

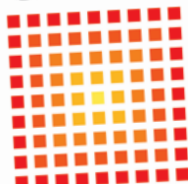
TIAMA

recognizing critical defects
immediately at the hot-end thanks
to the Tiama HOT eye



Tiama
HOT
systems

tiama



hot eye

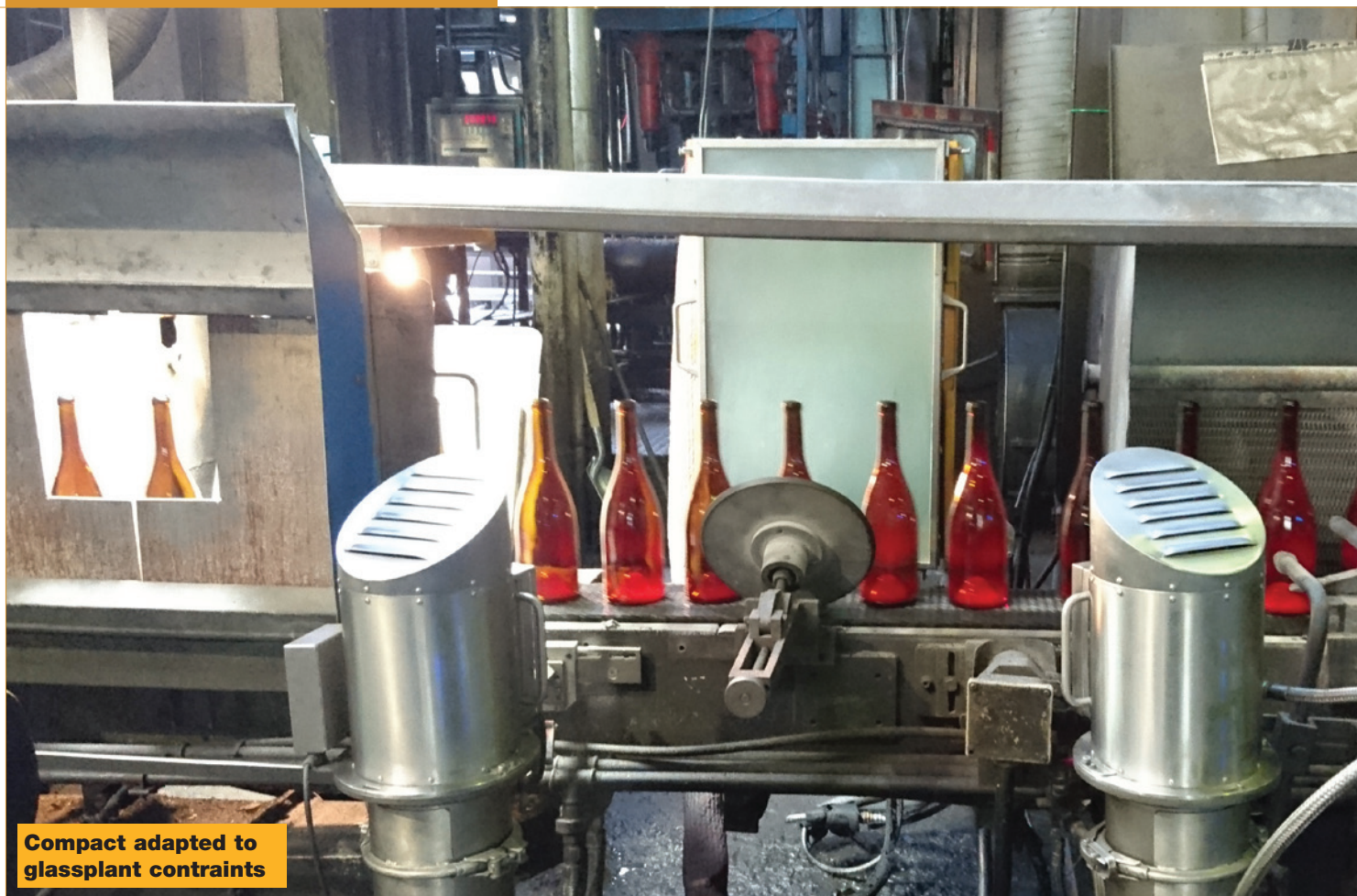


Tiama is continuing to expand and develop its hot-end sensor equipment to ensure the best return-on-investments for glassmakers. This article presents the company's newest development – the Tiama HOT eye – for the detection and recognition of defects at the hot end.



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Hot-End Product Manager
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HOT-END SENSORS



Compact adapted to glassplant constraints

For more than 10 years now, Tiama has been a major player in the hot-end, launching several systems dedicated to the monitoring of the process. The very first one was the I-Care, a system with two infrared cameras located just after the IS machine.

