

Assuring the safety of frozen foods during a global pandemic –and beyond

The safety and quality of food will always be a key concern of food manufacturers. Every year there are cases of foreign material contamination that lead to recalls and can compromise consumer safety. The fallout can be expensive and damage a food processor's brand. For these reasons, food manufacturers must keep their products safe, which requires proactive due diligence such as utilizing inspection equipment.

Metal detectors provide an effective line of defense by detecting ferrous, nonferrous, and stainless-steel metal contaminants in food. Used by food processing facilities for decades, metal detection is a tried-and-true inspection solution, but not without challenges and risks.

Some metal detection challenges are inherent: product effect, the signal seen by the metal detector due to the shape and characteristic of the food product, can be difficult to compensate, leading to missed contaminants or good product being erroneously scrapped. Set-up and tuning of a metal detector can be difficult to complete correctly, which can lead to sub-optimal performance if left unaddressed. But more recently, new inspection challenges have emerged as consumer behavioral changes drive a continuously evolving food processing landscape.

Food manufacturers must now more than ever choose agile processing solutions, including inspection for foreign objects, in response to changing market demands. This need for flexibility has become more evident in light of the COVID-19 pandemic, which has greatly impacted the global food supply chain.



Changing consumer behavior

The onset of the pandemic created a swift behavioral shift in the way people purchase and prepare food. Many were subject to stay-at-home orders or quarantine as fear spread about contracting the virus in public. As a result, consumers have been preparing more meals at home. That trend is expected to continue even as restrictions are lifted.

According to the American Frozen Food Institute¹, 90% of U.S. consumers are eating more meals at home, and more reached for frozen foods compared to pre-pandemic times. Reasons for purchasing frozen food include the long shelf-life, ability to stockpile in case of food shortages, and the ability to limit trips to the grocery store to avoid crowds. As a result of these behaviors, frozen food sales in the

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Source: American Frozen Food Institute¹

U.S. have nearly doubled. And a similar trend was observed outside the U.S., too, with frozen food sales increasing 45% in Italy, 42% in France, and 33% in the UK according to IRI². Following the initial frozen food purchasing surge, sales leveled out but remained heightened. It is expected that the uptick will continue for the foreseeable future.

A straightforward solution to the newfound demand for frozen foods would be to increase production to keep shelves stocked. Unfortunately, this isn't so simple. Food processing facilities are designed to optimize the use of floor space, meaning many pieces of equipment are often positioned closely together, necessitating the workforce to be in close quarters and therefore at an increased risk level for human-contacted virus transmission. At the onset of



the pandemic, some poultry and meat processing facilities became hotbeds of viral outbreak due to these risks. According to the U.S. Center for Disease Control and Prevention³, factors that contribute to risk of transmission include the distance between workers, how long the workers are in contact, how the workers come into contact, and sharing common spaces. Further adding to transmission risk, food processing facilities often employ a round-the-clock workforce with employees continuously rotating in and out of areas in the building and using the same equipment.

Adapting to meet challenges

Many food processing facilities are taking proactive measures to reduce risk. Among these measures are creating workplace controls, like frequently cleaning equipment and increasing sanitation for workers, or modifying workstations so that workers can stand at least 6 feet apart. Although these measures may improve defense against a viral outbreak, it may constrain food processing facilities from maximizing productivity. Even before the challenges created by the COVID-19 pandemic, demands for more efficiency and higher throughput pushed food processors and packagers to grow, a challenge that has been aggravated by the pandemic.

So, food processing facilities are turning to new methods to meet their quotas, such as the use of automated equipment. According to PMMI⁴, 52% of food processors want to install more automation. More automation arms food processing facilities to be more productive, so less time and labor is needed to accomplish a given task. It also lessens the amount of time employees must come in contact with a piece of equipment. Overall efficiency has never been more important.

Clearly, the challenges created by the pandemic have not only created a new demand for frozen foods, but exacerbated production challenges. Nonetheless, frozen food processors must trek forward producing food without compromising safety. Fortunately, new technologies make frozen food safety in a rapidly changing environment attainable.

New technology to meet inspection challenges

The Thermo Scientific™ Sentinel™ 1000 Selectscan metal detector is an example of these new technologies. It alleviates many of the aforementioned challenges by offering a high-performing, flexible contaminant detection solution. Selectscan, the latest metal detection technology, is the use of one fully-flexible frequency per product application ranging from 50 to 1000 kHz. By using a unique, optimized frequency for each product, a higher level of metal detection can be reached for all products because there is no need to compromise by choosing a single fixed frequency for all.

Setup is made easy with the all-new Autolearn feature, which guides the operator through product configuration using a step-by-step wizard, chooses the correct operating frequency, and optimizes phase and sensitivity settings. Using Autolearn, product setup is performed quickly and easily and provides peace of mind that the performance level of metal detection is maximized. In tandem, Autolearn and Selectscan technology result in less touch-time needed for setup and product changeovers. The work can be performed by less-skilled workers, enabling a high level of metal detection without necessitating that specially trained personnel be on hand to access the device at all times or make small adjustments. This flexibility makes physical distancing of personnel shortages less of an obstacle.

The Sentinel 1000 metal detector also has a rich feature set, including an advanced phase tracking feature particularly valuable to frozen food processors as product may thaw in a warmer environment. The Sentinel 1000 metal detector can automatically compensate small, gradual signal changes over time. By utilizing phase tracking, no manual



intervention is needed to re-tune the device. The unit will self-correct during thaw without warranting an operator to touch a single button.

Furthermore, the device itself is easy to clean and disinfect to prevent virus transmission through contact with the equipment. It features a resilient stainless-steel case, epoxy aperture liner, and plastic front panel together rated to the IP69K ingress protection standard. The design enables a repeated cleaning routine so as to lower risk of viral transmission without damaging the inner electronics and compromising performance over time.

The Sentinel 1000 metal detector tackles arguably the most challenging, and classic, metal detection challenge: product effect. Frozen foods typically run as “dry” products, lacking conductivity when frozen solid, as no moisture is present. Still, frozen foods will exhibit some product effect which must be minimized to ensure a high level of metal detection.

To demonstrate the efficacy of the Sentinel 1000 metal detector, a test was recently performed using frozen ready-to-eat meals containing steak, rice, gravy, and spiced fruit. The trays were run through a 250x125 mm aperture. Using the Autolearn feature, the Sentinel 1000 metal detector selected a 450 kHz operating frequency in less than 10

minutes of touch time. As a result, metals as low as 0.8 mm ferrous, 0.8 mm nonferrous, and 1.2 mm stainless steel diameter spheres were detected reliably, reaching a high level of food safety in a short period of time. And while 450 kHz worked well for this particular application, it's important to consider that a different frequency may work better for other frozen foods.

Since the Selectscan technology can detect at any frequency from 50 to 1000 kHz it can be used for a wide range of product effect compensation for any product. By dialing-in the best frequency for the application, small metal contaminants can be reliably detected that previously could not be found using a single-frequency device. The Sentinel 1000 metal detector is arguably the most powerful single-frequency metal detection solution available, hosting the features and flexibility needed to keep frozen food safe in the new normal – and beyond.

Sources

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