



Zero Disgust: Reliably Detecting Impurities in Chocolate

Consistently high quality is a basic expectation of customers when it comes to chocolate products. To ensure this, quality control must meet a number of requirements. One of the most important tasks is to detect foreign bodies and impurities in the chocolate and subsequently eject the contaminated products. Failures in this process can quickly lead to dissatisfied customers, expensive product recalls, and a damaged reputation.

The 5th complaint this year! Mrs. Miller from quality control is very unhappy. Once again, a customer has found a foreign particle in his chocolate – this time a small fly in a whole milk bar. In the previous months, customers have complained about tiny plastic crumbs in white chocolate, a moth in dark chocolate, and a small spider in a bar of dark chocolate. It's a disaster. Fortunately, no customers have yet posted pictures of spoiled chocolate on social media platforms, as it has happened to a competitor!

Wanted: A simple and efficient technical solution!

Mrs. Miller is determined to do something about it. The hygiene measures in place are flawless; she can't address that point. She needs to find a way to check each bar for contamination before packaging. Hiring employees to carefully inspect each product to detect even the tiniest particles is far too expensive and fraught with human error – a different solution is definitely needed. Highly motivated, Ms. Miller searches online for a suitable technological solution. And she is successful: Strelen Control Systems GmbH in Germany has developed such a system, which can be quickly and easily integrated into existing production lines. She is keen to find out more details.

Eagle-eyed cameras

Strelen Control Systems GmbH uses cameras instead of inspecting employees and relies on digital image processing to detect and directly eject contaminated products. Depending on the bandwidth, one or more inline cameras record the passing chocolate bars and the image processing software evaluates the shots in real time.

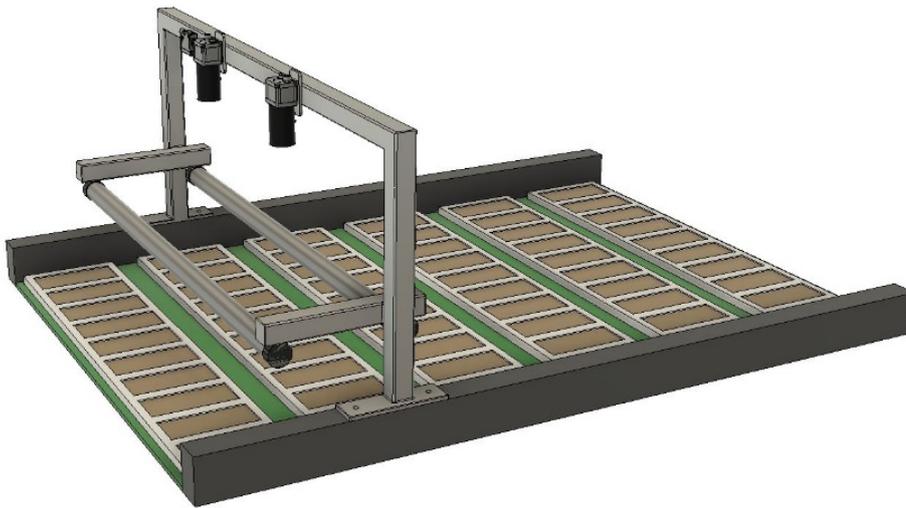


Image 1: Lighting and cameras are installed above the production line.

Even black insects in dark dark chocolate or light gray plastic particles in white chocolate can be reliably detected due to the differences in contrast and/or brightness values. Since color cameras are used, splitting the images into different color channels also makes it possible to detect colored particles in the chocolate that might remain hidden with a pure grayscale camera.

Digital image processing can spot the smallest parts

If the image processing software detects deviating color particles, it sends a signal and the corresponding bars are automatically rejected. Contaminants with a size of approx. 1mm² and larger can be detected. Theoretically, even smaller particles can be detected, but then the risk of false positives is too great. Even the tiniest air bubble could then lead to rejection and too many bars would thus be discarded.

