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Flexible and Robust Container Glass Thickness Measurement

New multipoint thickness measurement for inline inspection and a hot glass container measurement system increase productivity and reduce downtime

Since 2000 ic-automation GmbH has been producing special machinery. ic-automation now offers standardized flexible wall thickness measuring systems for the container glass industry based on the most advanced chromatic CHRocodile sensors.

Inline Container Measurement

The ICM (Inline Container Measurement) multipoint system is designed to be used on conveyors to measure hot or cold non-spherical containers and to be integrated into all new or old stop rotate inspection machines, such as the CO, M, MX4, FleXinspect or SmartLine.

Normally, an inspection system offers one to four thickness measurement channels. Quality control managers would probably prefer more but this is (was) just too expensive. Having more measurement points in the critical zone of LWBB and NNPB containers, i.e. just above the base, around an embossment or in the shoulder area, is a huge benefit. A stack of many single probes is too large, however; it does not fit into the machinery mechanically and is costly. To measure these areas we use a multipoint line probe with a line length of 12.5 mm. Up to 12 points can be measured along this line. The customer is free to choose the number of measuring points and the position thereof.

The first ic-automation GmbH ICM multipoint systems are up and running at Allied Glass Containers Ltd. in

England. Having 24 channels which can be freely distributed across two production lines is extremely beneficial for reliable quality control.

For example, four line probes with five points each on a 12.5-mm line and four point probes or two line probes with 11 points and two point probes can be used. The operator is even free to choose the point distance along the line. Just above the base or below an embossment measurement points with a distance of 1 mm make sense. On the body, distances of 2 mm, 3 mm or 4 mm between the measurement points may be more suitable.



Fig. 1a (above): ICM thickness measurement on a conveyor.

Fig. 1b (below): Robust shielded optical line probes. Photo: Allied Glass



100% inline thickness measurements just above the bottle base, in the infeed area or below an embossment are now possible at a price that offers a very short return on investment.

Offline Container Measurement

The initial glass production stage is hot; obtaining information on the container thickness in the hot area and not having to wait for the glass to anneal enables operators to react faster. This is especially helpful if a change of job is scheduled or there are problems with a mold or cavity. The ic-automation GmbH OCM (Offline Container Measurement) system is built like a tank to guarantee precise dimension and wall thickness measurement – even in the harsh environment of the hot area. If it is to be operated at the cold end only, we offer a version without active cooling of sensors, stages and electronics.

This is what Thomas Feier at DURAN DWK life sciences in Mainz had to say after working with the OCM: „Without the OCM the wall thickness of all articles was normally measured using a Magna Mike (magnetic-inductive measurement). With an average of four measuring points per article, the minimum and maximum value must be determined and entered into the CAQ system.

Disadvantages:

- Reproducibility of the measuring points difficult
- Different angles (glass/measuring tip) with different testers
- Relatively high time expenditure
- Risk of scratches due to direct contact with metal.

Bottles with a capacity of more than five liters also have handling problems due to their high weight. The 19-litre bottle weighs approx. 6 kilos, for example. With this bottle, the OCM



Fig. 2: Positioning a hot Erlenmeyer flask for contactless wall thickness inspection.

Photo: DURAN



Fig. 3: the OCM in the lab measuring a large and heavy container.

Photo: DURAN

took approx. 20 seconds for the measurement along two circles at two measuring heights. With the conventional method, even an experienced examiner needs approximately 3–4 minutes.

Additional advantage of the OCM:

- The wall thickness on the body and base can be measured very early on in the process as the OCM is suitable for the hot area. This makes optimizations possible earlier and reduces downtime.
- All data is automatically saved for use in all kinds of production and quality control software.“

Conclusions

The ICM and OCM systems enable early and accurate determination of wall thicknesses in production with outstanding flexibility and robustness, thus supporting glass manufacturers in the production of increasingly lighter and more complex containers.

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