

Calculations

0

$$T = 90^\circ\text{F}$$

$$\phi = 60\%$$

$$h = 41.6 \text{ btu/lbs}$$

$$V = 14.25$$

$$\dot{V} = 500 \text{ CFM}$$

$$T_{wb} = 77^\circ\text{F}$$

$$w = 0.018$$

$$\begin{aligned} m_{H_2O} &= m_a (w_1 - w_2) \\ &= 35.08 (0.018 - 0.0096) \\ &= 0.29 \end{aligned}$$

$$m_a = \frac{500}{14.25} = 35.08$$

$$-Q_{out} + m_a (h_1 - h_2) = 0 \Rightarrow Q_{out} = 35.08 (41.6 - 28.7) = 452.53$$

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$$T_{db} = 90^\circ\text{F}$$

$$\phi = 60\%$$

$$h = 41.6 \text{ btu/lbs}$$

$$V = 14.25$$

$$h_1 = \frac{m_o h_o + m_a h_a}{m_1} \Rightarrow \frac{(35.08)(41.06) + (37.87)(38.6)}{72.95}$$

$$m_1 = m_o + m_a \Rightarrow 35.08 + 37.87 = 72.95$$

$$h_1 = 40.45$$

$$w_1 = \frac{m_o w_o + m_a w_a}{m_1} \Rightarrow \frac{(35.08)(0.018) + (37.87)(0.0096)}{72.95}$$

$$w_1 = 0.013$$

1', 2, & 3

$$T_{wb} = 75^\circ\text{F}$$

$$w = 0.0096$$

$$\phi = 50\%$$

$$h = 40$$

$$V = 13.2$$

$$h_{2,3} = 28.7 \text{ btu/lbs}$$

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$$T = 75^\circ\text{F}$$

$$w = 0.0096$$

$$\phi = 50\%$$

$$m_1 = \frac{500}{13.2} = 37.87$$

$$\dot{V} = 500 \text{ CFM}$$

$$V = 13.2$$

$$h_1 = 38.6$$

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$$T = 90^\circ\text{F}$$

$$\phi = 50\%$$

$$V = 14.15$$

$$T_{wb} = 74^\circ\text{F}$$

$$w = 0.015$$

$$m_a = \frac{500}{14.15} = 35.33$$

$$Q_{in} = m_a (h_1 - h_2) \Rightarrow 72.95 (41.6 - 28.7) = 941.055$$