

## TEMPERATURE ACTUATED VALVE



5025,000 20,000 30 20,000 2 20 10,000 10.0 5000 5.0 2500 2000 3.0 1500 Gallons Per Minute (GPM) 0.2 2,0 1 1000 ć٩ 0 1.0 500 0.0 0.5 4 250 1 200 0.3 150 0.2 100 0.1 50 .05 25 20 .03 15 .02 10 .01 -5 3 30 2 5 10 20 10. 50 100 200 300 ∆P (PSI)

Condensate – Pounds Per Hour at Full Open

**Temperature Actuated Valve Flow Capacities** 

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## Approximate Cv Required Uninsulated\* For Freeze Protection of Water Lines

1. GPM =  $\frac{A_1 AP_2}{A_1 AP_2}$ 

$$\frac{A_{1}^{}AP_{2}^{}(0.5t_{w}^{}-t_{a}^{}+16)}{40.1 d^{2}(t_{w}^{}-32)}$$

Where: GPM = gallons per minute of water flow

 $A_1 = pipe flow area, ft^2$ 

 $A_2$  = exposed pipe surface area, ft<sup>2</sup>

 $t_W$  = 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  
 $C_v = \text{total required } C_v \text{ of valves}$   
 $\Delta P = \text{pressure drop across valves}$   
(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:

 $\begin{array}{l} \mathsf{A_1} = 3.36 \; \text{sq. in.} = 0.023 \; \text{ft}^2 \\ \mathsf{A_2} = 0.622 \; \text{ft}^2/\text{ft} \; \text{x1} \; 25 \; \text{ft} = 77.8 \; \text{ft}^2 \\ \mathsf{d} = 2.067 \; \text{in.} = 0.172 \; \text{ft} \end{array}$ 

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  $C_v$ .

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