

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

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

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)