

Guide

VISION INSPECTION



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Trust is good – control is better

Ancient wisdom that today is more valid than ever. In times of bad press about counterfeit drugs, recall campaigns due to poor product quality, and the associated impact on image, protecting your products and ensuring they meet all quality requirements should be the top priority. This guide explains the reasons to choose vision packaging control, the benefit or added value for companies and their customers, and the methods or tools to achieve this.

What are the benefits of vision inspection?

The human eye is easy to trick and too slow for today's busy world. At packaging lines with a production speeds of about 200 pieces per minute (pharmaceutical industry), and up to 400 pieces per minute (food industry), we depend on automated systems. Especially since these offer a number of additional options that manufacturers of high-quality or high-volume products can use to increase value.

The techniques employed by counterfeiters have become so sophisticated that is almost impossible to distinguish fake products from the originals. Tests have shown that the counterfeits have often been considered to be the originals because they were more appealing, e.g., in terms of color design. While this could be passable for consumer goods, in the case of prescription drugs, it is downright dangerous. The patient must be certain of taking their medication with the correct active ingredients in the right dosage.

The same is true for other products, they should also be exactly what one pays for. Or do you still want to pay for an original, just to own a counterfeit – even if it's well made? Do you want to spend money on poorly performing items? Your answer is almost certainly "no". High-quality packaging is important, too. At the end of the day, this is the customer's first impression of a product.

Precise vision inspection ensures:

- The same high-quality results are always achieved with the same parameters.
- Data is recorded and re-used at each inspection station within the packaging process. It is stored in the system and can be retrieved at any time.
- Throughput is optimized, as the data gathered makes it possible to react more quickly, prevent problems in the packaging process, and thereby improve the overall quality.
- Costs are reduced, due to minimized waste and manual labor.

Time is money

Each additional manual step in the packaging process might influence the production speed. As a result, each manufacturer must establish, how many inspections are required, at which point in the packaging process, in order to guarantee quality and prevent more expensive activities in retrospect. A product recall is not only frustrating and poor for a company's image, it also takes the dynamic away from product sales for a period of time. This is because the fault must be identified, and in particular, be prevented in the future. In the meantime, the product must be packaged elsewhere. Implementing an essential recall also uses up resources.

There are multiple aspects to factor into the cost – not only the logistical efforts but also replacement with new, correctly packaged products, the expense of the crisis management and legal teams, and the disposal of the products in question.

If, due to the absence of more precise identification options, the affected products cannot be isolated, then the recall will not only affect individual batches, but often entire product ranges. Here, costs can quickly add up into the tens of millions. If damage claims follow, the end is not in sight. A medium-sized company can then quickly spiral into financial trouble.

Vision packaging control does not stop mistakes from happening, but it can prevent these faulty products from reaching the market. Any potential for improving the process is identified at an earlier point in time.

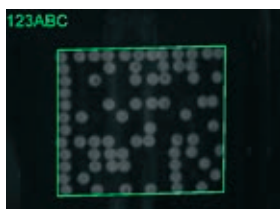
What inspections can be performed?

Generally speaking, almost any request for inspection can be accommodated. It is always a question of the parameters and the techniques used. As a general rule, the more precise and detailed an inspection ought to be, the slower the belt must run or the longer the line must be, in order to integrate the inspection stations.

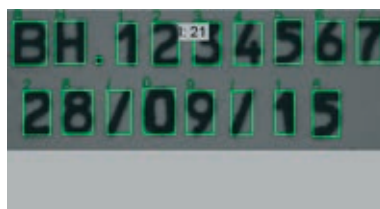
For example, inspections can be carried out with different characteristics, as OCR/OCV shows. OCR (Optical Character Recognition) discreetly inspects whether certain characters are present in a predetermined manner, whereas OCV (Optical Character Verification) goes further, checking whether the character string matches the specification.

Can all inspections be carried out with one system or inspection station? No, unfortunately this is not (yet) possible. In many cases, a person is still better at checking such things, but not over extended periods of time. Generally, eyes become fatigued after approximately 20 minutes and as a result, a people cannot replace continuously operating automatic systems. Depending on the complexity or external circumstances, a mix of successive solutions is the best choice.

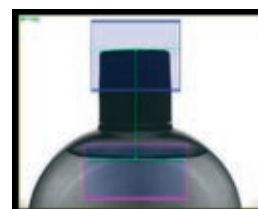
Examples of common requirements in packaging inspections:



Data matrix code



OCR/OCV



Presence, orientation, filling level



Integrity



Foreign objects



UV inspection

Good planning is essential

The solutions for vision inspection range from very simple, standardized systems right up to complex, high-end solutions that are specially programmed and configured for the respective application – and can therefore cover a wide area of application in terms of quality requirements. But it often seems difficult to find the right solution to guarantee product quality. Good preparation and the exact definition of the requirements by the customer are as essential as the flexibility of suppliers and their systems/solutions.

