miho Inspektionssysteme

COMMUNICATION FROM SPECIALIST TO SPECIALIST

LABEL INSPECTION

HOW TO CHOOSE THE RIGHT TECHNOLOGY

LABEL INSPECTION IS IMPORTANT

LUC TRICOT, M.Sc.Eng., MBA

The product labelling process is fundamental. The label plays an essential role; it is a communication tool between the producer and the consumer and a powerful marketing tool that builds the brand's image and makes the product attractive. It also contains vital information to inform and protect the consumer. As a manufacturer, it is essential to verify the product labelling quality and conformity before it leaves the production line. This article presents different solutions to realize an efficient in-line label quality verification process.

INSIDE THIS ISSUE:

WHY IT IS IMPORTANT

The Beverage and Food industries face significant responsibilities as the quality, and the conformity of their products play an essential role in consumer health and safety. All operational processes in these industries must comply with rules and regulations meant to keep business and consumer risk under control.

Legal Aspects of Product Labelling

Food and Beverage labels must comply with national requirements.

Europe promotes the free movement of safe and wholesome food. EU laws ensure that consumers have the appropriate information to make informed choices in the food and beverage they buy, eat or drink.
To support these objectives, many European rules, like the Directive 2000/13/EC on Labelling.

Foodstuffs or the Regulation (EC) No 110/2008 on Geographical origin of spirit drinks, are imposed on the industry.

Not complying with these rules implies unnecessary legal exposure and increases the risk of damaging the company image and reputation.

Possible Consequences of Defective Labels

Labels delivered to the production site are typically considered compliant in terms of artwork and print information. Rigorous artwork checks, and label content control are performed by the printer and by the company's raw material quality control department.

Marketing departments have to be creative and contribute to products which are beautiful and attractive. Labels play a crucial role. They offer limitless possibilities in terms of artwork and brand name consolidation while providing all legal consumer information. The wide variety of labels, high line speeds, regular production changeovers to respond to customer demands and flexibility requirements are only a few examples of elements that can induce labelling errors and defects.

Delivering products with defective labels to the market, represents a high-risk situation for a company and can have exceedingly severe consequences. The first immediate consequence is a product recall. Such cases lead to several penalizing action, such as: a communication campaign to inform the market of the problem, the physical recovery and eventual stock rework or destruction. More consequences can result, like: penalties to be paid to the customers, decreasing sales figures as a result of product absence at point of sale or loss of company image.

Previously described facts, risks and consequences can be avoided through the implementation of in-line quality control processes, which we describe in the following paragraphs.

Besides ACL labels (Applied Ceramic Labels), the industry implements different labelling approaches:

- *glued on labels,*
- *self-adhesive labels,*
- *in-mold labels (used for blow molded bottles),*
- *sleeve labels.*

Label Defects.

During the labelling process, each labelling approach has specific challenges in terms of quality and quality control, different kinds of label defects can be generated:

Wrong label on the product

Improper label position

Label surface damage

Defects due to the label application

Label wrinkling

Label flagging

Printing error

Label Inspection solutions

The industry has over the years moved from a label presence control using simple optical sensors to machine vision based inspection. The latter offers the advantage that using the optimal lighting and camera combination, where a high-resolution image of the label can be taken. Using high-performance image processing software and hardware, accurate and reliable inspection can be executed to detect previously described label defects.

Be aware of the following elements: It is important to understand the impact environmental and product characteristics can have on the label inspection performance.

Ideally, the inspection should be done in a controlled environment, avoiding the influence of external light or direct sunlight. This condition is required to favour a controlled illumination and a stable inspection of the label. Well designed inspection systems provide the necessary protection to guarantee these conditions. Whenever the quality check happens at a location where such protections are challenging to implement (i.e. inside labeller), it is essential to realize that lower inspection accuracy or higher risk of false rejects may have to be accepted.

Multiple product characteristics will impact inspection performance. For optimal inspection, some label features have to be clearly visible to the camera, which must offer the right image quality with crisp transitions and suitable contrasts. The position of a dark label on a dark bottle may be difficult to analyze, reading a black printed “Use By Date” on a dark and uneven background may be impossible. Geometric characteristics or fluctuating positions of the product at the point of inspection, can cause image distortion and make inspection difficult.

