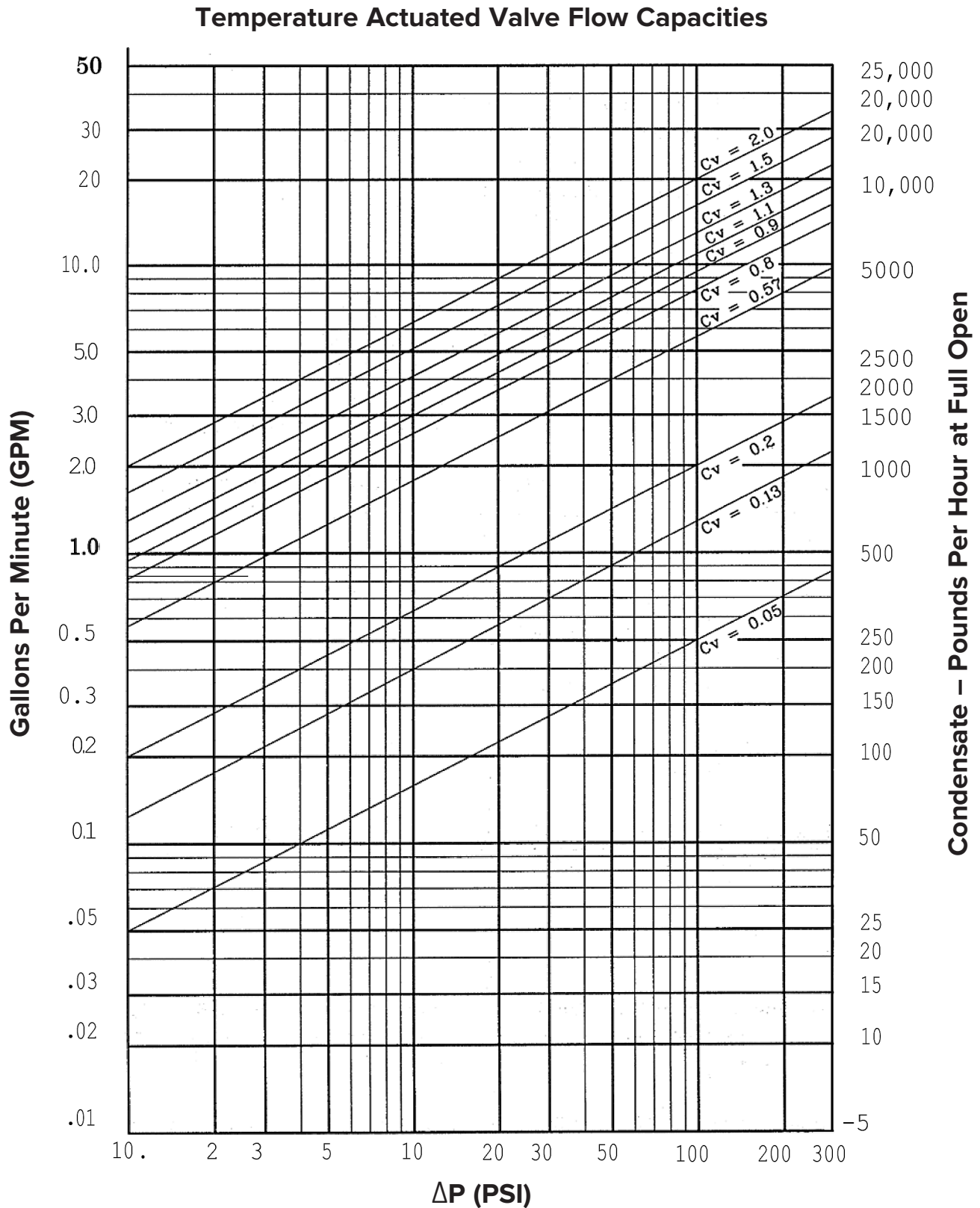


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TEMPERATURE ACTUATED VALVE





Temperature Actuated Valve

Approximate Cv Required Uninsulated* For Freeze Protection of Water Lines

$$1. \text{ GPM} = \frac{A_1 A P_2 (0.5 t_w - t_a + 16)}{40.1 d^2 (t_w - 32)}$$

Where: GPM = gallons per minute of water flow

A_1 = pipe flow area, ft²

A_2 = exposed pipe surface area, ft²

t_w = temperature of resupply water, °F

t_a = minimum air temperature, °F

d = ID of pipe, ft

$$2. C_v = \frac{\text{GPM}}{\sqrt{\Delta P}} \quad \text{Where: GPM = gallons per minute of water flow}$$

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:

$$A_1 = 3.36 \text{ sq. in.} = 0.023 \text{ ft}^2$$

$$A_2 = 0.622 \text{ ft}^2/\text{ft} \times 125 \text{ ft} = 77.8 \text{ ft}^2$$

$$d = 2.067 \text{ in.} = 0.172 \text{ ft}$$

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

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

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 .



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