48584
50	1010	1657	2594	4233	6059	9411	11844	14275	21039	36383	52746
55	1090	1788	2798	4567	6537	10153	12779	15401	22700	39254	56908
60	1170	1919	3003	4901	7016	10896	13714	16528	24360	42125	61071
65	1250	2050	3208	5235	7494	11639	14648	17654	26020	44996	65233
70	1329	2180	3413	5569	7972	12381	15583	18780	27680	47867	69395
75	1409	2311	3617	5903	8450	13124	16517	19907	29340	50738	73557
80	1489	2442	3822	6237	8928	13866	17452	21033	31001	53609	77719
85	1569	2573	4027	6571	9406	14609	18387	22160	32661	56480	81882
90	1648	2704	4231	6904	9884	15352	19321	23286	34321	59351	86044
95	1728	2834	4436	7238	10362	16094	20256	24413	35981	62222	90206
100	1808	2965	4641	7572	10841	16837	21191	25539	37641	65093	94368
105	1887	3096	4845	7906	11319	17579	22125	26665	39302	67964	98530
110	1967	3227	5050	8240	11797	18322	23060	27792	40962	70835	102692
115	2047	3357	5255	8574	12275	19065	23994	28918	42622	73706	106855
120	2127	3488	5459	8908	12753	19807	24929	30045	44282	76577	111017
125	2206	3619	5664	9242	13231	20550	25864	31171	45943	79448	115179
130	2286	3750	5869	9576	13709	21292	26798	32297	47603	82318	119341
135	2366	3881	6073	9910	14188	22035	27733	33424	49263	85189	123503
140	2446	4011	6278	10244	14666	22778	28668	34550	50923	88060	127666
145	2525	4142	6483	10578	15144	23520	29602	35677	52583	90931	131828
150	2605	4273	6687	10912	15622	24263	30537	36803	54244	93802	135990
155	2685	4404	6892	11246	16100	25005	31471	37929	55904	96673	140152
160	2765	4534	7097	11580	16578	25748	32406	39056	57564	99544	144314
165	2844	4665	7301	11914	17056	26491	33341	40182	59224	102415	148476
170	2924	4796	7506	12248	17534	27233	34275	41309	60884	105286	152639
175	3004	4927	7711	12582	18013	27976	35210	42435	62545	108157	156801
180	3083	5058	7915	12916	18491	28718	36145	43562	64205	111028	160963
185	3163	5188	8120	13250	18969	29461	37079	44688	65865	113899	165125
190	3243	5319	8325	13584	19447	30203	38014	45814	67525	116770	169287
195	3323	5450	8529	13918	19925	30946	38948	46941	69185	119641	173450
200	3402	5581	8734	14252	20403	31689	39883	48067	70846	122512	177612
205	3482	5711	8939	14586	20881	32431	40818	49194	72506	125383	181774
210	3562	5842	9143	14920	21359	33174	41752	50320	74166	128254	185936
215	3642	5973	9348	15254	21838	33916	42687	51446	75826	131125	190098
220	3721	6104	9553	15588	22316	34659	43622	52573	77486	133996	194260
225	3801	6234	9757	15922	22794	35402	44556	53699	79147	136867	198423
230	3881	6365	9962	16256	23272	36144	45491	54826	80807	139738	202585
235	3960	6496	10167	16590	23750	36887	46425	55952	82467	142609	206747
240	4040	6627	10371	16924	24228	37629	47360	57078	84127	145480	210909
245	4120	6758	10576	17258	24706	38372	48295	58205	85787	148351	215071
250	4200	6888	10781	17592	25184	39115	49229	59331	87448	151222	219234
255	4279	7019	10985	17926	25663	39857	50164	60458	89108	154093	-
260	4359	7150	11190	18260	26141	40600	51099	61584	90768	156964	-
265	4439	7281	11395	18594	26619	41342	52033	62711	92428	159835	-
270	4519	7411	11599	18928	27097	42085	52968	63837	94088	162706	-
275	4598	7542	11804	19262	27575	42828	53902	64963	95749	165576	-
280	4678	7673	12009	19596	28053	43570	54837	66090	97409	168447	-
285	4758	7804	12213	19930	28531	44313	55772	67216	99069	171318	-
290	4837	7935	12418	20264	29010	45055	56706	68343	100729	174189	-
295	4917	8065	12623	20598	29488	45798	57641	69469	102390	177060	-
300	4997	8196	12827	20932	29966	46541	58576	70595	104050	179931	-

