Cooling Formulas

CONVERSION

1 Ton = 12000 Btu/hr

COOLING LOAD REQUIREMENT

Total Cooling Load (Btu/hr) = 4.5 x CFM x (H1 – H2)

Where:
CFM = Airflow in Cubic Feet Per Minute
H1 = Entering Air Enthalpy (Btu/lbm dry air)
H2 = Leaving Air Enthalpy (Btu/lbm dry air)

Or

Total Cooling Load (Btu/hr) = Sensible Cooling Load (Btu/hr) + Latent Cooling Load (Btu/hr)

Where:
Sensible Cooling Load (Btu/hr) = CFM x Density Factor x (T1 – T2)
Latent Cooling Load (Btu/hr) = CFM x 0.69143 x (G1 – G2)

Where:
CFM = Airflow in Cubic Feet Per Minute

$$\text{Density Factor} = 1.08 + \frac{(70\text{-Blower Temp}) * .024}{10}$$

T1 = Entering Air Drybulb Temperature (°F)
T2 = Leaving Air Drybulb Temperature (°F)
G1 = Grains of Moisture of Entering Air = 7000 x humidity ratio (lbm moisture/lbm of dry air)
G2 = Grains of Moisture of Leaving Air = 7000 x humidity ratio (lbm moisture/lbm of dry air)

EFFICIENCY CALCULATION

SEER = BTU / W-hr

COST OF COOLING:

Cost of cooling = BTU/hr x hrs of operation x electricity cost ($/kw-hr) / (SEER x 1000)