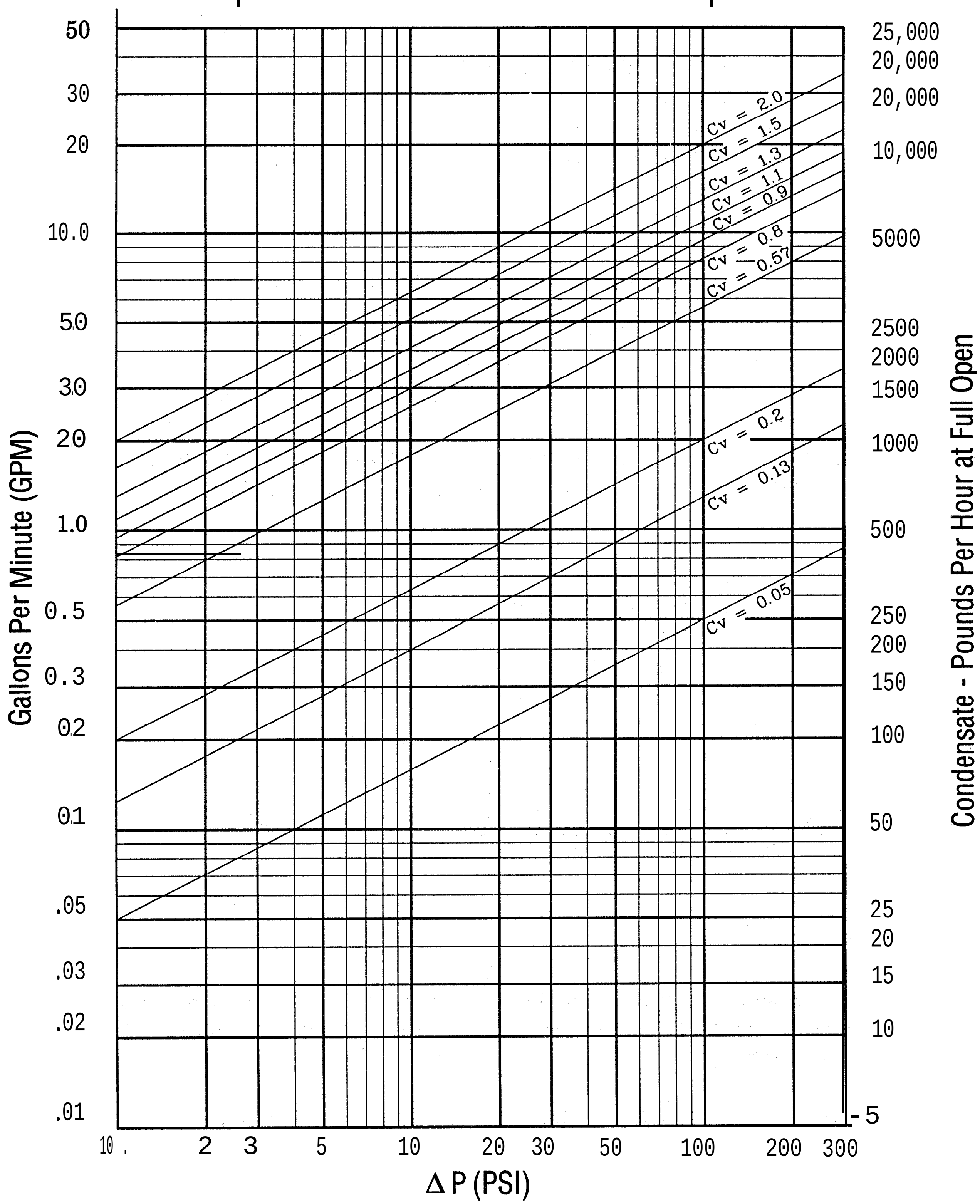
Armstrong®

Temperature Actuated Valve Flow Capacities



Approximate C_v Required For Freeze Protection of Uninsulated* Water Lines

1) $$GPM = \frac{A_1 A_2 (0.5t_w - t_a + 16)}{40.1\, d^2 (t_w - 32)}$$

Where:
- GPM = gallons per minute of water flow
- A_1 = pipe flow area, ft^2
- A_2 = exposed pipe surface area, ft^2
- t_w = temperature of resupply water, °F
- t_a = minimum air temperature, °F
- d = ID of pipe, ft

2) $$C_v = \frac{GPM}{\sqrt{\Delta P}}$$

Where:
- GPM = gallons per minute of water flow
- C_v = total required C_v of valves
- ΔP = pressure drop across valves (if valves discharge to atmosphere $\Delta P = P_s$ where P_s is supply pressure.)

EXAMPLE: Freeze protect a 125 foot long run of 2" pipe when the minimum air temperature is -15 °F. The resupply water is 40 °F minimum, at 60 psig.

From pipe data chart, for 2" schedule 40 pipe:

A_1 = 3.36 sq. in. = 0.023 ft^2

A_2 = 0.622 ft^2/ft x 125 ft = 77.8 ft^2

d = 2.067 in. = 0.172 ft

also: t_w = 40 °F

t_a = -15°F

1) $$GPM = \frac{(0.023)(77.8)\,[(0.5)(40) - (-15) + 16]}{40.1(0.172^2)(40 - 32)}$$ GPM = 9.6

2) $$C_v = \frac{96}{\sqrt{60}} = 1.24$$

Chose the valve or valves required to give a C_v of 1.24 or more; in this case a single C port ASDV. In some cases, a single valve will suffice; however, the use of several smaller valves will improve reliability.

*For properly insulated lines, use 25% of the C_v indicated as an approximation of required C_v.