For each label inspection application, it is essential to clearly define the application requirements. Some testing with the products to be inspected will need to be done, to be aware of the possibilities but also of the limits of the chosen inspection solution.

Labels that are difficult to inspect

green label on green bottle (low contrast)

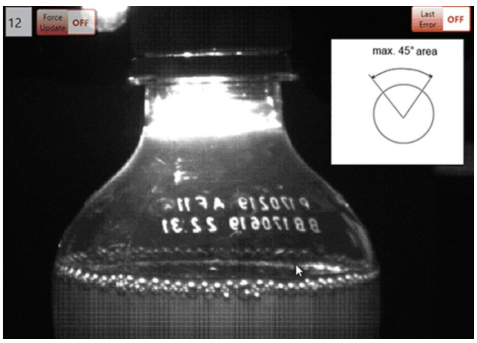
Lot number printed on uneven background

Label with light reflection

WHERE TO INSTALL THE LABEL INSPECTION

Installation inside the labeler

Depending on the labeler type, the inspection can be realized in two ways.



When self-adhesive labels are applied, it may be possible to verify the label just before its application to the bottle. In such situations, the label is flat, the bottle shape does not influence inspection, and illumination conditions can be perfectly controlled. These conditions can be perfect for checking the print quality and the correctness of, for example, complex codes (i.e. lot numbers). The disadvantage of this location is that additional cameras are required if the conformity of the labelling must also be checked.

When suitable; cameras can be mounted inside the labeler to inspect the labels after they have been applied to the bottle surface. Camera and lighting positions must be carefully chosen to allow image acquisitions where bottles have fixed positions with labels facing the camera. Elements like horizontal, vertical and angular label positions, label identification, peeling or curling can be inspected accurately after leaving the labeler.

miho EC-Cam

More info : miho EC Cam

miho has developed an innovative camera based label inspection system for integration into a labelling machine or in single file after the labeler. A prerequisite for use in single file, is that the labels are aligned with the camera module or that they are wrap-around labels

Labels can be inspected for the following criteria:

- Presence
- Logical correctness
- Integrity (after prior verification by miho)
- Including reject monitoring in the inspection machine
- Correct position and angle
- Imprinted EAN barcode and expiry date

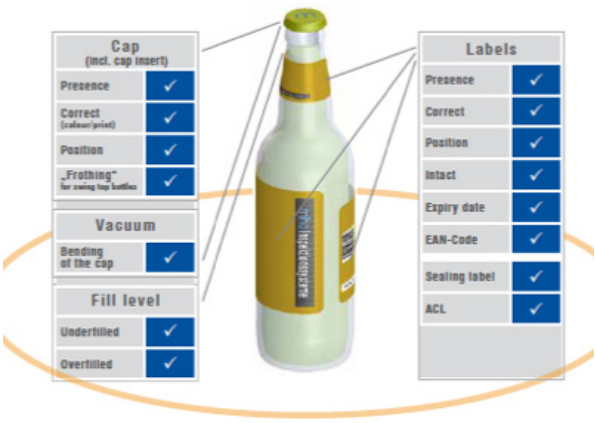
Installation after the labeler

The bottles geometry will define the stability of its angular position on the conveyor. We can for example, consider that square bottles will leave the labeler in a fixed position, with front and/or back labels always oriented in the same direction. Placing an EC-Cam camera on each side of the conveyor, gives one the possibility to inspect front, back and neck labels.

Round bottles on the contrary, have no fixed angular positions after the labeler. For these situations, miho developed the miho Allround, an innovative 360° label inspection system capable of inspecting each individual bottle label, independent of the angular orientation of the bottle on the line.

