

# spirax/sarco®

## Steam Sizing Chart

### DETERMINING THE VALUE $C_v$

$C_v$  calculation is an interactive process requiring knowledge of valve dynamics, piping geometry factors, and outlet velocities. In practice, this sizing chart is based on empirical values and will cater for most applications.

### HOW TO USE THE CHART

**Example 1.** To find  $C_v$  value for critical flow application.

Steam Demand	1500 lb/hr
Upstream Pressure	55 psi guage 70 psi absolute

Refer to Selection Chart Opposite.

- 1) Draw 1500 lb/hr flow line (A-B)
- 2) Draw a horizontal line from 70 psi absolute to critical pressure drop line (C-D). At this intersection drop a vertical line.
- 3) At the crossing point of these two lines, read off the  $C_v$  value required, i.e.  $C_v$  13
- 4) Select valve size required from the appropriate valve type technical information sheet.

**Example 2.** To find  $C_v$  value for non critical flow application.

Steam Demand	500 lb/hr
Upstream Pressure	85 psi guage 100 psi absolute
Downstream Pressure	65 psi guage 85 psi absolute

- 1) Draw 500 lb/hr flow line.
- 2) Draw a horizontal line from 100 psi absolute  
At the intersection with 20 psi pressure drop, draw a vertical line.
- 3) At the crossing point with the 500 lb/hr horizontal line read off the  $C_v$  value required, i.e.  $C_v$  3.8
- 4) Select valve size required from the appropriate valve type technical information sheet.

### HOW TO USE FORMULA

Proceed by calculating the required  $C_v$  from given flow data, having prior determined whether the flow is critical or sub-critical. The following equations have been adapted from the ISA S75.01 standard to allow for practical everyday use without significant sacrifice in accuracy.

#### FOR STEAM SERVICE

Subcritical Flow  
When  $\Delta P$  is less than  
.81 ( $P_1/2$ )

Critical Flow  
When  $\Delta P$  is greater than  
.81 ( $P_1/2$ )

