

spirax /sarco®

Sizing and Selection Chart 25T, 25TE, 25E, 25PT, 25PTE

How to Select and Size

25T and 25TE Temperature Controls

25E Electric On/Off Valve

25PT and 25PTE Pressure/Temperature Controls

Select the pilot or pilots best suited to the application, then determine the regulator size required to meet the steam capacity load. Satisfactory temperature control and low control maintenance depend on sizing each regulator correctly for its intended application.

Too large a regulator may tend to hunt or it may operate for long periods with the main valve just barely cracked open. Wire drawing – the erosive scouring of high-velocity steam – can subject an oversized valve seat to premature wear.

Too small a regulator will not meet peak heating load requirements. It will increase the time a system requires for coming up to temperature during start-up.

Size of the regulator should be determined by actual steam capacity requirements, not by pipe sizes in the system. For most applications, regulator size will be smaller than the sizes of connected piping.

Determining Steam Capacity

For heating water with steam:

$$\text{lbs. of steam/h} = \frac{\text{GPM}}{2} \times \text{temp rise } ^\circ\text{F} \times 1.1$$

For heating fuel oil with steam:

$$\text{lbs. of steam/h} = \frac{\text{GPM}}{4} \times \text{temp rise } ^\circ\text{F} \times 1.1$$

For heating air with steam coils:

$$\text{lbs. of steam/h} = \frac{\text{CFM}}{800} \times \text{temp rise } ^\circ\text{F}$$

For radiation:

$$\text{lbs. of steam/h} = \frac{\text{sq. ft. EDR}}{4}$$

How to Size Valve

Proper regulator sizing requires the following information:

- 1) The steam capacity required for the application in pounds per hour.
- 2) Inlet supply pressure of the steam taken immediately ahead of the regulator.
- 3) Outlet steam pressure from the allowable pressure drop across the regulator.

Where it is impossible to calculate the pressure drop, 35% to 40% of the gage supply pressure can be used as a reasonable approximation. Noise level increases with the pressure drop. Install regulator with properly sized piping.

Example

Determine what size Spirax Sarco 25T Temperature Regulator will be required for an instantaneous water heater heating 20 GPM of water from 60° to 160°F. Steam supply pressure at the heater is 75 psig. Permissible drop across the regulator is 20 psi.

Solution: Using formula for heating water:

$$\begin{aligned} \text{lbs. of steam/hr.} &= \frac{\text{GPM}}{2} \times \text{temp rise } ^\circ\text{F} \times 1.1 \\ &= \frac{20}{2} \times 100 \times 1.1 \\ &= 1,100 \text{ lbs/h} \end{aligned}$$

From the capacity chart overleaf, look in the first column for 75 psig inlet pressure. In second column, find 55 psig downstream pressure (75 psig inlet less 20 psi permissible drop). Follow a horizontal line to the sixth column where we find that a 1" regulator is required to supply no less than 1,100 pounds per hour.

