

Lebensmittel-Technologie

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UNOFFICIAL ENGLISH TRANSLATION

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Intelligent large-area LED lighting

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Intelligent large-area LED lighting

Quality assurance is essential in food production. A carefully designed inspection process helps ensure it.



4,200 biscuits per minute must be inspected very precisely for many quality features and sorted into pass/fail categories. Image: Cretec.

The competitive advantage of flawless food requires consistent quality assurance at the highest level. Industrial machine vision provides the inspection. Optimised illumination and intelligent light control are needed for reliable operation and flexible use.

Consistently perfect biscuit quality guarantees lasting customer loyalty and prevents expensive recalls that damage reputation. Wide conveyors in the confectionery and baking industry often require inspection of large areas, demanding extensive hardware and software knowledge of lighting technology for machine-vision quality assurance. Hygienic design must also meet the

industry's regulations and standards.

On small inspection fields, covers or high light intensity can more easily prevent interference such as incoming daylight. Applying conventional methods to large areas requires substantial effort and restricts flexible inspection of different objects arranged across a wide field. Demanding applications call for a combination of powerful LED lighting systems and intelligent, versatile light control.

Homogeneous large-area illumination

For extensive inspection fields, Cretec offers a broad portfolio of

large-area, modular LED lighting systems with intelligent control. Modules in variable and individual sizes range from borderless backlighting to homogeneous reflected illumination. They provide technologically and economically efficient vision solutions even for complex fully automated inspection requirements.

Confectionery and baked goods must be illuminated so that critical, complex features can be detected precisely with clear image contrast. This requires lighting knowledge and application experience: how light reaches the object from the source, how it is reflected or scattered, and how the lens ultimately forms a high-quality image on the camera sensor.

As in professional photography, the lighting follows the definition of luminance: the brightness of light from emitting surfaces. This precisely describes homogeneous light emission across the entire illuminated area. It is especially important when object shape and reflective properties, such as applied glazes, create demanding inspection conditions. For fast-moving objects requiring intense light, the centre must not be overexposed. Maximum borderless uniformity is essential to perfect vision results.

Enjoyment in flawless quality

Enjoying delicious biscuits involves every sense: touch, hearing, taste, smell and sight. How much we eat with our eyes is apparent in biscuit browning and glazing. Whether made from classic dough or wholegrain dough, their

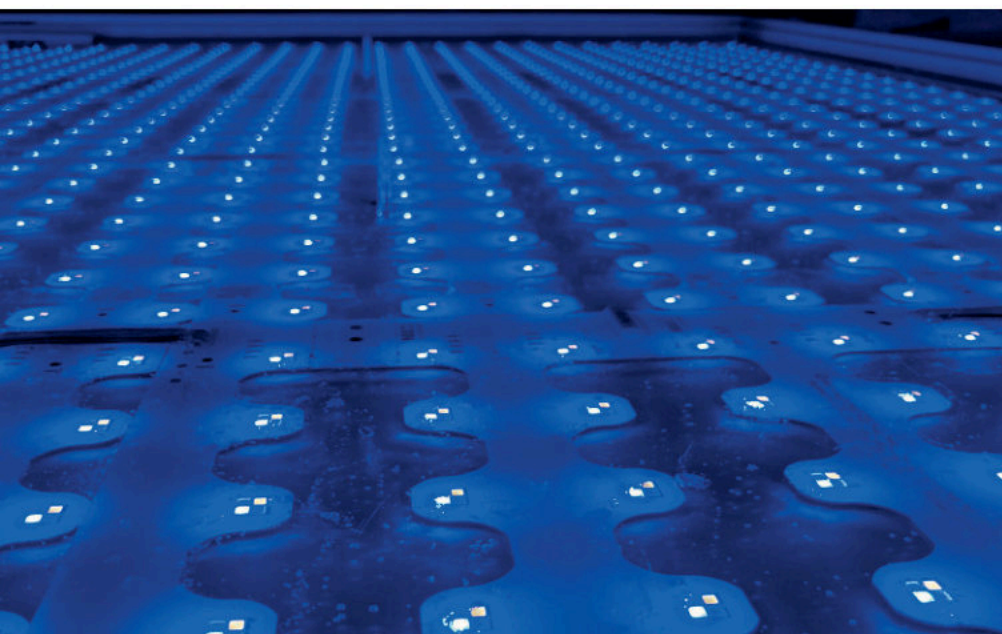
appearance immediately suggests crispness, flavour, fragrance and other sensations. Perfect lighting lets machine vision distinguish subtle browning differences among many properties. Other high-resolution features reveal defects. Inspection criteria include correct area and height, surface embossing, corner shape, absence of spots, colour gradients in the biscuit centre, material inclusions, damage, foreign bodies and contamination.

At 4,200 pieces per minute on a wide conveyor, everything must run perfectly for the subsequent production stages. Fully automated production on a continuously moving wide conveyor is complex. Quality control must therefore detect many additional process-related features. AI algorithms are used for selected features to keep improving inspection performance automatically. The powerful industrial vision system includes eight cameras, lighting, a 3D system and other required components in an application-specific hygienic design. Installed directly above the conveyor, it ensures smooth production at the highest quality. Ongoing production is continuously inspected and documented for over 20 features, and biscuits are sorted



Designing the complex vision system for biscuit production involves capturing many relevant inspection functions. Image: Cretec.

into pass and fail categories. Many results are used directly as a data stream, feeding back into the production process.



Large-area lighting modules with four-colour LEDs in strobe, colour-change or daylight mode enable a wide range of industrial vision applications. Image: Cretec.

Company for networked technologies and multidimensional machine vision
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