

## Roasting Cocoa Beans Efficiently and Safely

InfraTec thermal cameras monitor bean temperatures in real time

*Akkadia B.V. is a Dutch company that offers camera solutions primarily for production and process control. Its proprietary Astraguard™-Firewatcher system monitors cocoa beans during the roasting process. The integrated InfraTec thermographic cameras measure the temperature of the beans more accurately than conventional thermometers do. The system thereby ensures better roasting quality and prevents overheating and fires in the oven.*

### Akkadia Systems B.V.

Prinsenbeek, Nederlande

[www.akkadia.net](http://www.akkadia.net)

### Infrared camera

VarioCAM® HDx head integrated into the Astraguard™ Firewatcher system

To develop their aroma, flavor, and characteristic chocolate-brown color, cocoa beans must be roasted at 90 to 125 °C for 10 to 35 minutes. This process, known as the Maillard reaction, takes place in industry-standard gas- or electric-powered ovens. To prevent overheating and fire hazards inside the roasting ovens, Akkadia has offered its Astraguard™ platform since 1994, with a major upgrade in 2018. With this upgrade, the system was converted into a thermography-based solution that allows detailed monitoring of process temperatures.



The original Astraguard™ system used analog thermal imaging cameras that were limited to a specific spectral range. Although these infrared cameras detected overheating that was invisible to the naked eye, detection was limited to sparks and smoldering fires. The rest of the furnace interior appeared black, meaning that exact temperatures could not be measured.

The new system, launched in 2018, uses IP-based infrared cameras from InfraTec. The robust OEM cameras are installed in a specially developed housing that protects them from heat, harmful gases, shocks, and vibrations. A thermoelectric cooler stabilizes the operating temperature of the uncooled microbolometer cameras. Germanium protective windows integrated into the housings enable interference-free, more detailed measurements inside the oven, thereby allowing continuous monitoring of the roasting process across the entire spectral range of the cameras.

Depending on the temperature readings from the infrared cameras, the system workstation outputs three statuses: “in operation,” “early warning,” and “alarm.” These signals are displayed on a screen for the operators and forwarded to the plant’s programmable logic controller (PLC). If the system detects a hazard, the PLC automatically reduces the gas supply.

### Advantages of the new Astraguard™ system include:

- Higher roasting quality via precise temperature monitoring
- Improved process visibility and control
- Enhanced safety through real-time visualization
- Reduced fire risk
- Accurate localization and rapid extinguishing in case of fire

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The system is highly robust, minimizing downtime. Operating costs are also reduced thanks to lower fuel consumption, more efficient production process, and fewer losses due to fires. However, the main reason why Akkadia chose InfraTec's thermographic cameras is their exceptional accuracy: the cameras measure temperatures up to ten times more accurately than the thermometers used in the ovens. Thanks to the wide standard temperature measurement range of the VarioCAM® HDx head cameras used, even the smallest thermal details inside the oven are visible – unlike with the old system. This also improves the operators' understanding of the roasting process.

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