

Helping glassmakers compete in the global marketplace

MIKE RENTSCHLER EXPLAINS HOW IMPROVEMENTS TO INSPECTION MACHINES CAN HELP MANUFACTURERS MEET THE DEMAND FOR LOW PRICE / HIGH QUALITY CONTAINERS

As a larger number of manufacturers look to grow their business through exports, the market for glass containers has truly become global. Manufacturers no longer compete with other manufacturers only in their region. Today, their toughest competitors often are oceans away.

Competition is based on both price and quality; buyers demand high quality containers at the lowest possible price. Inspection equipment suppliers are responding to the new global market and are helping manufacturers meet the low price / high quality demands of this growing market. The goal is to provide machines that offer flexibility, inspection reliability and accuracy at an affordable price.

IMPROVEMENT PROJECTS

At Emhart Inex, continuous improvement projects are being made to the company's Veritas series of inspection machines for on-line, high-speed glass container inspection. Because of recently released developments, Veritas now offers:

- Non-contact finish gauging inspection, eliminating the need for mechanical equipment that touches the finish and the risk of finish damage during inspection
- Smoother container handling with fewer change parts
- Inspect and reject verification, significantly cutting the risk that uninspected containers will get into the final pack
- Improved inspections, including innovative approaches to wire edge and lean detection

- User interface tools that make the Veritas inspections easier to set up
- Common parts across the entire Veritas product range, reducing spare parts requirements for plants with multiple Veritas platforms.

As new technologies emerge and development programmes, currently underway, are completed, there will be further improvements to the Veritas series.

NON-CONTACT FINISH GAUGING INSPECTION

With the addition of vision ring inspection on the Veritas iM and improvements to the vision plug and dip inspection on the Veritas iB, it is no longer necessary to contact the container finish with any mechanical gauge. The risk of damage to the finish or contamination of the container caused by worn or misaligned tooling, or due to improper setup, is greatly reduced.

On a line that includes both the Veritas iM and iB, the use of vision ring, vision plug and vision dip inspection also eliminates the need for the vertical stroke mechanisms on the Veritas iM, which significantly reduces spare parts requirements and general wear and maintenance related to plug and dip inspections. With the elimination of these mechanisms, the machine also operates with less vibration.

BETTER CONTAINER HANDLING

In addition to the removal of stroke mechanisms from the Veritas iM, further developments in the mechanical outfeed enable smoother container handling with a

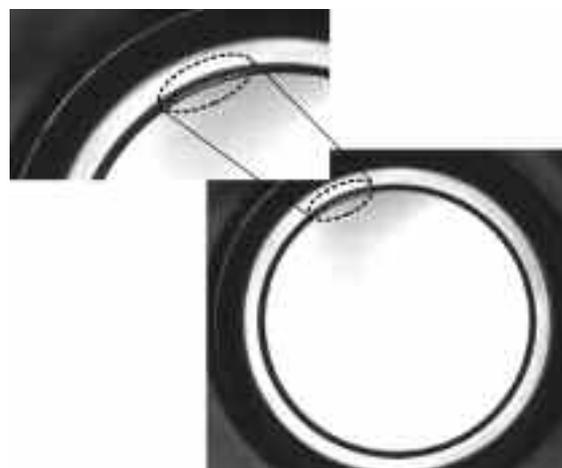


FIGURE 1: IN THIS DARK-FIELD ILLUMINATED FINISH IMAGE THE WIRE EDGE DEFECT (HIGHLIGHTED) IS DIFFICULT TO SEE AGAINST THE NORMALLY-OCCURRING VARIATIONS ON THE INNER DIAMETER OF THE FINISH

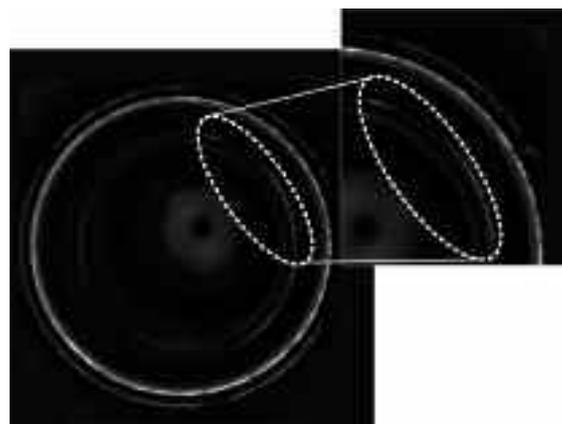


FIGURE 2: IN THIS IMAGE, CAPTURED USING DIRECT LIGHTING AND A TELECENTRIC LENS, THE WIRE EDGE IS CLEAR AND EASY TO DETECT

reduction in change parts.

When running in an 18-pocket configuration (container diameters 16 mm to 80 mm), the new live belt stripper eliminates the need for container-specific outfeed tooling and allows for gentle transition from the machine starwheel back to the production line conveyor. The live belt stripper also simplifies the machine set-up, shortens set-up time and reduces the spare parts associated with a conventional stripper mechanism.

