



# APPLICATION NOTE



## Europastry uses thermography to control the temperature of pre-cooked breads

Europastry performs the inspection of critical control points in the bread-making process, precisely at the exit of the baking and freezing process, in an unattended, continuous and online manner using the **bcbMonitor 4.0** integrated with FLIR A35 thermal imaging cameras.



Founded in 1987, Europastry is a leader in the frozen bakery dough sector, with 22 factories around the world and offering its products in more than 80 countries. That is why maintaining the quality of its products is essential, not only because of its commitment to its wide portfolio of clients, but also because it is part of an industry where a quality problem can negatively affect the health of consumers.

As a result, the need to inspect two critical control points in the bread-making process arises where temperature plays a fundamental factor in the quality of the final product: the baking and freezing processes.

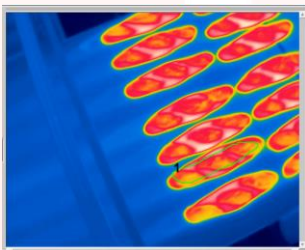
It should be noted that infrared thermography integrated into acquisition and processing software is an ideal tool to monitor these processes, since it is a non-destructive and non-invasive technique, without direct contact, capable of covering large areas of measurement, quickly and efficiently.



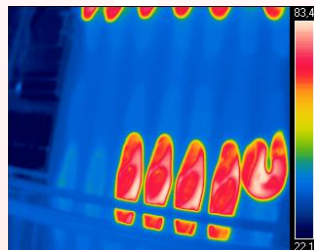
FLIR A65 thermal imaging temperature sensor for process control / quality assurance in food processes.



Europastry Paterna plant in Valencia, Spain.



ROI of a loaf on the baking sheet.

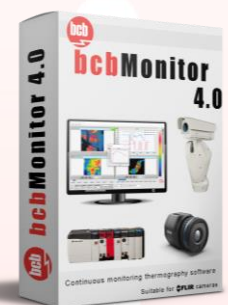


Generation of alarms for a defective piece of bread.



Tray with a loaf displaced from its ROI and zone without loaves

\* Courtesy of Europastry



**bcbMonitor 4.0** Advanced continuous and unattended thermographic monitoring software.

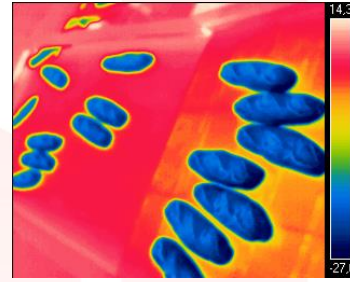
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## Inspection in baking processes

Controlling the production parameters in the baking process is critical to determine the final quality of bakery products for different reasons such as: color, texture and other more complex ones such as the control of the presence of carcinogenic and mutagenic products. Substances such as acrylamide or organic compounds such as PAH or AHC can originate during this process, which are harmful to health.

To this end, the application developed by **bc** for baking inspection aims to monitor the temperature of the bread trays when leaving the oven to ensure that the minimum temperature necessary to ensure the absence of contaminating germs has been reached. For this application, a minimum of 85°C is required. These temperatures are recorded for traceability and the need for recording in the event of audits. Also, due to the difference in temperatures with the tray.

The system detects, by means of FLIR A35 thermal imaging cameras integrated into the **bc**Monitor 4.0, the edges of the loaves on the tray. By means of selected regions of interest, it is verified that said edges are convex. If concave shapes or holes are detected inside the edge, it means that there is a quality problem related to the shape and an alarm will be generated



Out of the freezer.

## Inspection of the freezing process

In the case of the freezing process, the thermographic inspection is carried out with the **bc**Monitor 4.0 at the exit of the process, where the temperature of the bakery products is controlled to be below -10°C. The temperature is continuously recorded and an alarm is generated when this threshold is not met. Similarly, at this critical point in the process, the system detects that the edges of the loaves are convex. If concave shapes, or holes inside the rim, are detected, it means that there is a problem with the bread, which will generate an alarm.

With the process active, the system will be running continuously, and the images will be analyzed continuously, although the recording of images will only be in case of alarm or on request, to avoid occupying the entire disk with in case it was being recorded continuously.

## Unified inspection system

The **bc**Monitor 4.0 allows the integration of four (4) cameras to be controlled, allowing the programming and visualization of each one of them in a unified way, defining regions of interest and generating alarms. This software incorporates modifications for the application that Europastry needs, such as communication with Siemens PLCs. It is also possible to perform off-line analysis of image files generated by the software and communicate through the internet or a local network. Finally, the system includes a specific OPC INSP driver for Profinet communication and its integration into the **bc**Monitor 4.0 to allow bidirectional communications between the system and the factory PLC.

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