Reliable, user-friendly and 100% food safe

Mrs. Miller is delighted by this solution! It performs the tests quickly, efficiently and reliably, it can be implemented easily without having to change the setup of the production line, and it meets all the special requirements of the food industry. The accompanying software is well-structured and easy to use thanks to a clear user interface. The technical and commercial departments are easily convinced by the se aspects and the installation of the system is commissioned.

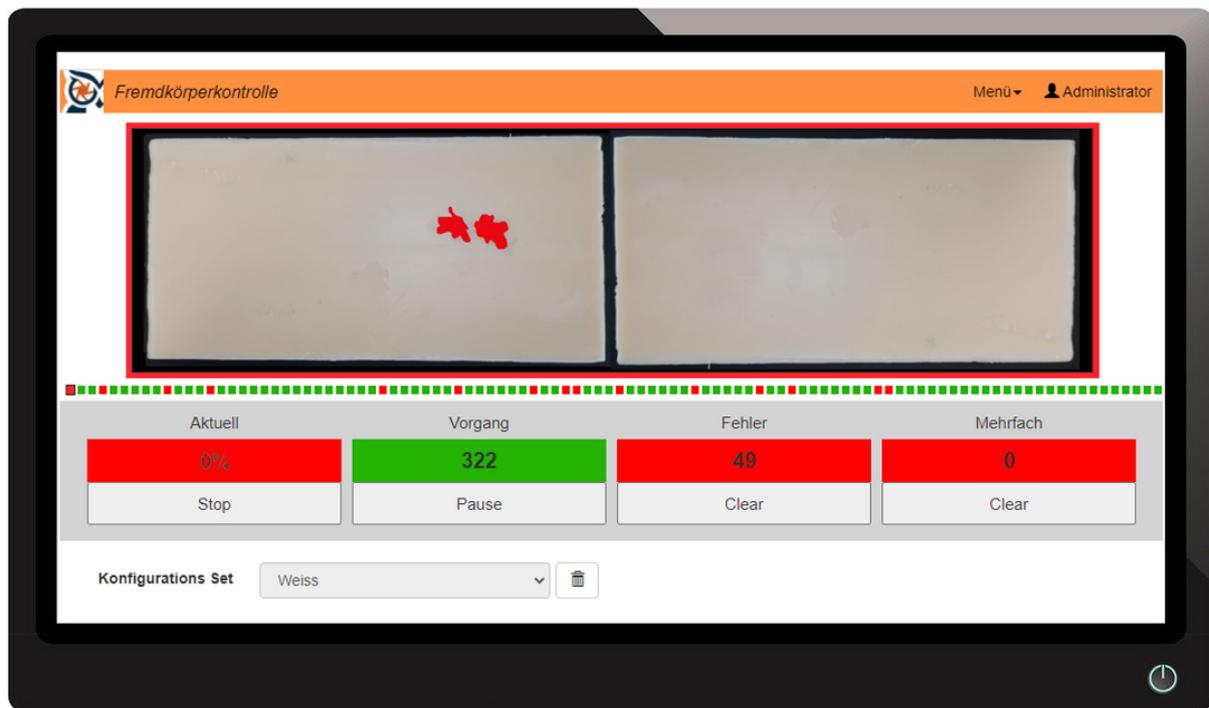


Image 2: The user interface of the Strelen Control Systems GmbH software

Positive results

The construction and setup of the system works smoothly and the employees are quickly familiar with the new software. Ms. Müller is pleased that the new system has been so well received. After a few months of operation, everyone can take stock with satisfaction: Not a single complaint has been received during this time! If there are any impurities, the sheets are reliably sorted out and pseudo defects occur only very rarely - a benefit for the entire production.

This solution was developed by Strelen Control Systems GmbH, a company based in the Rhine-Main area. The system house has been active in the field of digital image processing in conjunction with artificial intelligence for more than ten years. Industry 4.0 applications and individual products are at the forefront of the innovative developments, which are successfully used in the food, pharmaceutical and packaging industries, among others. Since a modern workshop is also attached, Strelen offers complete solutions with integrated image processing from a single source.

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