

Infrared Heat for Food Processing

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Processing chocolate, filling candies, pre-browning instant meals or heating surfaces of foods: exact temperatures that avoid overheating of the food are required in the food processing industry.

Infrared emitters transmit heat without contact and only as long as necessary.

Without preheating, and using energy efficiently, heat is delivered exactly when it is needed.

Moreover, IR emitters react very quickly and can therefore be well controlled - an important precondition for the quality of food.

See in our application examples how Infrared systems solve the challenges of food processing:

- **Efficient browning of ready meal toppings**
- **Improving chocolate quality**
- **Increasing shelf life of bread**

More efficient food browning with Carbon Infrared Heating



Oscar Mayer Ltd manufactures a range of potato-topped and crumb-topped ready meals for major high street supermarkets and it is important, in terms of final presentation, that the products are pre-browned. By installing an oven using carbon infrared heaters Oscar Mayer has been able to eliminate previous maintenance problems, improve energy efficiency and liberate valuable floor space, at its food manufacturing plant in Chard.

Surface browning must be carried out without any after-cooking of the product itself and this was previously done using long wave, metal-sheathed infrared heaters. However, this aging system was proving increasingly difficult to maintain and the production line often had to be stopped to replace broken heating elements.

As a result, Oscar Mayer contacted specialists Protech Food Systems, of Bedford, to see if the surface browning operation could be carried out more reliably and efficiently. Protech then co-operated with Noblelight to design and install a new oven incorporating the latest carbon infrared technology.

Carbon infrared is ideal for surface browning, as it delivers medium wave infrared radiation, which is perfectly suited to evaporating water from products, at a very high-power density. This ensures that the surface of the food product rapidly achieves a sufficient temperature to drive away any local moisture and then cause browning without any possibility of after-cooking.

Following trials to establish the maximum production line speeds for both crumb and potato topping, the system installed features two IR cassettes in an oven designed and built by Protech.

Since installation, the new system has proved to be eminently reliable in operation, requiring little or no maintenance. Its compactness compared with the previous system has also allowed improvements to be made to the production line layout. Moreover, significant energy savings have been achieved due to the fact that the carbon infrared system switches on and off virtually instantaneously, eliminating the need for lengthy pre-heating of the system to the required operating temperature at the start of each shift. The fast response of the system also means that the heat can be removed very quickly if the line stops unexpectedly.

Infrared heating systems help to maintain chocolate quality



Two carbon infrared heating systems from Excelitas are helping to ensure consistent chocolate quality at the Kinnerton Confectionery Ltd. One system is used to pre-heat chocolate moulds prior to filling and the other is used to melt chocolate rims prior to rim heating, which involves the fusing of two chocolate halves. Both retrofitted systems have also provided significant space and energy savings.

Established in 1978, Kinnerton Confectionery is Britain's largest manufacturer. Its range includes advent calendars, clusters and chocolate figurines. The production of moulded chocolate involves depositing liquid chocolate into polycarbonate moulds. However, it is important that the moulds are pre-heated to a specific temperature before the chocolate is poured. If the moulds are too warm, the chocolate can change its characteristics and detemper. If they are too cold, the poured chocolate will lose shape and possibly crack.

To prevent this, Kinnerton had previously used both metal element heaters and a warm air heating system. The metal element system incorporated a servo system to locate the heating elements over the moulds and, in the event of line stoppage, this involved considerable delay in removing the heaters, which meant that a number of filled moulds were excessively heated. The warm air heating system took up considerable space and was difficult to control so that heating was not consistent causing quality problems.

In an effort to solve these problems, Kinnerton contacted Excelitas, who provided a trial infrared system. This proved so successful that a full-scale 14.4 kW carbon infrared system was installed, featuring a pyrometer to ensure that the moulds are heated to exactly 29°C. Subsequently, a second 9.6 kW carbon infrared system was installed for rim heating.

As David Hume, NPD Technical Process Manager at Kinnerton, explains, "The infrared system, which was retrofitted without any problems into the available space, provides precisely controllable heating for both the moulds and the chocolate rims so that reject levels have been significantly reduced and quality improved."

Infrared germ reduction can increase bread shelf life by days



The use of our Noblelight Carbon Infrared (CIR®) heating systems from Excelitas has been shown to reduce the formation of mould on baked bread, prior to packing, significantly extending bread shelf life. Typically, when subjected to carbon medium wave infrared (IR) radiation for four seconds, shelf life has been increased by three to four days.

One of the major problems in large-scale bakeries is mould contamination of the bread surface between baking and packing. Mould spores are naturally present within a bakery environment and contamination can take place as the bread cools before it is wrapped.

After successful tests, both in the Neston Applications Center and on-site, at various bakeries, Excelitas demonstrated the effectiveness of Infrared as a mould-prevention technology. It has been shown that mould contamination is prevented if the bread is heated for a few seconds before final packing. Because of the short exposure time, there is no detrimental effect on the taste or texture of the bread. Excelitas now offers its test facilities to bakeries to prove the effectiveness of the technique for themselves.

In the bakery sector, carbon infrared is allowing simple, quick and safe disinfection of baking trays, conveyors and other bakery equipment, killing germs and spores to eliminate mildew and fungal growth. Infrared is in this case much more practical than ultra-violet disinfection, which is effective mainly on smooth surfaces and requires a high UV dose to destroy mould and fungi. Carbon infrared emitters from Excelitas are also eminently controllable, with a response time of 1-2 seconds, so there is no danger of overheating baked items in the event of unplanned conveyor stoppage. They are also extremely compact, allowing easy retrofitting into existing machinery and emitter fields can be adjusted to match the width of baking trays.

Infrared emitters and accessories adjusted to demands of food processing

For the food sector, infrared modules are manufactured in stainless steel and fitted with a wire mesh to afford mechanical protection. An additional foil frame can, if requested, protect the food from any falling particles. Noblelight Infrared emitters from Excelitas are very responsive and can be switched on and off within 1-2 seconds. All infrared systems can be controlled so that any unexpected or unwanted conveyor belt stoppage will have minimal effect on the equipment or product. Emitter failure detection is also incorporated within the control system. The parameters required for any system can be established in one of our test centers or by using hire modules on site. The investigations are carried out by experienced engineers and technicians, who can assist in the selection of the right emitters and systems to suit a particular product and process.