More info : miho Allround

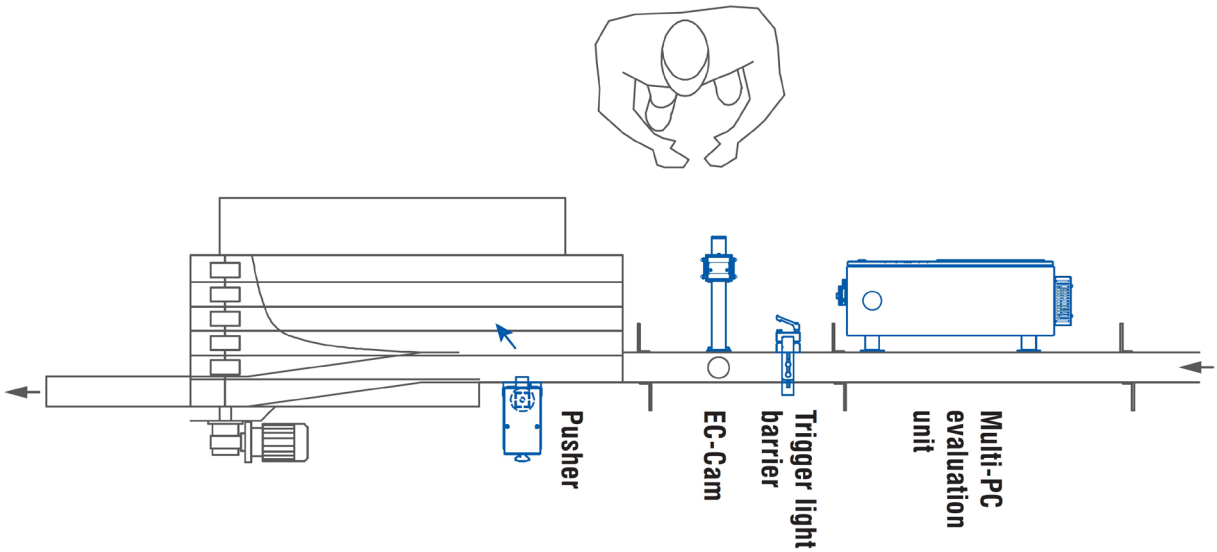
This state of the art 360° inspection system realizes the following inspections at speeds up to 60.000 b/h.



- 360° inspection of a full bottle after filling, capping or labelling
- Inspection on up to 5 labels
- Cap inspection.
- Fill Level Inspection
  (in combination with our fill level inspection systems).

This inspection system is ideal for a final quality inspection of filled and labelled containers. To provide unprecedented inspection performance, it uses high performance image processing hardware and software, combined with several cameras and sensors. 4 cameras are implemented for the 360° label inspection. A fifth camera and 3D sensor can be added to inspect the integrity of the cap.

INTEGRATION EXAMPLES



Creative miho engineers help you find the optimal integration of your inspection equipment, guaranteeing optimal product transport during the inspection process but also optimal stability during the reject process.

Detailed inspection performance data can be provided on request

TO CONCLUDE

- The faultless labelling equipment of beverage containers is becoming increasingly important. In addition to the integrity of the labelling, the logical correctness must be checked: EAN barcode, expiry date, proper language variant of the label

- The trend is driven by :
- the increasing marketing activities of the beverage manufacturers,
- the increasing quality demands of the end consumer and
- by legal requirements or certifications

- The miho EC-CAM camera-based label inspection checks the container's labels either directly in the labeller or sleever or in free flow

- Alternatively, the miho Allround 360° full label inspection system checks all features in full as the last check before packaging of the containers.

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miho project engineers can discuss your application and run trials on your products to help you choose the best solution for your application.

For more information we invite you to visit our website www.miho.de or to contact us directly by mail at info@miho.de or at ltricot@miho.de

About the Author

Luc Tricot - Regional Director, miho Western Europe - He has been passionate about automation applications and their associated product quality control challenges for over 20 years.
Discovering new applications, collaborating with leaders in the industry, finding creative solutions and building up pleasant working relationships with customers, are a pleasure for him.

miho Inspektionssysteme GmbH - Obervellmarsche Str. 12 - 34292 Ahnatal, Germany
Tel: +49 5609 8382-0 - E-mail: sales@miho.de - web: www.miho.de