IMPROVEMENTS TO CHECK DETECTION

Besides offering conventional light/sensor check detection, the Veritas iM is now available with modulated light/sensor check detection. Although the set-up time required for both check detection systems is similar, the modulated light/sensor system makes it easier to set up on-check defects that occur in similar locations on the container, without having to make compromises in inspection sensitivity.

With sensors now tuned to capture reflected light from specific frequency-modulated light sources, the signal processing has been improved, and with it, the inspection itself has become more accurate. Future developments also will incorporate a comprehensive vision check detection system within the Veritas iM.

INSPECTION VERIFICATION

Container manufacturers want cost-effective machines that help them meet global customers' stricter quality requirements; they also want assurance of 100 per cent inspection. Machines must perform inspections accurately and the risk of uninspected ware getting into the pack must be as close to zero as possible.

The Emhart Inex Veritas series performs inspection verification through a mix of systems designed for the specific container handling methods used in each machine. All Veritas machines have built-in reject verification through a system that continuously monitors the cullet chute entrance. If the system senses that a rejected container is not rejected into the cullet chute, the machine shuts down.

All machines also include circuitry that reliably tracks containers and looks for inspection results. If a container enters the reject area but has no inspection results, the container is rejected. In all Veritas machines, inspection verification is based on the assumption that a container must be proven good to be allowed to pass the reject station (both the container and its inspection results with a pass signal arrive simultaneously at the reject station).

INSPECTION DEVELOPMENTS

Recent development programmes focused on lighting and software have led to the addition of a new wire edge inspection option on the Veritas iB, along with the addition of an automatic lean correction function, which is now standard on the Veritas iC.

With the increased use of the narrow neck press and blow process, as well as continuing light-weighting of containers, wire edge inspection is rapidly becoming a requirement, especially for beverage containers supplied to fillers in western Europe and north America.

DETECTING WIRE EDGE

Although often considered a critical defect, wire edge has been difficult to detect reliably. Typically, some form of dark field illumination was used; however, depending on the angle of the light and where the defect occurred relative to the light, it was possible to miss some wire edge defects because they did not appear in the image (see Figure 1). The solution was either to increase inspection sensitivity and, with it, the number of false rejects, or to allow the undetected wire edge defects to pass.

The Veritas iB wire edge system solves this problem by combining direct lighting and a telecentric view of the container in the vision plug inspection station (an option on the Veritas iB). The result is an image that can clearly

show even the most difficult-to-see wire edge defects (as shown in Figure 2), as well as providing an uncompromised vision plug inspection image.

With the Veritas iC, developments to the lean detection tool now make it possible to attain accurate, reliable inspection without requiring a 100 per cent precise set-up. Using algorithms that automatically correct for errors in optical alignment, the lean detection tool now requires less time to set up.

NEW OPTIONS

New options available for the Veritas iC also include improved sidewall and dimensional inspections. The use of additional cameras (the standard Veritas iC is equipped with six cameras) enables increased inspection flexibility by allowing the system to capture views dedicated to specific inspections.

With the nine-camera option, the Veritas iC captures 18 images – six dedicated to opaque sidewall defect detection, six dedicated to transparent defect detection, three dedicated to sidewall stress detection and three dedicated to dimensional inspection. A 12-camera near-infrared system is also available for the inspection of dark, near-opaque containers.

Besides adding wire edge inspection to the Veritas iB, making lean detection more reliable and expanding the image acquisition capabilities on the Veritas iC, new user interface set-up aids, called MetaTools, are being added to all of the Veritas machines. Designed to reduce the complexity of the inspection setup, these MetaTools, when fully implemented, can lead to significant reductions in inspection set-up time, plus reduce the level of training required for machine operators and set-up technicians.

FEWER SPARE PARTS

In addition to eliminating the stroke mechanisms on the Veritas iM (when the line is equipped with vision inspection for plug, ring and dip), a common vision engine has been developed for all vision inspections. This further reduces spare parts requirements by eliminating the need for machine-specific vision computers. The same vision computer used on the Veritas iM now can be used for vision inspections on the Veritas iB or iC.



FIGURE 3: VERITAS iB BASE AND FINISH INSPECTION SYSTEM

CONCLUSION

With more than 300 machines sold since they were introduced, the Emhart Inex Veritas series is a popular and widely-respected line of glass container inspection devices. Veritas also has become the primary development platform for quality assurance at Emhart Inex. Veritas series machines today offer increased and improved inspection capabilities, are easier to use, and (depending on inspection configuration) require fewer spare parts.

Future innovations are planned to the Veritas series for comprehensive glass container inspection. The result is an ongoing drive to improve the Veritas series as a reliable, cost-effective tool designed to enable glass container manufacturers to compete in the global marketplace by providing their customers with containers that meet both cost and quality requirements. ■

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