Sizing and Selection Chart

25T, 25TE, 25E, 25PT, 25PTE

Capacities Pounds of saturated steam per hour

Inlet Steam Pressure psig	Outlet Steam Pressure psig	Nominal Valve Size											
		1/2"S	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"	6"	
C _v Factor ▶		1.16	3.48	6.5	10.5	14	20	35	56	74	115	260	
† 2	0	15	45	85	140	180	260	455	725	960	1,490		
† 3	0	19	55	105	170	225	320	560	900	1,185	1,840		
† 5	2	20	57	106	171	228	326	572	915	1,200	1,875		
	1	23	70	131	211	282	405	705	1,125	1,490	2,310		
† 7	4	21	63	117	189	252	360	630	1,010	1,330	2,070		
	2	27	81	151	245	326	466	815	1,300	1,725	2,680		
† 10	5	29	86	160	260	345	495	865	1,385	1,830	2,840		
	3	37	110	205	332	442	632	1,105	1,770	2,340	3,635		
† 12	7	29	90	167	270	360	515	990	1,445	1,910	2,965		
	4	43	128	238	386	515	735	1,285	2,060	2,720	4,220		
† 15	10	30	95	175	285	380	540	950	1,500	2,000	3,100	7,000	
	8	37	110	210	335	450	640	1,120	1,795	2,370	3,680	8,320	
	5	45	135	250	405	545	780	1,365	2,185	2,890	4,480	10,170	
20	15	34	101	190	310	410	585	1,025	1,640	2,165	3,365	7,600	
	10	47	140	265	425	570	810	1,420	2,270	3,000	4,660	10,530	
	0-5	60	180	335	540	720	1,025	1,795	2,870	3,790	5,895	13,325	
25	20	36	107	200	325	430	650	1,080	1,725	2,280	3,545	8,000	
	15	50	145	270	435	580	830	1,450	2,325	3,070	4,770	10,790	
	0-7	70	205	385	620	825	1,180	2,065	3,305	4,360	6,785	15,340	
30	24	41	125	230	374	500	715	1,250	1,995	2,640	4,100	9,270	
	18	65	195	365	590	785	1,120	1,960	3,135	4,245	6,440	14,560	
	0-12	75	230	430	695	925	1,320	2,310	3,695	4,885	7,590	17,160	
40	34	45	97	255	410	545	780	1,365	2,180	2,885	4,480	10,135	
	24	86	256	478	772	1,030	1,470	2,570	4,115	5,440	8,450	19,110	
	0-18	95	280	525	850	1,135	1,620	2,835	4,535	5,995	9,315	21,060	
50	42	57	170	320	515	690	985	1,720	2,755	3,640	5,660	12,790	
	35	95	275	515	830	1,105	1,580	2,765	4,425	5,850	9,085	20,540	
	0-21	115	350	650	1,050	1,400	2,000	3,500	5,600	7,400	11,500	26,000	
60	50	69	210	385	625	835	1,190	2,085	3,330	4,400	6,845	15,475	
	40	110	235	610	990	1,315	1,880	3,290	5,265	6,955	10,810	24,400	
	0-27	130	385	720	1,165	1,555	2,220	3,885	6,215	8,215	12,765	28,860	
75	65	75	225	420	675	900	1,285	2,250	3,600	4,760	7,400	16,735	
	55	122	365	685	1,110	1,475	2,110	3,695	5,910	7,810	12,135	27,430	
	0-35	155	470	875	1,415	1,890	2,700	4,725	7,560	9,990	12,525	35,100	
100	85	102	305	575	925	1,235	1,765	3,085	4,940	6,525	10,140	22,925	
	75	155	460	865	1,395	1,860	2,660	4,655	7,450	9,840	15,295	34,580	
	0-48	200	600	1,120	1,815	2,420	3,460	6,055	9,690	12,800	19,895	45,000	
125	110	110	335	625	1,000	1,345	1,920	3,360	5,375	7,100	11,040	24,960	
	90	205	615	1,150	1,860	2,480	3,540	6,195	9,910	13,100	20,355	46,000	
	0-62	245	730	1,365	2,220	2,940	4,200	7,350	11,760	15,540	24,150	54,600	
150	130	140	425	790	1,280	1,700	2,440	4,265	6,825	9,000	14,000	31,680	
	105	255	760	1,410	2,290	3,050	4,360	7,630	12,210	16,130	25,100	56,700	
	0-76	285	860	1,600	2,590	3,460	4,940	8,645	13,830	18,280	28,400	64,220	
175	155	150	450	840	1,360	1,810	2,585	4,525	7,240	9,570	14,870	33,600	
	120	300	910	1,700	2,740	3,655	5,220	9,135	14,620	19,310	30,000	67,860	
	0-87	330	985	1,840	2,970	3,960	5,660	9,900	15,850	20,950	32,545	73,580	
200	170	215	645	1,200	1,950	2,600	3,700	6,490	10,380	13,700	21,300	48,200	
	140	330	980	1,830	2,960	3,950	5,640	9,870	15,800	20,870	32,430	73,320	
	0-103	375	1,125	2,100	3,390	4,520	6,460	11,300	18,000	23,900	37,145	89,980	
250	210	285	850	1,590	2,450	3,430	4,900	8,575	13,700	18,130	28,200	63,700	
	175	410	1,220	2,280	3,685	4,920	7,020	12,280	19,660	25,980	40,365	91,260	
	0-131	460	1,385	2,590	4,180	5,570	7,960	13,930	22,300	29,450	45,800	103,500	
*275	225	290	880	1,640	2,650	3,530	5,050	8,830	14,130	18,670	29,000		
	200	415	1,240	2,320	3,750	4,990	7,130	12,480	19,980	26,400	41,000		
	0-145	505	1,510	2,830	4,570	6,090	8,700	15,230	24,360	32,200	50,000		
*300	250	310	920	1,720	2,780	3,700	5,290	9,250	14,800	19,600	30,400		
	225	415	1,250	2,330	3,770	5,020	7,170	12,550	20,100	26,500	41,300		
	0-160	550	1,640	3,070	4,960	6,600	9,440	16,320	26,400	34,900	54,300		

† Specify low pressure main valve and low pressure "T" pilot for 2-1/2", 3" & 4" at inlet pressures of 15 psig and below. Not available in cast steel.

6" size not recommended below 15 psig. "E" pilot is not recommended for use with 2-1/2", 3" & 4" valves at pressures below 15 psig.

* Cast steel construction required for service above 250 psig.

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