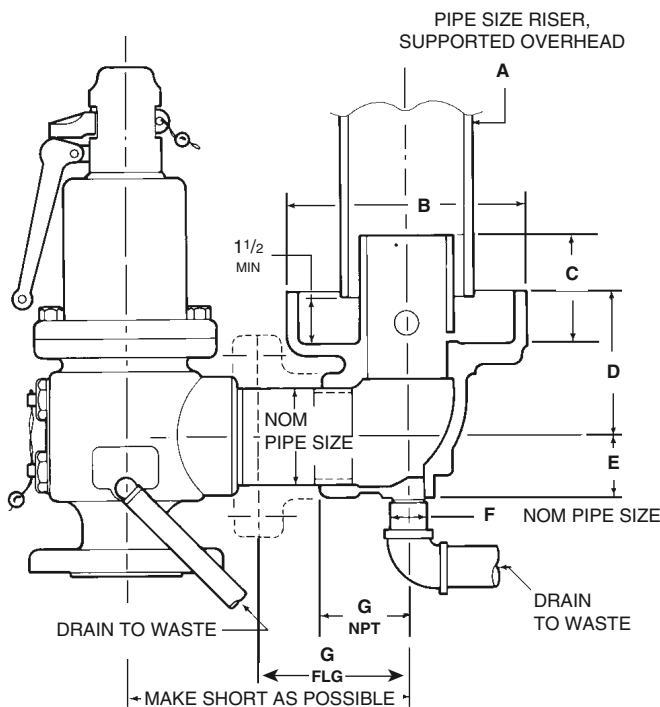
Installation, operation and maintenance guidelines

Drip Pan Elbows

The use of a drip pan elbow is highly recommended for the steam service safety valves. When attached to the valve outlet, these elbows collect and remove condensate as well as isolate the valve from discharge piping stresses.

Elbows through 4" feature female NPT threads and connect to the valve outlet using a short nipple of an appropriate pipe size. 6" and 8" elbows have integral ANSI 125 flanges and bolt directly to the valve outlet.

Select the drip pan elbow model to match the outlet size of the safety valve.



Dimensions

Size	A	B	C	D	E	F	G	Weight
1-1/4"	2.0	5.5	2.4	4.1	1.4	.375	2.1	5.0 lb
1-1/2"	51	140	61	104	36	10	53	2.3 kg
2"	3	6.25	2.4	3.6	1.6	.5	2.25	6.5 lb
	76	159	61	92	41	13	57	3.0 kg
2-1/2"	3.5/4	7.4	3.0	4.3	1.9	.75	2.7	11.0 lb
	89/102	188	76	109	48	19	69	5.0 kg
3"	4	8	3.5	4.9	2.3	.75	3.1	14.5 lb
	102	203	89	124	58	19	79	6.6 kg
4"	6	9.6	4.5	5.75	2.9	.75	3.75	27.0 lb
	152	244	114	146	74	19	95	12.2 kg
6"	8	12.75	6.6	7.6	4.2	.75	8	60.0 lb
	203	324	168	193	107	19	203	27.2 kg
8"	10	16.5	7.5	9.6	5.4	1.0	10.75	102.0 lb
	254	419	191	244	137	25	273	46.3 kg

Planning your Installation

Install the SV7 safety valve upright with the spindle vertical. ASME Section I models must be connected to the boiler independent of any other connection and as close to the boiler or normal steam flow path as possible without unnecessary intervening pipe or fittings. Make sure any intervening pipe or fitting is not longer than the face-to-face dimension of the corresponding tee fitting of the same diameter and pressure rating.