Pursuing its growth strategy in this area of the glass plant, Tiama then presented its innovative product range: the Tiama HOT systems composed of a set of individual modules positioned between the shear cuts and just before the annealing lehr. These modules are filled with sensors collecting data from the gob to the formed bottles. They help operators to have a better understanding of their own process. They also offer indications on how to improve process management.



HMI -Detection of a birdswing at the HE



DESIGNED TO BE MODULAR

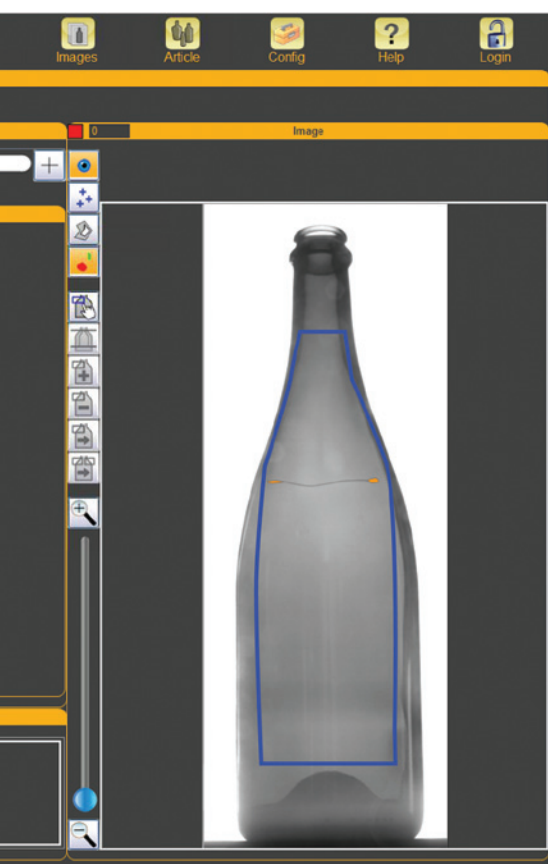
The modular approach of Tiama HOT systems aims at optimizing the glass plant return on investments. Indeed, the original I-Care embedded four main functions: container infrared emissivity measurement and analysis, container defect detection, container dimensional control and transportation monitoring on the hot end conveyor. Those four functions have been improved and spread over three modules:

- The Tiama HOT eye for con-

tainer dimensional inspection and defect detection and recognition;

- The Tiama HOT form for infrared emissivity measurement and analysis;
- The Tiama HOT move for container transportation monitoring.

Glass plants can now implement one or all of the systems, depending on their actual needs and objectives, without being bound to invest in the three technologies at the same time. A modular approach that leads to the most cost effective solution.



BIRDSWING
defect detected
AT THE HOT-END



WINGS defect
detected AT THE
HOT-END



HOT-END SENSORS

Beyond that, the online Tiama HOT system portfolio is completed with the Tiama HOT mass for gob weight monitoring, as the former Tiama GIA, Gob Image Analyzer.

Today, Tiama is integrating its Tiama HOT systems technological portfolio with the presentation of the Tiama HOT eye.

UNIQUE AND INNOVATIVE SOLUTION AT THE HOT-END

The main feature of the Tiama HOT eye is to detect and recognize defects at the hot-end. It means that once the system has detected a defect, it informs the operators about what kind of defect was produced and can

raise a specific warning in the case it recognizes a critical defect.

