Reference Data

Wattage Requirements

The following equations can be used to make quick estimates of wattage requirements.

For Steel

Use equation:

$$kW = \frac{\text{pounds} \times \text{temperature rise (°F)}}{20{,}000 \times \text{heat-up time (hrs.)}}$$

OR

$$kW = \frac{\text{kilograms} \times \text{temperature rise (°C)}}{5040 \times \text{heat-up time (hrs.)}}$$

For Heating Water in Tanks

Use equation:

$$kW = \frac{\text{gallons} \times \text{temperature rise (°F)}}{375 \times \text{heat-up time (hrs)}}$$

OR

$$kW = \frac{\text{liters} \times \text{temperature rise (°C)}}{790 \times \text{heat-up time (hrs)}}$$

1 cu. ft. = 7.49 gallons

For Air

Use equation:

$$kW = \frac{\text{CFM}^{**\,(1)} \times \text{temperature rise (°F)}}{3000}$$

OR

$$kW = \frac{\text{cubic meters/min}^{(1)} \times \text{temperature rise (°C)}}{47}$$

For Oil

Use equation:

$$kW = \frac{\text{gallons} \times \text{temperature rise (°F)}}{800 \times \text{heat-up time (hrs.)}}$$

OR

$$kW = \frac{\text{liters} \times \text{temperature rise (°C)}}{1680 \times \text{heat-up time (hrs.)}}$$

1 cu. ft. = 7.49 gallons

For Heating Flowing Water

Use equation:

$$kW = \text{GPM}^{*} \times \text{temperature rise (°F)} \times 0.16$$

OR

$$kW = \text{liters/min.} \times \text{temperature rise (°C)} \times 0.076$$

For Compressed Air

Use equation:

$$kW = \frac{\text{CFM}^{**\,(1)} \times \text{density}^{(2)} \times \text{temperature rise (°F)}}{228}$$

OR

$$kW = \frac{\text{cubic meters/min}^{(1)} \times \text{temperature rise (°C)} \times \text{density (kg/m}^3)^{(2)}}{57.5}$$

* Gallons per minute
** Cubic feet per minute
(1) Measured at normal temperature and pressure
(2) Measured at heater system inlet temperature and pressure