For ASME Section VIII service, the valve should not be connected to vessel in the vapor space which is to be protected. The connection between the valve and boiler or vessel shall have an area at least equal to the valve inlet. (Stop valves are not permitted between the vessel and safety/relief valve and the discharge to atmosphere except per ASME VIII UG-135(e).

Discharge lines from the pressure relieving device shall be at least the same size as the valve outlet and as short and direct as possible. Discharge lines shall prevent liquid from collecting in the discharge side of the valve and must be directed to a safe discharge area. The valve body drain and vent holes must not be plugged. Consider both the weight of the discharge pipe and the reaction forces generated by discharging. Adequately supported discharge piping relieves stress on the valve. (A Spirax Sarco drip pan elbow is an ideal choice).

Remember to free the valve of all packaging materials and remove dirt, sediment, and scale from mounting flanges and nozzles prior to installation. The use of proper handling equipment will prevent damage to the flange facings or misalignment of internal components caused by rough handling.

Do not use the test lever to hoist the valve during installation.

Note: These are general guidelines only, and it is the responsibility of the user to ensure the installation is in accordance with ASME Code and jurisdictional requirements.

Scheduled Maintenance

SV7 Series safety valves are 100% tested and then sealed to prevent unauthorized adjustment or repair.

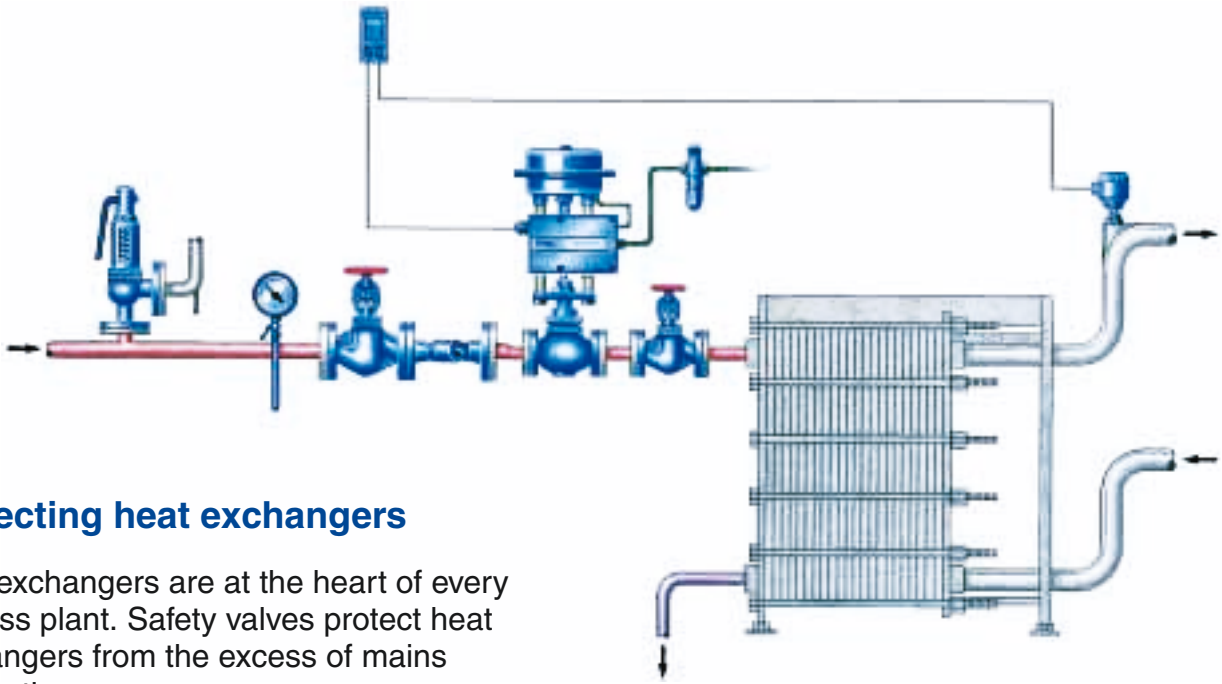
All warranties are void if seal is broken.

