

Power Notes: A Common Sense Approach to Radiant Heat

Radiant heaters have the ability to heat a product without physically contacting it. This can be advantageous when the product must be heated while in motion or when physical contact would mar the product's surface finish. In many applications, electric radiant heat has many benefits over alternate heating methods. Some of these benefits are listed below. Fast Heat-Up and Cool-Down Times.

The thermal inertia of an infrared radiation heating system is generally very low, thus dispensing with the requirement for long pre-heat cycles. This means that the heaters are ready within minutes of turn on. Since radiant energy heats the product directly without an intervening heat transfer medium such as air, radiant heating can be much faster than convection heating. Convection heating must conduct the heat energy through the boundary film of air that clings to the products' surface. Radiant energy is absorbed at and below the surface of the product and then transferred by conduction throughout the material's thickness. Radiant heat-up times are typically less than one-third the heat-up time of a conventional oven.

High Efficiency

Radiant Heaters generate electromagnetic waves that when intercepted and absorbed by the product are converted directly to heat. Since they do not necessarily heat the air or surroundings, radiant ovens can be designed to achieve a high level of efficiency. The energy radiated may also be concentrated, focused, directed, and reflected in the same manner as light, which greatly increases its flexibility and adaptability and reduces the losses. Since radiant heaters generally require only a few minutes to reach operating temperature, energy savings can result from turning off the oven during gaps production.

Control Accuracy and Flexibility

Electric radiant heaters can be easily and precisely controlled. They can be zoned to provide uniform heating or a custom distribution of power density. Infrared sensors can sense the actual product temperature and be used to control the heater temperature or line speed.

Low First-Time Costs

The simplicity of electric infrared systems, the lightness of the structures, and the elimination of massive furnace foundations result in lower initial system costs. Compact radiant systems can be suspended from the ceiling. High heat source concentrations quickly increase product temperature shorten conveyor length, and save floor area. Radiant heaters can heat product equally, whether they are moving vertically or horizontally, making added floor space savings possible. Sometimes, the value of this space saving will exceed the first cost of the system.

Clean Heat

Electric radiant heaters do not produce products of combustion. Therefore, the product is not contaminated by hot gases. Low air velocities reduce the possibility of surface contamination by airborne dirt.