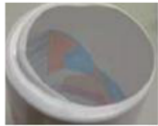


Food container inspection needs are solved by 3D smart sensors

Smart 3D sensors have proven capable of solving container inspection needs, detecting the smallest defects on container seal areas, enabling 100% automated inspection and defective part rejection, providing confidence that every container produced will meet consumer expectations. **Len Chamberlain** director of sales, LMI Technologies explains more

Containers for food products must meet rigorous dimensional control specifications to guarantee products are protected from premature spoilage. When packaging fails, the consequences can be recalls which damage brands and consumer confidence. The recent recall of Chobani yogurt products is a good example, where small variations on the seal surface produced 'leakers', posing a serious health concern and resulting in a near catastrophe for Chobani.

Food containers must have very flat surfaces to safeguard the integrity of the cover seal (Figure 1 – left). To insure every container meets the specified flatness,



100% dimensional inspection is critical. Sampling inspection processes used in the past are costly and do not provide absolute confidence that every container meets precise specifications. Implementing automated 100% inspection for this application is complex due to very high manufacturing rates, requiring detection of small defects at 600 cups per minute. In this case, cups were in continuous motion, rotating in less than 35 milliseconds.

Looking for a better solution, a major manufacturer of yogurt containers turned to Industrial Control of Zeeland, MI, US, a system integration partner of LMI Technologies. Based in Vancouver, LMI designs and builds 3D scanning and inspection solutions from the chip level up.

3D SMART SENSING

After 2D inspection methods proved unsuccessful, Industrial Control installed a 3D smart sensor in the printing system, near the curing light (Figure 2). Capable of resolutions in the order of ten microns, the sensor produced accurate results to detect small defects anywhere on the seal area. The laser-based optical design of the sensor insured that the intense UV curing light did not affect measurements.

The sensor's compact size facilitated easy installation, enabling the plant to be

functional within hours. A 48 hour test in continuous production produced very good results, followed by a further test of four full weeks which validated that a 3D smart sensor was the answer to provide 100% automated inspection.

3D smart sensors are designed as all-in-one inspection solutions for factory automation and control. These factory calibrated sensors have all components rigidly mounted inside a compact, lightweight IP67 rated enclosure. Also, all image acquisition and analysis hardware and software is inside the sensor housing, with no external hardware or software required. Although 3D sensing is often considered complex, latest developments have made implementation simple, even for those with limited experience in laser measurement technology.

To make set-up and implementation easy, all-in-one 3D smart sensors offer a built-in web server that connects to common web browsers. Sensors can be configured from any computer and any operating system. No added software or hardware is required. Once set-up is complete, the PC can be removed and measurement operations continue automatically. Another advantage that simplifies implementation is a comprehensive set of built-in measurement tools for computing values such as length, width, height etc. Each measurement tool includes decision making to generate pass/fail decisions. Measurement tools eliminate the need for

development of application specific software. In this application, a discrete sensor output is used to activate a reject mechanism to automatically remove any non-conforming cups.

Key to achieving the desired high speed inspection results was the ability to reduce the sensor's active area to increase the sampling rate. In this case, reducing the active area to 10X10mm increased the scan rate from the approximately 170Hz full field rate to 2,500Hz, providing 130 profile samples per cup rotation – more than adequate to detect any small defects. While scanning in this way creates a 3D map of the cup, in this case each individual profile is analysed (Figure 3).

Based on the success of the initial trials, LMI's 3D sensors have now been installed

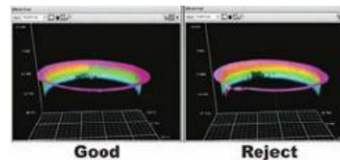


Figure 3 - 3D profiles of good and bad cups

in multiple production facilities in several countries, with a total of 11 systems operating 24 hours a day. Compact size and simple set-up make the system well suited for retro-fitting to existing lines. Although achieving 100% quality control is a universal challenge, it is absolutely critical for maintaining the highest standards for food packaging plants. Thanks to cutting edge developments in 3D scanning and inspection technology, sensors can now solve the challenges of 100% inspection of food containers in high speed production facilities. Automated inspection and sorting eliminates the cost of manual inspection and provides absolute confidence that every cup produced meets customer expectations, providing a dramatic improvement in product quality.



Figure 2 - a cup inspection station

LMI Technologies

www.lmi3d.com

T: +1 604 636 1011

Enter 230