Achieve a higher level of food safety with Selectscan metal detection

New technology rapidly identifies the best detection frequency

Introduction

Food safety, product quality and brand protection are of foremost concern to food processors. Meeting the needs of consumers in a fast-paced market with increasing levels of uncertainty has underscored the importance of a smooth running and safe supply chain. It begins with the ability to efficiently and effectively ensure the quality and safety of food products entering the manufacturing line, including inspection for microbiological contaminants and foreign objects.

Rapid changes in supply requirements have great impact on processing lines in the short term and necessitate that food processors reconfigure or plan for greater flexibility in their inspection process. For example, one factor that could impact lines includes changes in package sizes as needs shift from large food service and institutional packages to at-home and single-serve packages.

The trend to shipping-friendly packaging, which was already underway as large consumer products companies strive for economical and ecological improvements, is expected to continue to provide lightweight yet strong packages for home delivery. Consumers may be slow to retreat from a stock-up mentality which could continue the trend toward seeking out "middle of the store," shelf-stable, economical food products. Some manufacturers have limited the number of stock keeping units (SKUs) they produce to reduce time-consuming product changeover, yet maintaining high throughput of selected product lines at the expense of consumer choice.

Arguably producers and consumers are benefiting from the compliance requirements of the Food Safety Modernization Act which went into effect in 2011. It drove a shift from reactive to proactive food safety measures. More

recently, software-based recordkeeping and traceability have become integral to many food safety programs. Equipment manufacturers have also addressed the need for modernized, faster and easier user interfaces as food manufacturers transition to more automation resulting in fewer skilled workers. It is expected that process improvements to ensure food safety will continue, with further innovation and greater discipline at every stage in the supply chain.

Food inspection technology manufacturers are responding with new inspection solutions to better detect metal foreign objects – the most common contaminant type – to help food processors achieve the detection parameters they need and to meet the increasing number of inspection compliance programs that retailers are requiring to do business with their suppliers.

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Food metal detection challenges

Historically, metal detection technology has been a workhorse for the food industry despite its well-known and inherent limitations. The core principle of operation for food metal detectors is that a transmitter excites a signal as food contaminated with metal transverses the aperture, in turn triggering a detection. In practice, the signal created by the food itself, known as product effect, can mimic a contaminant, necessitating that the detector be able to distinguish actual metal from product effect. Failure to distinguish the product from metal can result in costly false rejections or product escapes.

Additionally, food plant environments present their own challenges: moisture, vibrations and other environmental factors can interfere with accurate metal detector performance. The device must also log setup changes and store performance statistics for documentation as part of a larger, holistic view of a company's food safety program in the event of a problem.

The Selectscan solution

Selectscan technology enables food processors to have an easy way to rapidly identify the single best frequency for an application. It tunes out product effect and adapts results to account for temperature changes and electromagnetic interference. At the same time it provides documentation of results from each production run. It is a completely new and holistic approach.

Home meal delivery is among the trends driving single-serve and at-home package sizes.

In addition to meeting all of the stated requirements, Selectscan can find metal foreign objects up to 25% smaller in volume than previous single frequency technology.

Selectscan has many automated features that would otherwise require programming by a skilled operator or technician. Central to Selectscan is the Autolearn feature, which takes the guesswork out of optimizing detection performance. Using an intuitive, on-screen wizard, a user is guided through a streamlined setup that can be accomplished in minutes. The result is an operating frequency capable of detecting the smallest metal contaminants tailored to a specific application.

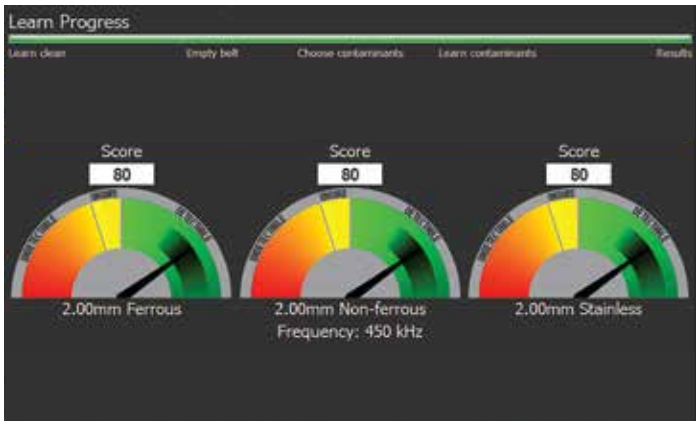
Uncontaminated food product is run through the aperture. Then ferrous, non-ferrous and stainless-steel metal spheres of the specified sizes used for audits, are simply added to the product and run through the aperture; the data is captured and processed. Based on the data, Autolearn will determine the best frequency of detection and automatically set all sensitivity parameters.

Additionally, a proprietary visual graphic scoring algorithm reveals how easily detectable each metal sphere will be during production. As shown in the next, the metal size, detectability score and best frequency are shown intuitively, so that the user can better understand their application. By adding more samples during Autolearn, the algorithm will be able to optimize setup with even greater accuracy, providing the user peace of mind that their product is as safe as possible.

Consider that in contrast setting up a traditional single fixed-frequency metal detector is time consuming and involves trial and error. It may take a skilled operator hours to tune and test the metal detector at each new frequency to determine if detection specifications are achievable. Arguably, the operator will trade off performance optimization for time.

Flexibility

Metal detector users know that different frequencies typically work better for different applications. Selectscan can detect across a full range of frequencies from 50 to 1000 kHz ensuring that the best frequency is selected for each application. Applications like potato chips or cheese may require a low frequency to tame the signal created by the conductive salt content, while a high frequency may work



Autolearn rapidly guides a user through product set-up to maximize operational efficiencies and detection performance, supporting improved plant efficiency.

best to detect stainless steel in a mineral-rich vegetable. When it comes to product inspection, there are seemingly endless application possibilities, but the flexibility of a Selectscan metal detector can cover them all. At the touch of a button, Selectscan seamlessly calls up a stored product file for frequent application changeovers. While Selectscan operates at one frequency at a time, each product file may utilize a unique optimized frequency.

Additional benefits

Selectscan includes other modern features that leading food safety plans demand. Designed with food safety in mind, an advanced feature set enables autonomous adjustments and provides traceability necessary for modern food safety plans. Phase tracking continually measures and adjusts the product phase to maintain performance while the composition of the product changes, such as a thawing frozen product, without the need for user intervention and costly line stoppages. Similarly, Auto Phase Relearn will re-sync product phase after a long break or large temperature change to avoid false rejection without needing to push a single button. Product statistics reveal the total numbers of accepted and rejected packs in an easy-to-read format that is organized by product, making future batch analysis easier and helping manufacturers improve efficiencies.

Because every application is unique, it is important to test actual food products for a specific application in a laboratory prior to instrument purchase. The best practice is that non-contaminated products are tested as well as packages containing ferrous, non-ferrous and stainless steel impurities. This will allow an accurate prediction of real-world performance and detection capabilities.

Selectscan's phase tracking adapts to thawing frozen products without requiring user intervention.

Conclusion

Advancements in foreign object detection technology are pushing the boundaries of detectable contaminant type and size in support of better food safety. At the same time, new solutions are responding to the need of food processors to more easily document and store records and make detection technology easier to use. As food manufacturers adapt to the new realities in food processing, product inspection manufacturers are developing solutions that are more flexible, help support productivity goals and can deliver a higher level of food safety for peace of mind and better brand protection. The best way to determine the right fit for an application is by having the manufacturer conduct a product test.

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Find out more at **thermofisher.com/selectscan**

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