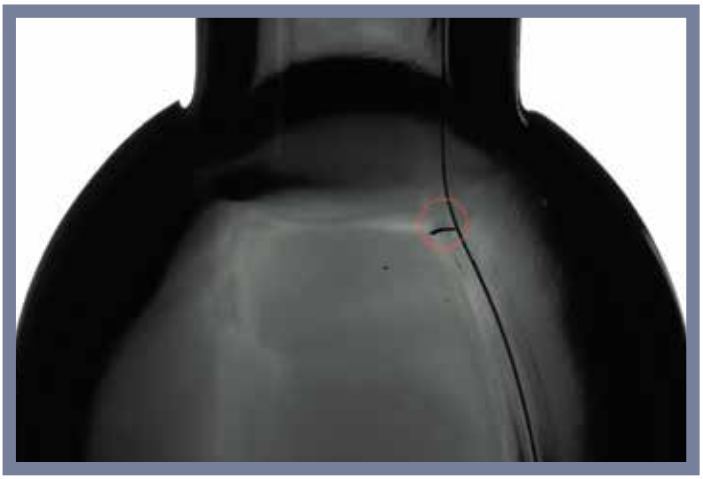
VIDEO SYSTEMS finetunes glass container optical inspection

After recent decades saw glass container inspection processes characterised by human manpower coupled with optical inspection technologies, VIDEO SYSTEMS' solutions now go the extra mile in identifying those defects that remain undetected.

Thanks to today's electronic and optical devices, glass container inspection systems will typically perform well when identifying small defects. However, this ability has been increasingly affected by a phenomenon of false positives. That said, it's maximised production that glass manufacturers are mostly after nowadays - thanks also to optimal defect identification. Still, the goal of green production must be factored in as well, such that optimised production also yields the desired effect of reducing pollution generation per-product-tons delivered to the market. Here Video Systems has proposed an artificial intelligence approach for optimising inspection methods for standard glass containers. Thanks to a methodology the company developed in 2003 as well as colour image analysis from 2018 annually adapted thereafter to new studies, technologies and market feedback, Video Systems noted an important reduction in false positives, coupled with an increased ability of its Imago line systems to identify specific defects that often go undetected.

QUALITY CONTROL SYSTEMS

Technology in quality control systems is growing swiftly. That makes sense, considering how key it is to hollow glass production, given that the final products (bottles, tableware, containers) are made for such high-quality-demand markets as those of pharma and food and beverages. Here all non-conforming containers are removed from the production chain and used as recycled glass (scrap). Then, upon exiting the line, products are packed and finally palletized for subsequent delivery to end-customers. Though certain companies are very experienced with control, current production cycles mean that not all can guarantee sustained reliability in reaching the required speed. For this reason automated systems for the quality control of glass containers have been introduced to production lines in recent years. The purpose of every hollow glass maker is to produce as many containers as possible at the highest quality and the lowest cost. Here's why, respecting any quality control system, the industry must work daily



to augment inspection capabilities with 2 main goals in mind:

- to increase the system capability to identify defects
- to reduce any false positives during container inspection

Today at Video Systems, the Imago product range is powered by many AI engines - each dedicated to various defects, including the following:

SIDEWALL QUALITY CONTROL

By leveraging artificial intelligence technology, false positives could be significantly reduced during stones identification - an approach that simultaneously cuts machine setup time thanks to reduced parameters and the self-tailoring system. With new containers, the AI engine also equips the system for automatic receipt generation based upon machine experience as well as the management of containers of different shapes - all at the same time. Indeed thanks to its AI-engine, the Imago Omnia sidewall machine can now cut the effect of false positives down to 0.5 percent.

In this case the ability of the system to identify real stress defects instead of container surface reflections (a typical problem on high density containers like champagne bottles) is among the greatest advantages of the AI engine approach.

SHOULDER AND FINISH CRACKS

To identify a shoulder and/or finish crack in standard carousel machines the operator needs to perfectly align a light emitter and receiver with the reflection angle, meaning that if the crack is different then the machine needs a new alignment. For such defects, the Linea system comes as a contactless solution which, thanks to its AI engine, requires no operator setup of the light emitter and receiver. Here, instead, the only requirement is to select the ROI of analysis together with certain added parameters like minimum defect size. As for special containers like those used for perfumes, development of the tailor-made machine had the AI engine prompting the final application to detect either very hard defects like small base cracks or else broken corners.

CONCLUSIONS AND OUTCOMES

Owing to the rising demand for quality by the final market for such products, quality control of articles is an increasingly important requirement for hollow glass producers. For many years, glass inspection was performed by hand, i.e. without the required reliability and speed of today's production cycles. Nowadays, however, almost all production lines provide automated systems for the quality control of glass containers. Here the preference is for vision systems that can both analyse bottles and identify any defective ones. These use classic algorithms to detect defects and, as such, must set high parameter numbers. Also, some such methods need the defective sample to prepare the analysis recipe. Existing systems perform well in identifying small defects, though this ability is increasingly affected by a phenomenon of false positives. The last years saw Video Systems working on AI solutions, managing colour images with a simple and fast machines setup that reduce the false positives, and working on new tailor-made solutions that applies robotics, AI and machine vision technologies to provide solutions to the market research supported by EU in APICUS and ZDMP H2020 projects. ■

VIDEOSYSTEMS
Technologies for a new world

VIDEO SYSTEMS SRL

Viale Mangiarotti 4
33033 Codroipo (UD) - Italy
Tel.: +39-0432-913582
Fax: +39-0432-913583
E-mail: info@videosystems.it
www.videosystems.it