glass WORLDWIDE

Reducing risk with latest inspection technologies

Who would have thought that the 15th and 16th Century concepts of Nicolaus Copernicus and Galileo Galilei would be applied to glass container inspection? According to Mike Rentschler, an application of the concepts from Copernicus and Galileo can be found in the tramp glass detection option available on the Bucher Emhart Glass FleXinspect T machine.

As they studied the heavens, Copernicus and Galileo realised that some of the objects in the sky in fact moved when observed over time. This discovery is the foundation of the inspection methodology that the tramp glass system uses to determine the presence of foreign objects in glass containers.

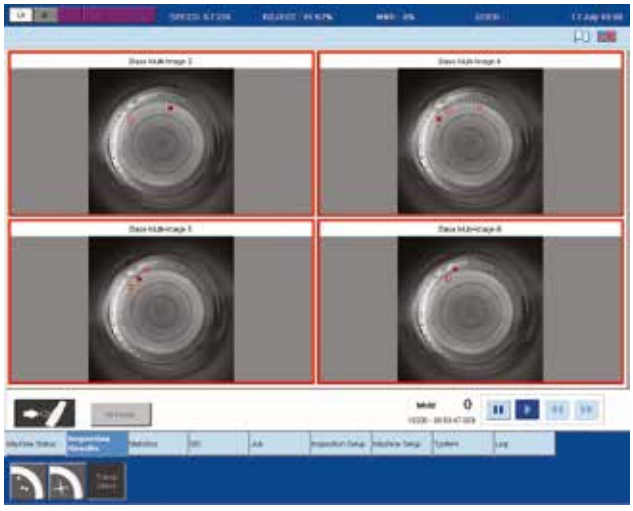
The fundamental concept of the inspection may date back centuries; however, Bucher Emhart Glass is the first company to harness the power and simplicity of the algorithm to help improve the quality of glass containers produced today.

Although referred to as 'tramp glass detection', this inspection option is actually designed to find loose particles that may have entered the container during the manufacturing process. For the last 25+ years, glass manufacturers have relied on what the industry calls 'base inspection' to find flaws associated with the bottom of a glass container. While this technique is generally effective for detecting defects that occur within the base of the container, it falls short in its ability to detect loose particles that may be bouncing around inside the container.

DETECTION IMPROVEMENTS

The major improvement of the latest tramp glass detection over conventional base inspection is in the way that defects are found and detected. Today, technicians in a glass plant's quality assurance department establish the limits as to what they need to pass and fail. Once the limit is defined, samples that represent the acceptable quality limit of the container being produced are either collected or manufactured. Samples are then handed over to the technicians setting up the inspection machine to manipulate the setup to pass and fail containers based on the size and type of samples provided.

Defects are often simulated by adhering opaque-to-semi-opaque dots to the bottom of the glass container. The sizes of these dots typically range from 1.0mm (0.039in) to 1.5mm (0.059in) and represent stones and bubbles that often can be found in the base of the container. But what happens if a loose particle of glass that measures only 0.8mm (0.031in) in size has entered the container? The answer is nothing. If the defect is smaller than the limit programed into the system, the container is considered acceptable, even if it contains loose glass particles. This scenario describes the weakness of conventional base inspection systems used in the industry today. And it gets even worse as engraved features are added to the bottom of the container.

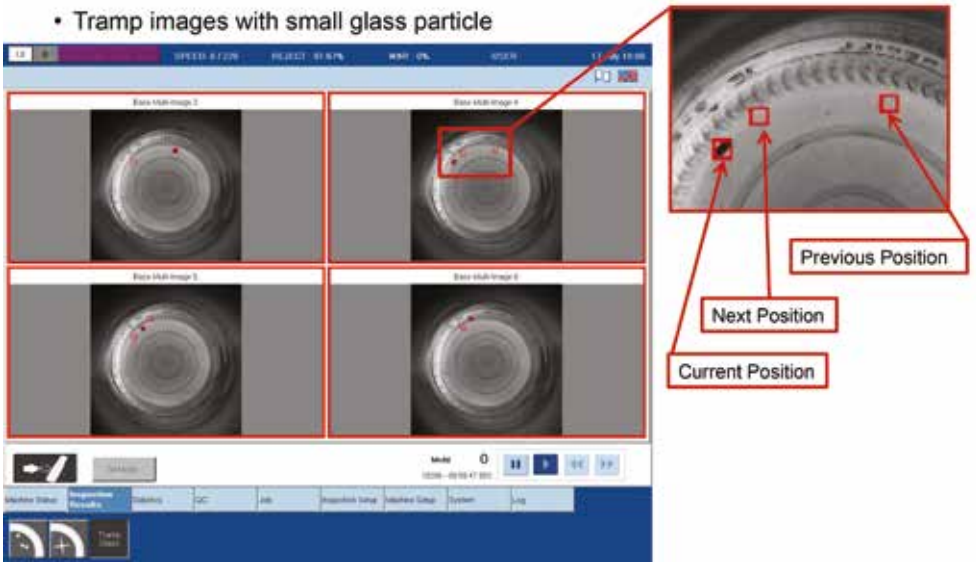


When installed on the FleX T, the Tramp Glass Detection can reliably detect loose objects inside a container that are smaller than 0.4mm, at speeds of up to 300 containers/min.

Bucher Emhart Glass tramp glass detection uses a completely different philosophy to detect loose particles that may be in a container. It does not look for any feature in a glass container; in fact, it will never be able to see a bubble or a stone. The only thing this inspection device is looking for is movement, movement caused by loose particles.

It took Copernicus and Galileo days, months, even years, to find moving object in the night sky. When installed on the FleX T, the Tramp Glass Detection can reliably detect loose objects inside a container that are smaller than 0.4mm (0.016in), at speeds of up to 300 containers/min. The accomplishments and success of this inspection feature has more to do with the application and ability to control the container within the FleXinspect T accurately.

The inspection itself is simply performed by comparing a series of photographs, taken with a high speed camera. The images are overlaid, constants are subtracted from the image and anything that remains in the image is a particle that is moving around the container. The fact that engraved features, push up characteristics and container shape have no influence on the device's ability accurately and reliably to detect loose particles goes a long way in ensuring that glass container producers can deliver a product to their customers that is free of any loose particles. ■



The Tramp Glass Detection option for use on the Bucher Emhart Glass FleXinspect T machine.

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