REFRIGERATION FORMULAS

Net refrigerating effect (BTU/lb.)	=	Enthalpy of vapor leaving evaporator (BTU/lb.)	−	Enthalpy of liquid entering evaporator (BTU/lb.)
Compression work (BTU min.)	=	Heat of compression (BTU/lb.)	×	Refrigerant circulated (lb./min.)
Compression HP	=	Compression work (BTU/min.)/42.4		
Compression HP	=	Capacity (BTU/min.)/42.4 × COP		
Compression HP (per ton)	=	4.715/COP		

REFRIGERATION FORMULAS *(cont.)*

$$\text{Power (Watts)} = \text{Compression HP per ton} \times 745.7$$

$$\text{COP} = \frac{\text{Net refrigerating effect (BTU/lb.)}}{\text{Heat of compression (BTU/lb.)}}$$

$$\text{Capacity (BTU/min.)} = \text{Refrigerant circulated (lb./min.)} \times \text{Net refrigerating effect (BTU/lb.)}$$

$$\text{Compressor displacement (ft.}^3\text{/min.)} = \frac{\text{Capacity (BTU/min.)} \times \text{Volume of gas entering compressor (ft.}^3\text{/lb.)}}{\text{Net refrigerating effect (BTU/lb.)}}$$

$$\text{Heat of compression (BTU/lb.)} = \text{Enthalpy of vapor leaving compressor (BTU/lb.)} - \text{Enthalpy of vapor entering compressor (BTU/lb.)}$$

REFRIGERATION FORMULAS *(cont.)*

$$\text{Volumetric efficiency} = 100 \times \left(\frac{\text{Actual weight of refrigerant}}{\text{Theoretical weight of refrigerant}} \right)$$

$$\text{Compression ratio} = \frac{\text{Head pressure, psia (absolute)}}{\text{Suction pressure, psia (absolute)}}$$

$$\text{Refrigerant circulated, lb./(min.)/(ton)} = \frac{200}{\text{Refrigerating effect}}$$

42.4 = heat flow, BTU/(min.) (hp); 200 = BTU/(min.) (ton); COP = coefficient of performance