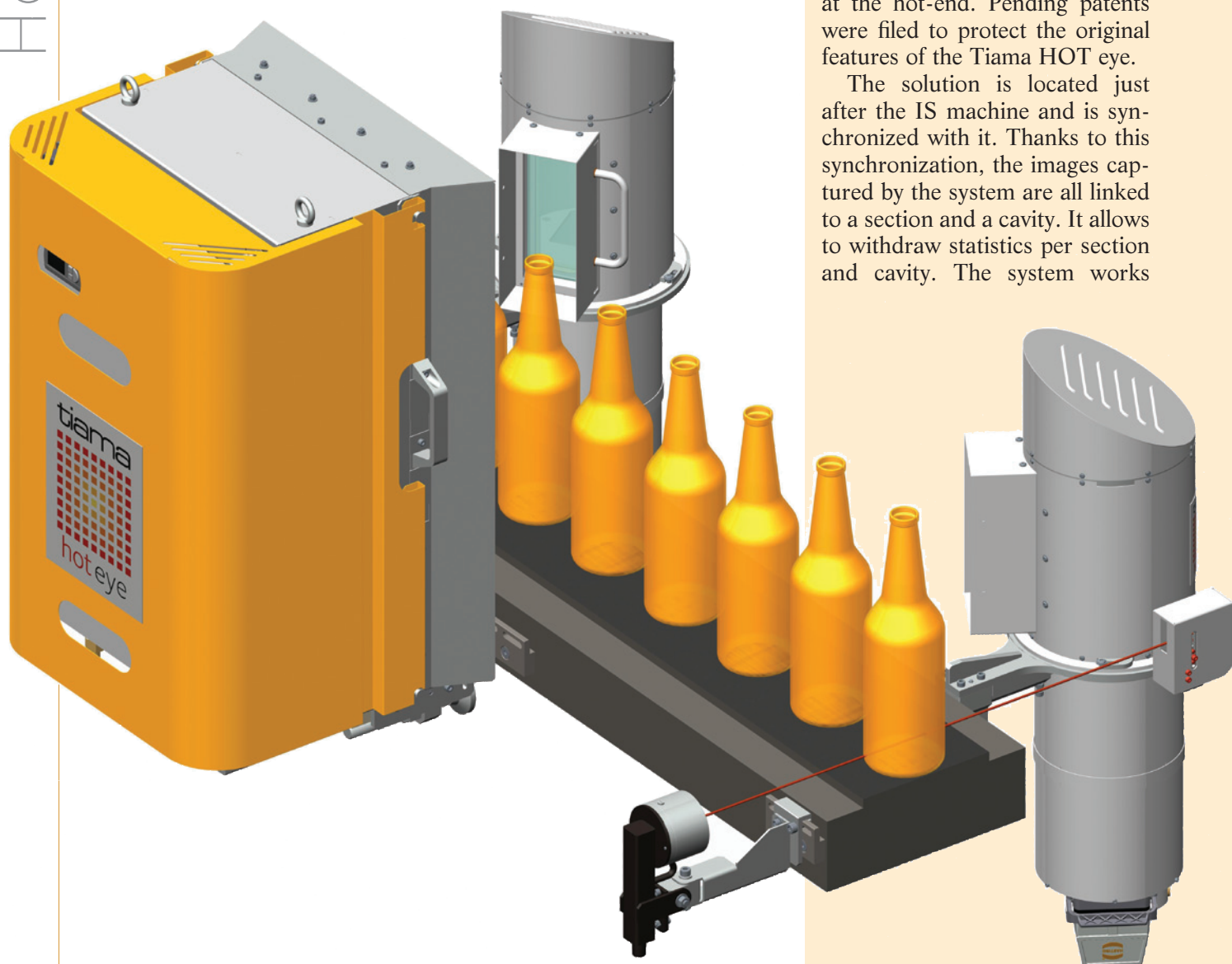
The Tiama HOT eye is equipped with two high definition cameras (Tiama cameras) placed inside two metallic tubes fixed on the conveyor. Because most glass plants suffer from a lack of space in the hot-end area, the different parts of the device are fixed directly onto the conveyor in order to reduce the footprint. The cameras are located in the lower parts of the tubes to protect them from the heat due to the articles radiation on the conveyor. These tubes are air cooled, using vortex systems. In front of them, an infrared light source, which is water-

cooled, flashes articles on the conveyor.

LIGHT TRANSMISSION MEASUREMENT

The choice of infrared technology avoids disturbing the operators by flashes while they work on the line. The Tiama HOT eye has been designed to resist to the harsh environment at the hot-end and requires little maintenance. This configuration is based upon light transmission measurements instead of emissivity measurements like the other systems equipped with infrared cameras. The Tiama HOT eye is the first system to use this technology and to allow critical defect recognition at the hot-end. Pending patents were filed to protect the original features of the Tiama HOT eye.

The solution is located just after the IS machine and is synchronized with it. Thanks to this synchronization, the images captured by the system are all linked to a section and a cavity. It allows to withdraw statistics per section and cavity. The system works



with all kind of processes and glass colours.

