

Electric infrared heating

Using technologies that help to improve your energy productivity¹ is a sure way to optimise production processes and, as a result, grow your business. Switching to electrically powered infrared heating and drying from gas, heavy fuel oils and other alternate fuel sources is an attractive option to achieve more with the energy you use.

Technology insights

Electric infrared heating and drying systems transfer heat energy instantly, rapidly and directly to a product that requires heating without the need for an intermediate commodity such as air or water.

- Electromagnetic waves heat products without the need to waste energy on also heating large volumes of cooler air.
- Electric infrared heating and drying systems produce very little visible light and emit zero harmful emissions, thus making them friendlier to the environment than other conventional heat sources.

The technology suits sensitive materials that require less intense heat and processes that need quick response times or shorter bursts of intense radiation from heating equipment. For instance, electric infrared ovens can quickly and easily vary the intensity of emitted heat while achieving power densities of up to 400 kW/m².

- This characteristic makes electric infrared heating and drying systems a superior technology to rapidly heat metals.

Medium wavelength electric infrared heating is especially well suited to the process of curing and drying coatings, because it corresponds well with the absorption bands for water, which most coatings contain. As infrared heating does not penetrate surfaces deeply and generally only heats outer surfaces, it is especially suited to dry coated and printed products.

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1. Energy productivity is defined as the ratio of output divided by energy consumption

Technology benefits

Using infrared heating for drying, curing, pre-heating and scorching processes offers several advantages over convection heating across the industrial, commercial and agricultural sectors, because:

- There is no direct contact with the product to be heated or dried
- The drying and heating rates are high
- Infrared emitters offer a high degree of controllability of the heat source
- Infrared emitters deliver heat in exact amounts directly to a specific point
- Infrared emitters can be adjusted precisely to materials' properties
- Infrared radiation can be focused for a specified time
- Unlike traditional heating, infrared heating does not dry surrounding air

Hybrid systems that combine infrared heating and fuel-fired convection ovens are an alternative technology solution to most effectively heat certain processes and applications. Infrared heating systems or hybrid systems that combine infrared and convection technologies offer a host of benefits:

- Cost savings due to high overall efficiency
- Improved product quality
- Improved product throughput
- Less wastage or product loss due to production process heat control
- Continuity of fuel supply
- No production delays or interruptions as a result of fuel delivery delays
- No necessity for bulk fuel handling or storage
- A cleaner energy source compared to gas, heavy fuel oils and convection heating

Improved drying and curing processes help to optimise energy productivity and put your business on a path to growth and expansion

Take note ...

There are a number of parameters to be considered - including product quality, operating costs and production rates - to determine whether electric infrared heating is the appropriate technology for a specific product or process.

- For instance, gas-catalytic technology has a slightly superior heating efficiency because of the intensity of the radiation it emits and the amount of time the product spends in the oven. This makes it an ideal technology to dry paper and fabric.

In general, gas-catalytic infrared systems are more cost effective than electric infrared systems in the case of materials that require much energy, such as some textiles.

Some other characteristics of electric infrared heating and drying systems:

- Infrared panels cannot be fitted to high ceilings; they must be hung lower on chains
- Heaters need to be evenly distributed in larger areas because infrared energy can only be felt up to three metres far
- Infrared emitters should not face windows because infrared energy can pass through glass
- Infrared panels are not suitable to heat locations that are very cold, such as outside seating areas
- The technology can be dangerous as the interior elements get very hot
- Once turned off, electric infrared heating and drying systems lose heat instantly and go cold quickly

Optimise your energy productivity

Eskom's Energy Advisors, in regions across South Africa, are dedicated to offering advice to business customers on the latest technology and process developments, including electric infrared heating and drying systems

Moreover, they are dedicated to supporting business customers achieve their growth targets by offering them advice on how to use energy in the most productive way possible within the operational framework of a specific business. Having a clear understanding of the potential impact of energy productivity and how it can *maximise output by using energy most optimally* requires a business to have exact energy use intelligence:

- Understanding its energy needs
- Understanding its electrical systems and processes
- Investigating the latest technology and process developments
- Understanding the cost saving benefits of energy-smart technologies
- Recognising areas where energy is used least and most
- Analysing how to reduce energy investment costs
- Considering how energy use patterns can be changed from peak to off-peak periods
- Realising that energy savings in one area can be used to power growth in another area

Eskom's Energy Advisors specialise in advising business customers in the commercial, industrial and agricultural sectors on how to gather *energy use intelligence*.
