

Opening the door to the next level of process control

According to Dr Thomas Bewer, the 'Bottle ID' and the Flex Control Center from Emhart Glass open the door to the next level of process control for the glass container industry.

Compared to the situation 10 years ago, today's container forming machines are equipped with a variety of sensors. However, process control in the forming process is still limited to measuring single parameters and adjusting single machine settings to stabilise the measured parameter. Examples are the well-established Bucher Emhart Glass closed loops for controlling plunger motion, gob weight and bottle spacing, as well as the blank mould temperature. Marking each individual container with a unique bottle ID opens up many opportunities.

Marking containers with a unique number at the hot end makes each bottle uniquely identifiable and traceable along its complete life cycle. To make this mark machine-readable at high speeds, data matrix coding is used. This marking offers possibilities along the complete value chain of glass container usage, for example dealing with recalls, anti-counterfeiting, managing returnable fleets and even for promotional campaigns.

Additionally, controlling the forming process is taken to the next level. The measured values of the container forming process are related to this unique identifier in a database. Such production information can be sensor readings and settings of the IS machine. Reading this identification in the inspection machines also allows relating the inspection results to this bottle identification. Consequently, quality measures (=inspection results) can be correlated to the process settings (sensor readings and machine settings) for each individual bottle. This patented correlation method opens the door to the next generation of process control in the glass industry as through analysis of defect causes based on sensor readings, the possibility to automatically adjust process settings to avoid further defects is realised.

Product family

Bucher Emhart Glass has introduced a family of products to mark and trace

the bottle along the forming process and attach all forming and inspection data to this mark. With a CO₂ laser marker (ID Mark) synchronised to the IS machine, bottles are marked with a datamatrix code that is read by the ID Read equipment integrated in the FlexInspect machines. The Flex Control Center collects, stores and analyses this data in a database related to the bottle ID.

Applications on the Flex Control Center use this data to advise the operator on safe machine operation, machine maintenance, process stabilisation and defect rectification. The Standard Operating Procedure (SOP) videos on the Flex Control Center advise the operator on safe machine operation. Additionally, these videos can be used for self-assessment training.

Monitoring applications give an overview of the process parameters and machine status and even notify the operator in case of deviations. Defect advisory tools identify the root causes of currently occurring defects using knowledge databases. For the next step in defect rectification, a one-to-one relationship is essential, as it allows the correlation of each individual defect to its root cause. Therefore, real production data is gathered and correlated to the individual container by statistical methods.

To benefit from this defect rectification solution, a complete End to End installation including ID Mark, ID Read and Flex Control Center is necessary. The first installation of its kind has been realised at the Emhart Glass Research Center EGRC in Windsor, CT, USA.

Initial correlations will concentrate on well-known influencing factors such as gob loading and its influence on wall thickness distributions. However, the possibilities are not limited to factors that are currently known to glassmakers. Through the complete process insight, big data analysis becomes possible, resulting in the

identification of 'hidden' and multi-variable correlations.

Furthermore, applications on the Flex Control Center can analyse trends in inspection results, as well as sensor readings and alert operators of a critical situation even prior to rejecting bottles. Every identified correlation will result in a new application on the Flex Control Center, helping the operator to control and stabilise the process and ultimately avoid defects. ●



The central hub in the glass plant of the End to End solution.

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