DETECTION AND RECOGNITION OF CRITICAL DEFECTS

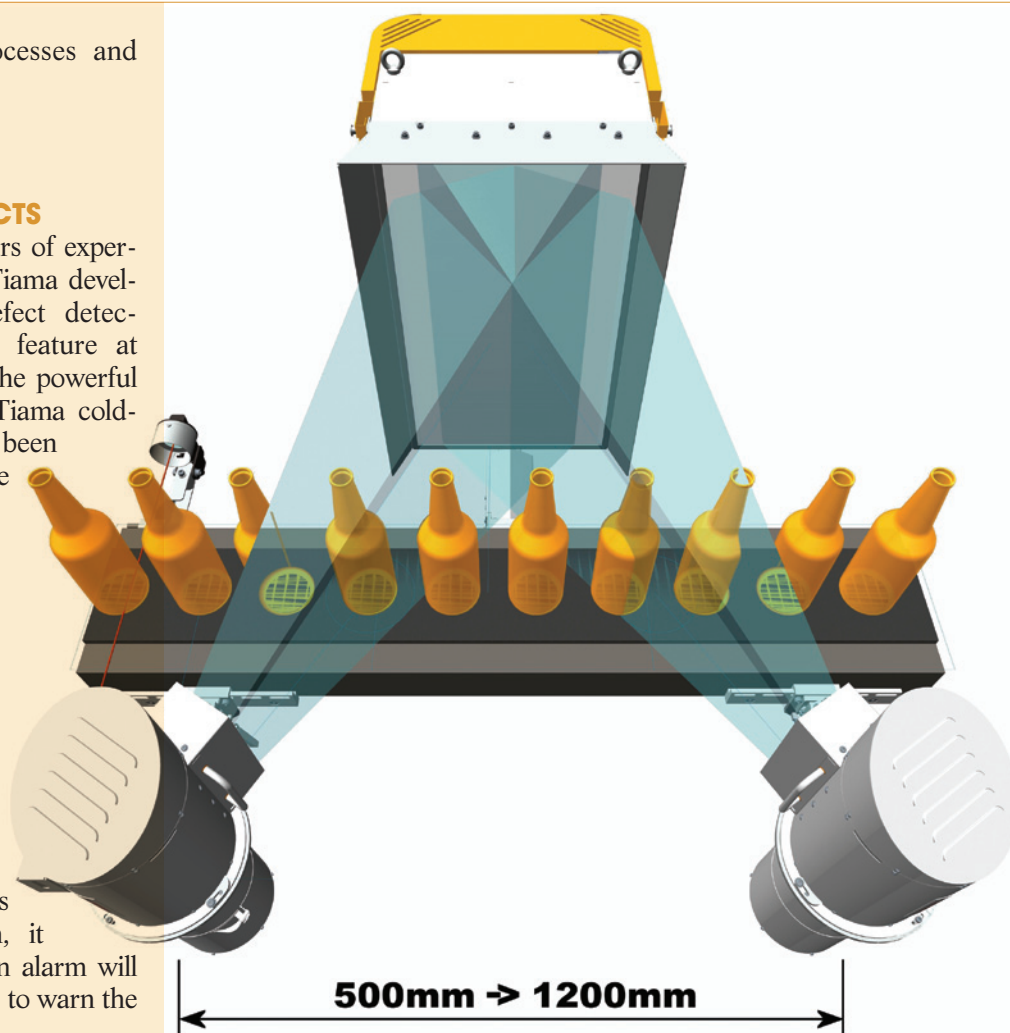
Benefiting from years of expertise at the cold-end, Tiamia developed this critical defect detection and recognition feature at the hot-end. Indeed, the powerful algorithms from the Tiamia cold-end machines have been adapted in order to be implemented in the Tiamia HOT eye. Not only the system is able to detect critical defects, but it can also identify its exact type. Birdswings, wings and blisters are examples of critical defects that can be recognized by the Tiamia HOT eye. If one of these defects is found by the system, it will be rejected and an alarm will appear on the machine to warn the operator.

ACCURATE DIMENSIONAL MEASUREMENTS

The Tiamia HOT eye also enables to carry out the dimensional measurements of articles at the hot-end. Up to six diameters and three verticalities (neck, body and total) can be measured by the system. The use of high definition cameras allows reaching an accuracy below 1 millimetre.

PROCESS MANAGEMENT TOOL

The Tiamia HOT eye is capable of real-time, process information delivery. Each time a critical defect is detected, an alarm will immediately appear on the screen to alert the operator about a critical defect creation on his production line. Thanks to this alarm and to the IS synchronization, the operator will know



which cavity has generated the critical defect. Consequently, he will be able to act directly on the concerned cavity to avoid the creation of new ones.

The Tiamia HOT eye enables operators to conduct immediate actions on the process. There is no longer need to wait for feedback from the cold-end, the reaction time is considerably improved as lehr time is saved. The system also provides statistics which help operators to perform targeted actions on the IS machine. In addition, the hot-end monitoring of critical defects contributes to the reduction of customers' complaints.

The Tiamia HOT eye is a monitoring solution helping customers to improve the management of their process and to reach their quality level. It is part of the Smart Factory strategy developed

by Tiamia. The system provides a full range of valuable data than can pushed and displayed in the IQ supervision systems to obtain a glass plant overview at-a-glance, from hot-end to cold-end.

Visitors to this year's glasstec exhibition in Düsseldorf will have the chance to find out more about the HOT eye at Tiamia's booth. ■



Real-time Process & Quality Controls

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