Formulas

**Imperial**

\[
kW = \frac{\text{CFM} \times (T°^2 - T°^1) \times 1.08}{3413}
\]

- **kW**: Power in kW
- **CFM**: Air volume in cubic feet per minute
- **T°2**: Temperature of air leaving heater in °F
- **T°1**: Temperature of air entering heater in °F

**Metric**

\[
P = \frac{\text{Q} \times (T°^2 - T°^1) \times 1.21}{3600}
\]

- **P**: Power in kW
- **Q**: Air volume in m³/hr
- **T°2**: Temperature of air leaving heater in °C
- **T°1**: Temperature of air entering heater in °C

**KW per square foot**

**Imperial**

\[
kW / \pi^2 = \frac{kW}{S}
\]

- **kW**: Power in kW
- **S**: Surface area in square feet

**Metric**

\[
P / \pi^2 = \frac{P}{S}
\]

- **P**: Power in kW
- **S**: Surface area in m²

**Duct area**

**Imperial**

\[
S = \frac{W \times H}{144}
\]

- **S**: Surface area in square feet
- **W**: Duct width in inches
- **H**: Duct height in inches

**Metric**

\[
S = W \times H
\]

- **S**: Surface area in m²
- **W**: Duct width in meters
- **H**: Duct height in meters

**Electric power**

**Single phase**

\[
P = V \times I
\]

**3 phase**

\[
P = \frac{V^2}{R} \times 1.732
\]

- **P**: Power in Watts
- **V**: Voltage in Volts
- **I**: Current in Amps
- **R**: Resistance in Ω (Ohm)

**Line current**

**Single phase**

\[
I = \frac{P}{V}
\]

**3 phase**

\[
I = \frac{P}{V \times 1.732}
\]

**Conversions**

- **∞F to ∞C**
  \[
  ∞C = \frac{(∞F - 32)}{1.8}
  \]

- **∞C to ∞F**
  \[
  ∞F = (1.8 \times ∞C) + 32
  \]

- **BTU to kW**
  \[
  1 \text{ kW} = 3413 \text{ BTU/hre}
  \]

- **kW to BTU**
  \[
  1 \text{ BTU/hre} = 0.29307 \times 10^{-3} \text{ kW}
  \]

- **mm to inches**
  \[
  1 \text{ in} = 25.4 \text{ mm}
  \]

- **Inches to mm**
  \[
  1 \text{ mm} = 0.03937 \text{ in}
  \]

- **CFM to FPM**
  \[
  1 \text{ FPM} = \frac{1 \text{ CFM}}{S}
  \]

- **FPM to CFM**
  \[
  1 \text{ CFM} = 1 \text{ FPM} \times S
  \]

- **S**: Surface area in square feet
### Selection Guide

#### Element Types

<table>
<thead>
<tr>
<th>Element Types</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
</table>
| Open Coil           | - Excellent heat dissipation  
                      - Minimal pressure drop  
                      - Fast response time  
                      - More kilowatts per sq.ft.  
                      - Quick delivery                                                                                                                                  | - Elements in direct contact with air  
                                                                                               - Elements in direct contact with air  
                                                                                               - Cannot be installed in humid environments  
                                                                                               - Cannot be installed in dusty environments                                                                                                    |
| Standard Tubular    | - Less sensitive to humidity and dust  
                      - Suited for demanding environments  
                      - Excellent mechanical resistance  
                      - Heating element not in direct contact with air                                                                                                  | - Increase in pressure drop  
                                                                                               - Slower response time  
                                                                                               - Less heat dissipation                                                                                                                      |
| Finned Tubular      | - Good heat dissipation  
                      - Less sensitive to humidity and dust  
                      - Suited for demanding environments  
                      - Excellent mechanical resistance  
                      - Heating element not in direct contact with air                                                                                                  | - Increase in pressure drop  
                                                                                               - Slower response time  
                                                                                               - Less kilowatt per sq.ft.  
                                                                                               - Longer delivery                                                                                                                               |

#### Static Pressure Loss

![Static Pressure Loss Graph](image-url)

Visit our web site at [www.neptronic.com](http://www.neptronic.com)
Minimum Air Velocity

Open Coil Elements

Tubular Elements