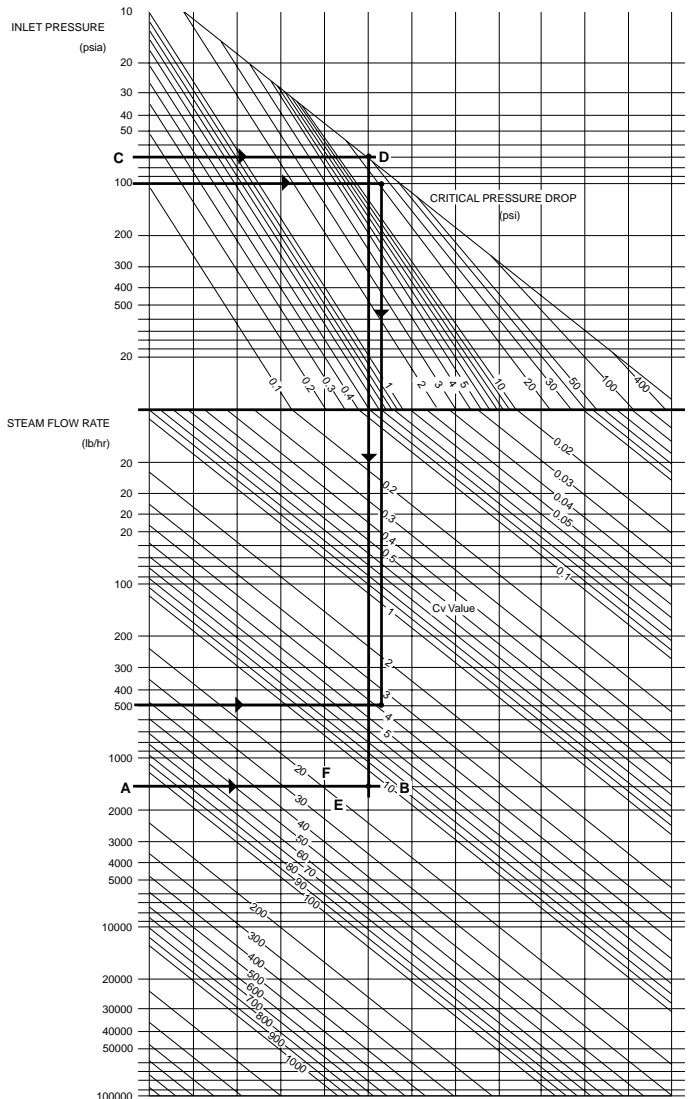
#### FOR SATURATED STEAM

$$C_v = \frac{w}{2.1 \sqrt{\Delta P (P_1 + P_2)}}$$

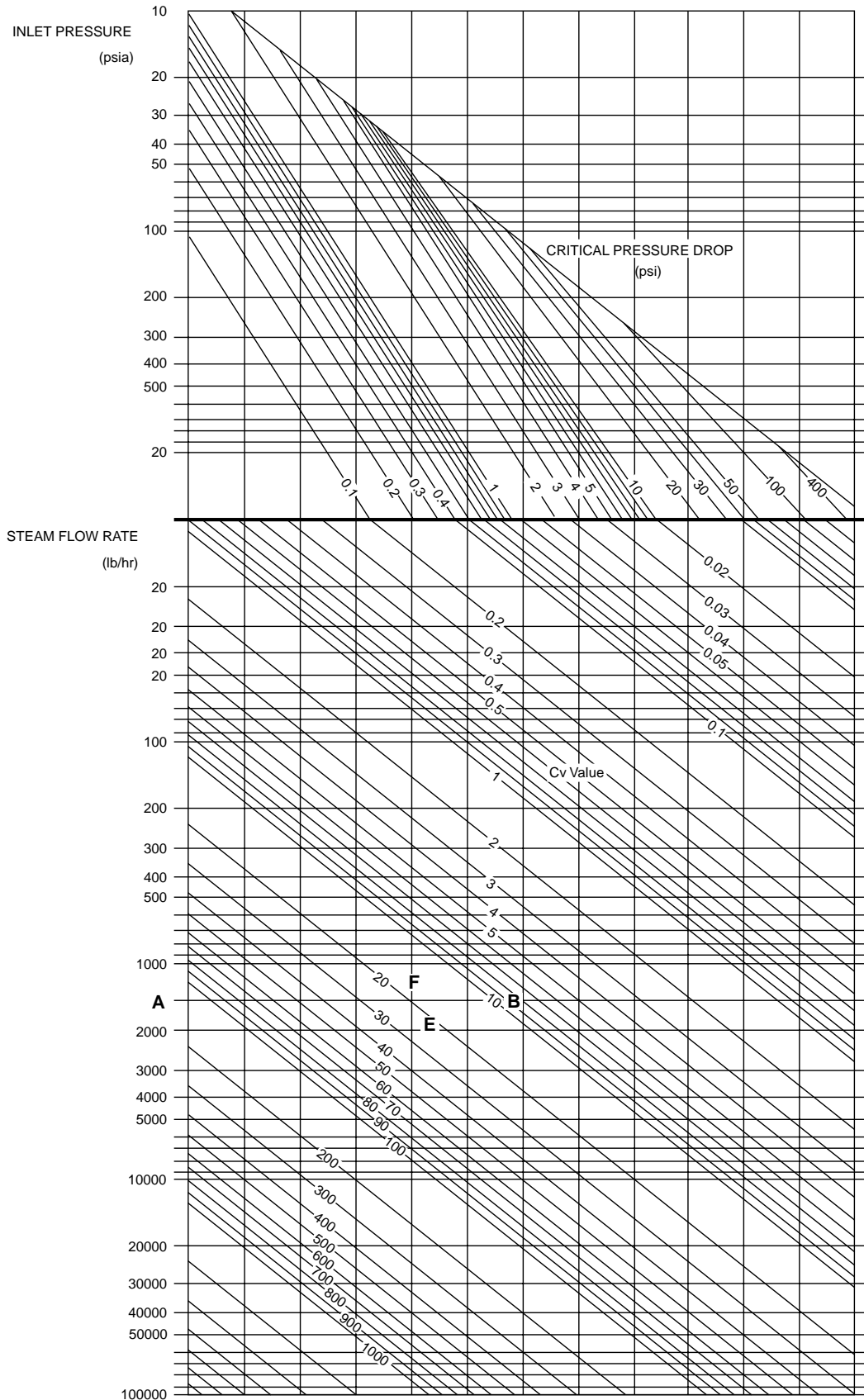
$$C_v = \frac{w}{1.647 (P_1)}$$

$C_v$  = Valve Coefficient  
 $P_1$  = Upstream Pressure, psia  
 $P_2$  = Downstream Pressure, psia  
 $\Delta P$  = Pressure drop  $P_1 - P_2$ , psia  
 $w$  = Flow Rate, lb/h

This chart is for example only. A complete chart for sizing is overleaf.



# Steam Capacity Chart



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TIS 1.618 US 09.99