Sizing and Selection Chart

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:

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

For heating fuel oil with steam:

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

For heating air with steam coils:

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

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:

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

\[ = \frac{20}{2} \times 100 \times 1.1 \]

\[ = 1,100 \text{ lbs/h} \]

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

Capacities  Pounds of saturated steam per hour

<table>
<thead>
<tr>
<th>Inlet Steam Pressure psig</th>
<th>Outlet Steam Pressure psig</th>
<th>Nominal Valve Size</th>
<th>1/2&quot;</th>
<th>1/2&quot;</th>
<th>3/4&quot;</th>
<th>1&quot;</th>
<th>1-1/4&quot;</th>
<th>1-1/2&quot;</th>
<th>2&quot;</th>
<th>2-1/2&quot;</th>
<th>3&quot;</th>
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<td>455</td>
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</table>

† 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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