

Electrical & HP Formulas

Technical Data and Multipliers

Ohms Law:

$$\text{Ohms} = \text{Volts/Amperes} \quad \text{Amperes} = \text{Volts/Ohms} \quad \text{Volts} = \text{Amperes} \times \text{Ohms}$$

Power—A.C. Circuits:

$$\text{Power Factor} = \frac{\text{Watts}}{\text{Volts} \times \text{Amperes}}$$

$$\text{Three Phase Kilowatts} = \frac{\text{Volts} \times \text{Amperes} \times \text{Power Factor} \times 1.732}{1000}$$

$$\text{Three Phase Volt-Amperes} = \text{Volts} \times \text{Amperes} \times 1.732$$

$$\text{Three Phase Amperes} = \frac{746 \times \text{Horsepower}}{1.732 \times \text{Volts} \times \text{Efficiency} \times \text{Power Factor}}$$

$$\text{Single Phase Kilowatts} = \frac{\text{Volts} \times \text{Amperes} \times \text{Power Factor}}{1000}$$

$$\text{Single Phase Amperes} = \frac{746 \times \text{Horsepower}}{\text{Volts} \times \text{Efficiency} \times \text{Power Factor}}$$

Power - D.C. Circuits:

$$\text{Watts} = \text{Volts} \times \text{Amperes}$$

$$\text{Amperes} = \frac{\text{Watts}}{\text{Volts}}$$

$$\text{Horsepower} = \frac{\text{Volts} \times \text{Amperes} \times \text{Efficiency}}{746}$$

Motor Application Formulas:

$$\text{Torque (lb.-ft.)} = \frac{\text{Horsepower} \times 5250}{\text{RPM}}$$

For Pumps:

$$\text{Horsepower} = \frac{\text{GPM} \times \text{Head(ft)} \times \text{Specific Gravity}}{3960 \times \text{Efficiency of pump}}$$

For Fans & Blowers:

$$\text{Horsepower} = \frac{\text{CFM} \times \text{Pressure (lbs./sq. ft)}}{33000 \times \text{Efficiency}}$$

Speed:

$$\text{Synchronous RPM} = \frac{\text{Hertz} \times 120}{\text{Poles}}$$

$$\text{Percent Slip} = \frac{\text{Synchronous RPM} - \text{Full Load RPM}}{\text{Synchronous RPM}} \times 100$$