Initial planning steps

1. Start by specifying the quality criteria that are relevant to you. Then determine which vision inspections could be used in an automated manner. An experienced system integrator or supplier of vision inspection systems can help you with this process and provide valuable information.
2. Determine which product range is to be inspected and define the natural product deviations and other parameters.
3. In the next step, select the hardware that best meets the previously defined requirements. In doing so, it is important to define accurately what the systems need to be capable of, or filter out what is not viable. This prevents unnecessary expenditure in the future.
4. Ensure that the solutions are tested, not just in a test environment, but also in your production area. This ensures that the application delivers precise results under real conditions, e.g., illumination, line speed, etc...
5. Use the data gained after the introduction of a system as a basis for continuously optimizing your processes. This reduces the reject number and increases the OEE.

Checklist: What kind of hardware is required?

- Image processing hardware (cameras, controller, lighting, etc.)
- Peripheral devices (sensors, ejectors, alarm, power supply devices, additional interfaces)
- PLC connection and controller
- Control monitors
- Spare part availability

Given the process-controlled aspects of vision inspection systems, the user interface is vital to performance. Systems with a graphical user interface are the easiest to operate – the user controls the application via intuitive icons and symbols in order to execute the desired actions. Screen prompts reliably guide the user through setup and analysis.

The characteristics of a good interface include clear, simple information regarding errors that have occurred and fast, easy access to technical assistance – online as well as offline. Some systems already offer graphical user interfaces with touchscreens. The touchscreen is one of the most reliable system interfaces since there are no mechanical barriers to overcome.

Application examples / techniques

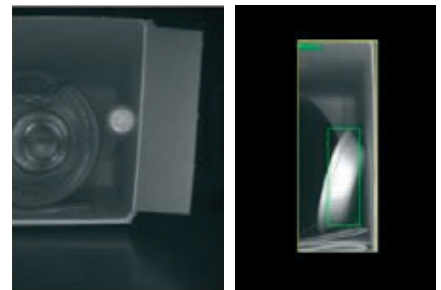
Inverse inspection

Sometimes it's vital to think a step ahead. For example, if there isn't sufficient line space or the surrounding conditions do not permit the use of conventional modules. In such a case, Laetus implemented blister slide control in quite an unusual way for a customer in South America. During blister perforations, the system checks the blister web against sheet edges. If the web is correct, the correct application of the foil, with subsequent perforation of the blisters, can be assumed.



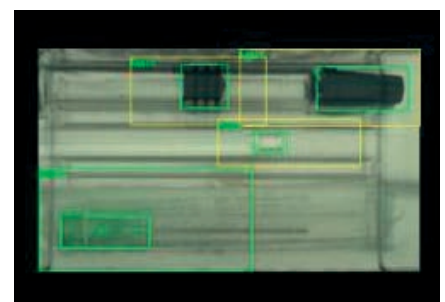
Multi-inspection 1

Vision inspection does not imply that only one characteristic is checked. Often a combination of inspections is the objective. Different product components are often subjected to inspection when they are part of preassembled goods. This is demonstrated by one customer, whose product for inspection consists of a folded box with small bottles, some of which are filled with powder and some with liquid. Also included is a pipette or spoon and the accompanying leaflet. Here, the presence of bottle, accessories, and leaflets are to be inspected, as well as the integrity of the components and their correct coding.



Multi-inspection 2

In a similar example, the following must be inspected in a blister container: syringe, piston, stamp, and needle as well as the transparent label on the syringe. It may be the case that not all features can be inspected at one station. This could be the case, if the contrast is not strong enough, e.g. the transparent label, or if the reading position is not fixed, such as with the syringe. Through the use of different modules, however, 80% of requirements can be checked.



Reading and position inspection

For another customer, the challenge was to inspect plain text and code (OCV) as well as the position of labels, on round, rotating products. The print is very small and varies in terms of quality. Here such a large tolerance had to be configured that defective labels managed to pass through the inspection as “good”. In such a case, rethinking the requirements, splitting the inspections or reducing the speed is recommended.



From just these few examples, it already becomes clear that the topic of vision quality inspection cannot be tackled in five minutes. Defining requirements precisely and detailed planning are key factors for a successful implementation. Can Laetus' systems fulfil every requirement? We are honest – no. Not all requirements can be solved with today's systems. But our well-equipped R&D department is constantly working to make further improvements to vision packaging control solutions.

A brief introduction to Laetus' vision inspection solutions

Code reading with ARGUS

The synonym for reliable print inspection. Regardless of whether it is simple code detection or whether additional color information, human readable text or artwork need to be reviewed, ARGUS, together with POLYPHEM and INSPECT, offer everything you need to ensure product and packaging safety.

POLYPHEM makes blister inspection simple

The packaging is one thing, the correct contents is another. POLYPHEM lends its attention to precisely this. Comprehensive color and form evaluation functions provide information on key identity and quality characteristics. Further factors such as contamination, mix-ups, foreign objects or varying alignments negatively impact quality. Three-dimensional height evaluations detect double allocations or tablets that have been broken horizontally or on the underside.

INSPECT, our all-round vision inspection talent

Quality inspection is not always the same. The wide range of our software applications allows us to offer a unique arrangement of test options, resulting a solution that precisely meets your needs.

