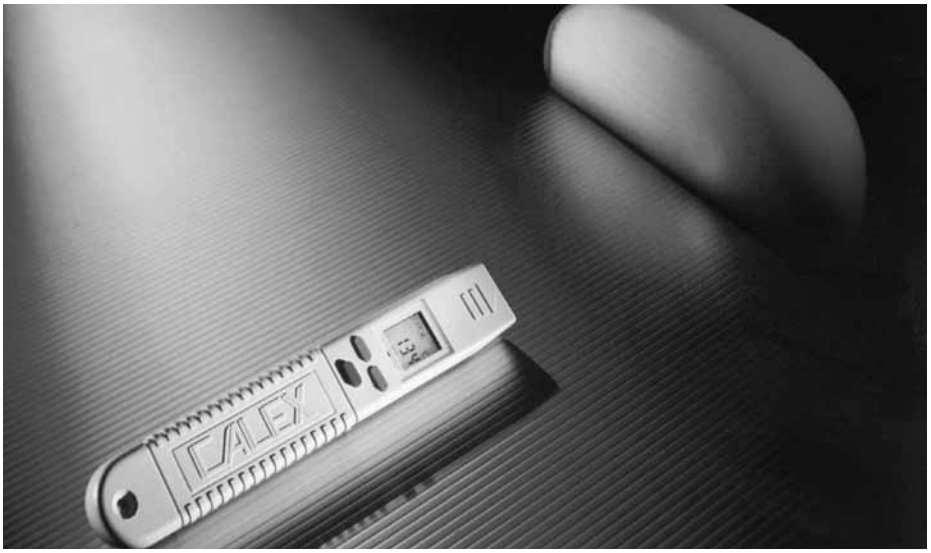
IR Thermometry
in Food Safety

Food safety is important to all of us. Both consumer and supplier should feel confident that their food is unspoiled and free from contamination. Since food product safety is ultimately a management responsibility, it is not surprising that considerable effort has been devoted to monitoring and controlling conditions at all stages of food processing from initial production through distribution, storage, display to point-of-sale. A preventative approach involving control of the ingredients, production process, and storage environment is the preferred method of ensuring uncontaminated and safe supplies. The procedure known as HACCP (Hazard Analysis and Critical Control Points) provides a logical and systematic basis for such an approach. It has been used to establish effective control systems in the food and catering industries. In any HACCP system, temperature plays an important role in maintaining quality throughout the process but particularly at the critical control points, or CCPs, which occur at certain stages in the production, distribution, and sale of foodstuffs.



Conventional contact or penetration probes using thermocouple or RTD sensors are often not the most appropriate means to measure food temperatures. They are slow due to the time required for the probe to reach thermal equilibrium with the food. This usually takes several minutes and can be a source of error if the user is pressed for time to do the measurement. Also, with any contact method, unless stringent and, ultimately, expensive precautions are taken, there is always the possibility of contamination and damage to the product. Furthermore, a contact measurement may not be possible because the item is not accessible, for example on a moving conveyor or out of reach on a high shelf. However, these problems can be overcome by using infra-red (IR) thermometers which are capable of rapid non-contact measurement of the temperature of solids and liquids at a distance.

An IR thermometer's action is based on the principle that all objects emit electro-magnetic energy according to their temperature. At low temperature, most of this energy is in the form of long wavelength (infra-red) radiation which cannot be detected by the eye and, therefore, cannot be seen but which, in some cases (eg. radiant energy from a warm radiator), can be felt. The rate of emission increases rapidly with temperature so that, at temperatures above 600°C, the amount of short wavelength energy (light) being emitted is sufficient to be detected by the eye. At first, the object appears dull red but, as its temperature increases, its colour changes from red to orange/yellow, and then white as more and more visible light is emitted. In this way, it has been determined that the surface temperature of the sun is 5900°C.

The optical components in an IR thermometer focus the emitted radiation on to a detector and signal processing electronics then convert the detector response into a digital reading of the object's surface temperature. IR thermometers are fast reading instruments because the response time of the detector and electronics is typically measured in milliseconds (thousandths of a second).

The Calex range of handheld IR thermometers includes the Pyropen series of pen-style units for use in the food industry. Cleverly designed to fit into one's pocket like a pen, and incorporating the latest advances in detector and electronics technology, the Pyropen is the ideal tool for all food professionals concerned with quality control. Checking temperatures could not be easier. Just point the Pyropen at the product - the built-in laser pointer highlights the target - and read its temperature immediately on the digital display. With a wide temperature range from -20°C to +500°C, the Pyropen can be used to check both food storage and cooking temperatures. What's more, not only food but the operating temperature of equipment such as ovens, deep fryers, dishwashers and electrical and rotating machinery can all be monitored quickly and safely.