Valves should be inspected regularly to assure continued safe operation and long service life. A visual inspection is recommended at two month intervals while in service, followed by a complete pressure test at least once per year. Pressure testing prior to bringing down the boiler or system is suggested so that needed service or repairs can be made if required.

These valves can be operated manually by means of the test lever when the system pressure is at least 75% of set pressure, or the system pressure may be increased until the valve operates.

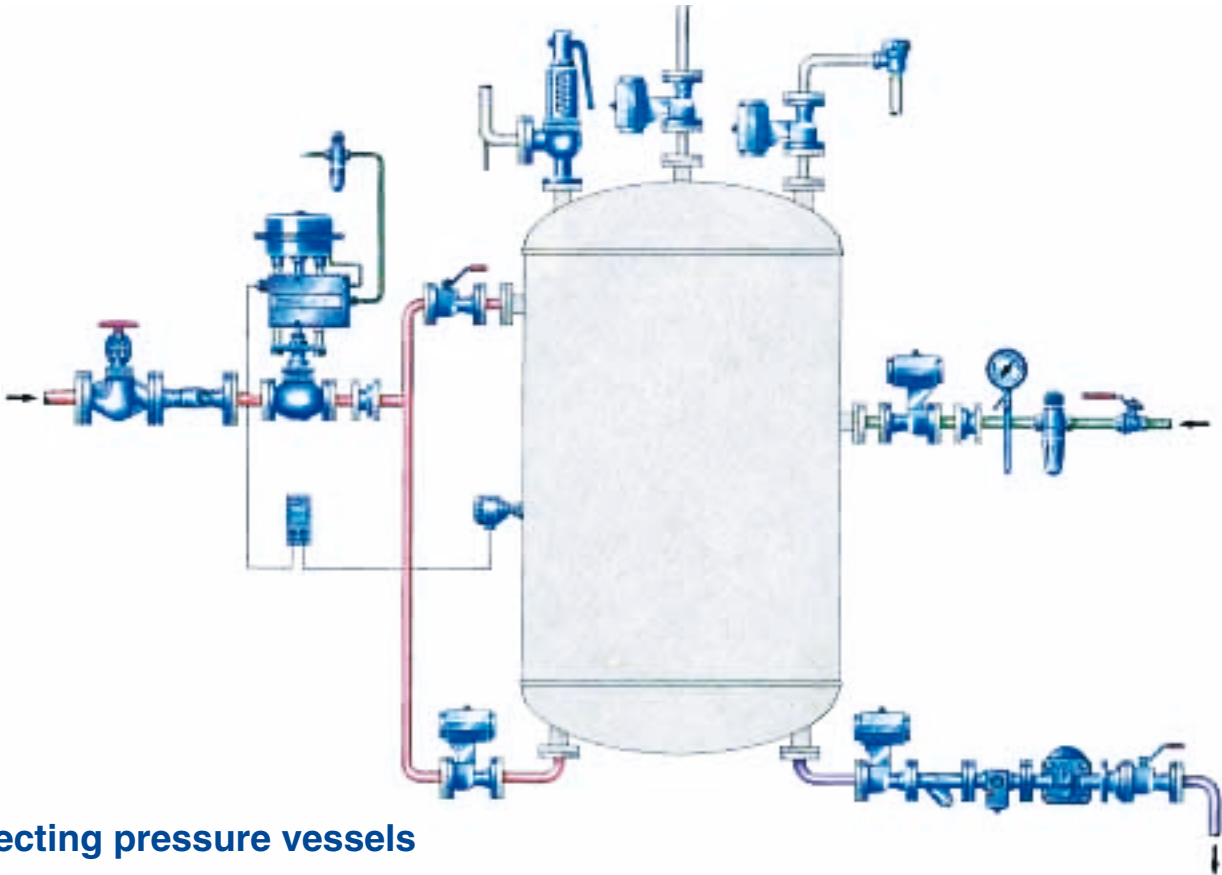
Any valve that fails to open at the nameplate set pressure or fails to open or close properly must be removed from the vessel for replacement or repair. Never attempt to stop leakage by compressing the spring or gagging the valve! For resetting, adjustment, or repairs contact Spirax Sarco for the name of Authorized Blue Tag centers who are familiar with the servicing of our safety valves.

