

Product inspection: how to stay ahead of the curve

Food safety is a key area of focus for manufacturers, brands and retailers alike. Consumers expect to be able to trust in the products they purchase, therefore if there is a quality issue this can very easily lead to dissatisfaction, negative feeling towards a brand or even a costly product recall. Regulations have evolved significantly in recent years, with a view to protecting not only consumers, but also the manufacturers of the products being sent into the retail supply chain.

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These regulations have a knock-on effect. More steps must now be considered in terms of product inspection, data collection and reporting, but demand and production schedules have not slowed down in order to accommodate this. Consumers are hungry for variety, choice and flexibility. Product proliferation is leading to more and more changeovers on production lines, and multiple packaging formats must be taken into consideration as items are packaged into glass, plastics, metals and flexibles.

Therefore, the ability to inspect products quickly and efficiently is highly advantageous, as is the facility to record large amounts of data simultaneously and to produce corresponding reports should they be needed at any point after production. Advanced product inspection systems on the market today have been designed to take up these tasks, and the corresponding software has been developed alongside to make it easy for manufacturers to remain compliant, productive and, importantly, reputable in the eyes of the end-user.

Regulatory compliance

Regulations around the world have been tightened and in some instances brand new pieces of legislation have been, or will be, implemented in the coming months and



years. These stricter controls have been driven, in part, by a number of high profile product recalls around the world and also as a result of retailers demanding tighter controls with regard to product inspection and food safety practices in general.

Consumers today also have a greater understanding of the processes involved in food production, and are rightly reassured by products that are manufactured in accordance with recognised safety standards.

In the US, the Food Safety Modernization Act (FSMA) was signed into law in January 2011. It applies to sites and products under the jurisdiction of the US Food and Drug Administration (FDA) and is also extended to any foreign facilities that export to the USA.

Its aim is to take a proactive approach to the prevention of food safety issues, as opposed to a reactive one that merely seeks to minimise the impact of an issue that has already occurred. The Act is constantly evolving, with new rules coming into effect as they are approved by the FDA. In September 2016, for example, a final rule relating to good manufacturing practice with regard to preventive controls for human food was implemented.

This proactive approach is commonplace across the board of regulations, including the Food Safety System Certification FSSC 22000 in Europe. This standard defines the requirements for integrated processes that work together to control and minimise food safety hazards.

It has been recognised by The Global Food Safety Initiative (GFSI), whose mission is to 'provide continuous improvement in food safety management systems to ensure confidence in the delivery of safe food to consumers worldwide'.

Continuing the focus on prevention, Hazard Analysis and Critical Controls (HACCP), and Hazard Analysis and Risk-Based Preventive Controls (HARPC), are also prevalent. HACCP is a globally recognised standard, whereby an audit determines Critical Control Points (CCPs) on a production line where food safety risks – such as contaminants entering products – are identified.

Manufacturers can then implement the necessary 'control' – which is often a product inspection system such as an x-ray machine, metal detector, checkweigher or vision system. HARPC is a US standard that defines the plan manufacturers use to implement food safety plans. The collection and storage of data created as a result of food safety measures is required across the board, and can help to identify trends with regard to incidents on the line where contaminants are concerned or where packaging may be compromised, as well as to aid the swift tracking and tracing of a product should it need to be recalled.

This data can also be used to prove due diligence should a manufacturer be required to prove that all reasonable efforts were made to ensure the safety of a product before it continued along the supply chain.

Maximum productivity levels

When introducing any new process it is of course paramount that production line speeds are factored into the equation. Productivity is intrinsically linked to profits, therefore there can be no room for systems that hamper the smooth running of a manufacturing or processing operation.

Advanced product inspection systems are capable of high speed in-line inspection. This enables products to be scanned while in motion, meaning throughput speeds are not affected.

Items that are flagged as containing a physical contaminant or packaging defect can then be removed from the line before they are able to continue for further processing. This stops further value being added and can prevent damage to downstream equipment, which has the potential to cause unscheduled downtime.

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Flexibility is also important, given the multitude of products many manufacturers are producing. Systems designed to be integrated into existing lines are available on the market today, meaning disruption can be kept to an absolute minimum when it comes to installation. There is also flexibility with regard to options. Infeed and reject systems can be tailored to meet specific requirements, for example, and inspection systems are able to identify contaminants across a wide range of product sizes and shapes in various presentations – from bulk and loose flow, to packaged and pipelined items.

Intuitive software has been developed alongside advanced detection capabilities, enabling production runs to be set up quickly and efficiently with minimal input from operators. Removing the human element as much as possible reduces the risk of errors that can lead to lost productivity.

Maintenance is also important to consider when looking at contributing factors to production downtime. By working with a product inspection expert with a worldwide network of service engineers it is possible to schedule preventive maintenance at times that suit specific schedules. By maintaining systems and planning effectively, accurate results can be consistently achieved and manufacturers are far less likely to experience inefficiencies due to equipment issues.

Mitigating product recall risks

With regulations becoming stricter it is not surprising, perhaps, that product recalls are rising. However, by implementing advanced product inspection systems, the risk of a costly product recall can be drastically reduced. Indeed, even in the unlikely event of a product reaching the retail supply chain that contains a physical contaminant or incorrect label, manufacturers can be sure that every effort was made to prevent this from happening and can prove a case of due diligence based on the inspection data captured by the system's software.

Consumers have the power to damage a brand at their fingertips, with social media outlets enabling them to report a contaminated product or negative experience in just a few short clicks. If the situation should lead to a product recall, the cost associated can be catastrophic. Not only is there the outlay to recall the product in the first instance, it is also well documented that consumers will move away from a brand if aware of a recall and many will not return – even after the event is over.

Product recalls due to microbiological contamination issues frequently make the news headlines. Well defined hygiene standards in food production areas are essential if the risk of bacterial growth is to

be avoided. Harsh washdown regimes can be challenging for processing equipment and product inspection devices need to be designed to cope with the rigors of the day to day working environment. Systems are available with IP69K ingress protection ratings and are designed to have smooth sloping surfaces enabling water to run-off after cleaning. This also makes the systems easy and fast to clean, contributing to overall uptime.

Physical contamination

Physical contamination is where x-ray systems come into their own – as well as checking for a number of additional quality assurance elements simultaneously, such as component counts, open flaps, fill levels and product in-seal inspection. Metal fragments, calcified bone, glass shards and some plastic and rubber components can all be detected. Working with an expert systems provider will ensure manufacturers are able to select the best possible solution based on their individual requirements. Tests will be run on products and packaging before a recommendation is made, and experts will be on hand to ensure detection sensitivity levels are optimised.

Mislabelling is also a common cause of product recalls – particularly where allergens are concerned. Vision inspection

systems utilise cameras and software to capture images of a product and look for things such as print and label quality, which are of particular importance when it comes to ensuring the proper label is on a package.

A high quality vision inspection system can verify the correct label is present on a given package, and when networked together with other equipment can even automatically change inspection profiles when a product changeover is triggered.

In addition, a vision inspection system can be set to look for specific allergen declarations on a package, identifying not just the incorrect label, but any printing errors that may be present. An experienced vision system provider will be able to provide a system utilising the proper arrangement of cameras and lights to ensure reliable inspection results.

As with any set of rules, they are there to protect those that they apply to – in this instance manufacturers, brands and consumers. To deviate from the regulations can have severe consequences, therefore it is advisable to work with expert providers to ensure that compliance does not have any adverse effects on productivity, quality or safety. Systems are available that enable production lines to operate at full capacity while meeting all of the necessary requirements – it is simply a question of which combination will work best for a manufacturer's individual operation. ■