General formulas

TOTAL BTUH — AIR SIDE:

Total BTUH = 1.09 x SCFM x (Lvg. Air Dry Bulb -Ent. Air Dry Bulb)

Where: 1.09 = (Sp Ht. of Air at 70°F) x (min./hr.) x Density Std. Air

.242 = Sp. Ht. of Moist Air at 70°F

60 = min./hr.

.075 = Density Std. Air in Lbs./Cu.Ft.

TOTAL BTUH — WATER SIDE:

Total BTUH = 500 x GPM x (Ent. Water Temp. - Lvg. Water Temp.)

Where: 500 = lbs./gal. x min/hr. x specific heat water

8.33 = lbs./gal.

60 = min./hr.

1 = specific heat water

INITIAL TEMPERATURE DIFFERENCE (ITD):

ITD = Ent. Water Temp. - Ent. Air Dry Bulb

MBH PER SQUARE FOOT OF FACE AREA:

$$\text{MBH / Sq. Ft.} = \frac{\text{Total BTUH}}{\text{Face Area (Sq. Ft.)} \times 1000}$$

LEAVING AIR TEMPERATURE:

$$\text{Lvg. Air Dry Bulb} = \text{Ent.Air Dry Bulb} + \frac{\text{Total BTUH}}{1.09 \times \text{SCFM}}$$

WATER VELOCITY:

$$\text{5/8" Tubes: Water Velocity FPS} = \frac{1.07 \text{ X GPM}}{\text{No. of Tubes Fed}}$$

FACE AREA: $$FA = \frac{\text{SCFM}}{\text{Face Velocity (FPM)}}$$

FACE VELOCITY: $$FV = \frac{\text{SCFM}}{\text{Face Area (Sq. Ft.)}}$$

ROWS DEEP:

$$\text{Rows Deep} = R_{ft} \times M_t \times \frac{\text{Face Velocity (FPM)}}{100}$$