47.28 Air at $75°F$ db / $64°F$ wb enters a cooling coil with an ADP of $45°F$ and a bypass factor of 15%. What is the wet bulb temperature of the leaving air?

A. $45°F$

B. $48°F$

C. $50°F$

D. $61°F$

Use the Psychrometric Chart to plot the process line from the room condition to the ADP.

Determine the coil efficiency using the bypass factor.

$$\eta_{coil} = 1 - BF = 1 - 0.15 = 0.85$$

Set the coil efficiency equal to the ratio of the actual reduction in wet bulb temperature from $1 \rightarrow 2$ to the maximum possible reduction which would be achieved only when State 2 is the ADP, corresponding to 100% coil efficiency. Substitute and solve for $T_{2,wb}$.

$$\eta_{coil} = \frac{T_{1,wb} - T_{2,wb}}{T_{1,wb} - ADP}$$

$$0.85 = \frac{64°F - T_{2,wb}}{64°F - 45°F}$$

$$T_{2,wb} = 47.9°F$$

Answer B

47.29 A 230V, single-phase, 5-hp motor operates at full load with a power factor of 0.8. The motor efficiency is 75%. What is the current drawn?

A. $10A$

B. $13A$

C. $15A$

D. $27A$

The current drawn by an AC motor is a function of the number of phases, power, voltage, motor efficiency, and power factor. Search for Motor Phases and find the table Power for Different Motor Phases. Select the first equation in the "Single-Phase" column. Substitute and solve using the values given.

$$I_{amps} = \frac{P_{hp}\left(746\frac{W}{hp}\right)}{V\eta\,(pf)}$$