

Application: Closure and Fill Level Inspection

Containers: Plastic bottles

Inspection: Missing Cap, Tamper Band, High Cap, Fill Level with Slosh/Foam Compensation

Solution: Closure & Fill Level Application with Intellect

Challenge:

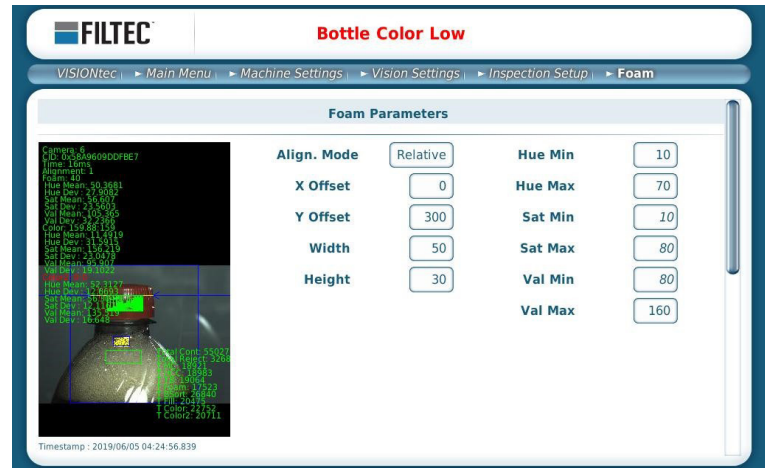
Container closures must be applied with a high degree of precision to ensure the safety and quality of the product; however, there may be problems with the capping process and without inspection, improperly sealed containers can end up on store shelves and in warehouses. Closure integrity inspection solutions provide the assurance manufacturers need by identifying and rejecting products that may not have been sealed properly. Depending on the content, accurately detecting fill level can be challenging. **FILTEC Vision Closure with Intellect ensures that fill level is measured precisely and line conditions that would induce sloshing and foaming do not interfere with the accuracy of the fill level measurement.**



Sample of Defects Detected



Each fill level inspection camera is run independently. Images are combined to compensate for product slosh and provide accurate fill level measurement.



The fourth color camera provides detection of foam that is used to adjust the fill level measurement and reports the cap color for verifying that the correct cap is in place.



Gradient threshold is adjusted based on image brightness and cap reflection to get the best result for broken or missing Tamper Band detection.



Inspection probes are adjusted to inspection for High, Missing or Cocked Cap.

Solution Summary

Fill Level Inspection and Slosh & Foam Compensation:

FILTEC provides several choices for fill level measurement. For carbonated beverages, the 360-Degree Cap and Fill Inspection Module is the ideal choice. By using 3 views of the filled bottle, the FILTEC inspection system can compensate for sloshing of the product. With the additional fourth color camera, the FILTEC inspection system can detect and compensate for foam.

Missing Cap, High Cap and Cocked Cap Inspection:

Using 3 views, the FILTEC inspection system can detect very small misalignments of the cap, either high cap or cocked cap, that result in under pressurization and leakage.

Tamper Band Inspection:

The sample image above illustrates a partially cracked tamper band. FILTEC uses multiple algorithms to inspect for very small tamper band defects not readily visible to the unaided eye.

Cap Color and Bottle Color Inspection

Bottle and Cap color can be different for each product produced. To determine if the correct cap and bottle are used, an additional camera view is provided to perform color analysis. For efficiency, this is the same camera that is used for foam compensation.

Additional capabilities include bottle sorting, label presence and position, shrink sleeve label inspection, and quantitative analysis.