Typical applications



Protecting heat exchangers

Heat exchangers are at the heart of every process plant. Safety valves protect heat exchangers from the excess of mains distribution pressure.

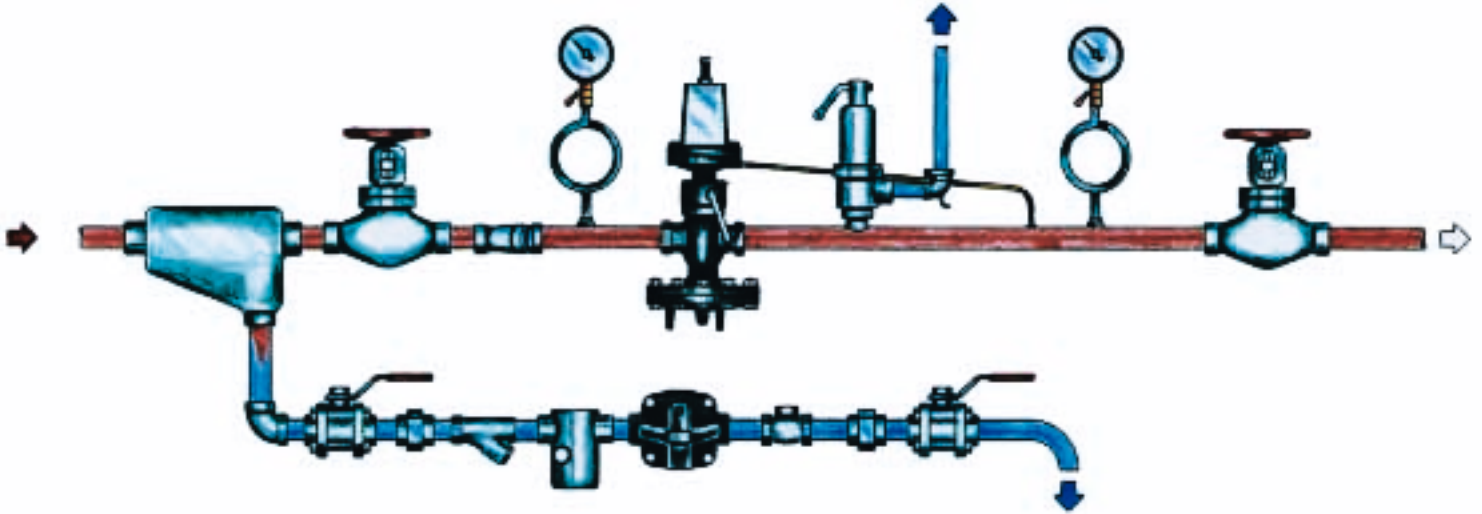


Protecting pressure vessels

Canning retorts, which are used within the food industry for cooking and sterilizing, are typical examples of pressure vessels which must conform to stringent safety standards. Safety valves ensure the safe working pressure of such vessels is never exceeded.

Pressure Reducing Stations

The downstream safety valve protects the upper limits of process pressure to keep the plant safe should the reducing station fail for any reason.



Other potential Spirax Sarco Safety Valve applications

- air service
- autoclaves
- chemical plants
- compressors
- continuous bypass duty
- critical blowdown
- food industry
- heat exchangers
- heating and ventilation industry
- pharmaceutical
- pipeline protection
- pressure vessels
- pulp and paper mills
- receiver protection
- refineries
- steam boilers
- steam processing equipment
- steam service receivers and storage vessels
- steam thermal expansion relief tanks
- variable back pressures
- vessel protections

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