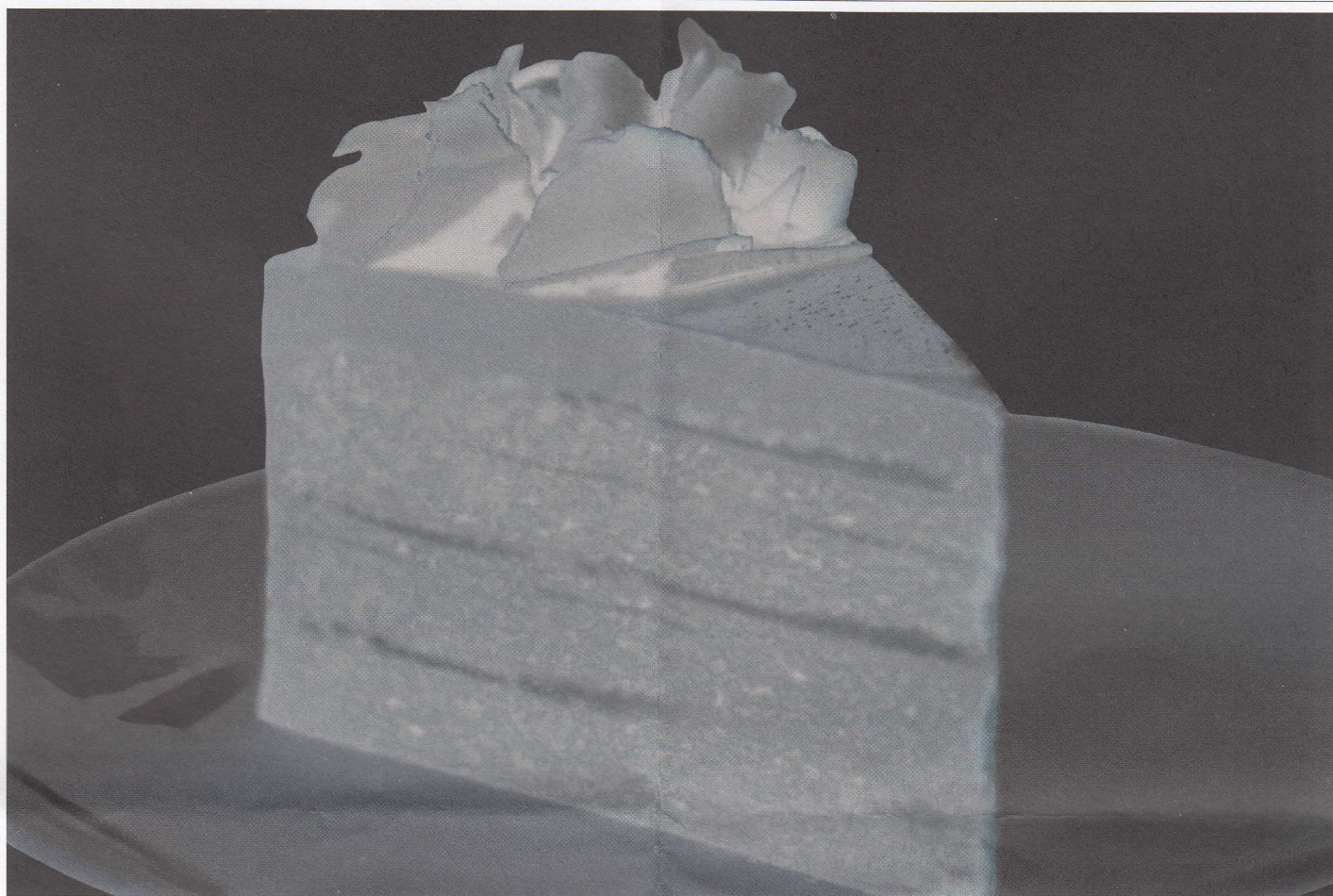


Metal Detector & X-ray



X-ray specs: watching out for contaminants

Detecting contaminants in baked goods protects a product's integrity, helps to avoid costly recalls and ensures legal compliance, so the systems used are becoming increasingly sophisticated

WRITTEN BY **Vince Bamford**

Last month, Addo Food Group recalled pastry products as a precautionary measure, highlighting the role that detection equipment can play in the baking industry.

Fifty-eight branded and own-label lines were pulled from stores because of potential contamination with small pieces of metal wire in part-processed pastry, the result of wear to a faulty drive belt. Although Addo said some of the metal may have been too small to be picked up by metal detectors, these and X-rays are a key line of defence for food manufacturers.

"Metal detection and X-ray inspection are the most commonly deployed technologies for preventing physical contamination in baked goods," explains

Paul Warfield, product inspection specialist at equipment supplier Mettler-Toledo.

While modern metal detection systems can spot ferrous and non-ferrous metals, X-ray systems can also detect non-metallic contaminants such as glass, mineral stone, calcified bone, high-density plastics, and rubber compounds.

When it comes to deciding whether to acquire a metal detection system, X-ray, or both, suppliers advise carrying out a Hazard Analysis and Critical Control Points (HACCP) audit, which will help identify the types and risks of contamination being introduced in your manufacturing process.

"Depending upon the contaminant's profile, if digested they may not be hazardous. However, if found, they highlight

Use detectors to satisfy retail demands

Paul Warfield, product inspection specialist at Mettler-Toledo, on the demands retailer audits make with regard to X-ray equipment

"Retailer specifications are as much about customer loyalty and cultural expectations as they are about the way the food looks and tastes. The product, the packaging and the process by which both are produced must demonstrate support for brand values, ranging from healthy eating and ethical sourcing to quality and price point.

"Product inspection technologies are responding in a number of ways. For example, the need for traceability from farm to fork is driving the development of more sophisticated, automated reporting capabilities that enable bakeries to supply the required data at a time and in a format compatible with retailer needs.

"Modern product inspection

systems are now capable of not only performing critical quality and integrity checks, but also assimilating data and analysing it to add value. Ethernet and Fieldbus connectivity make it easy for commercial bakeries to retrieve this data and generate reports to meet retailer audit requirements for traceability.

"Retailers have also developed crisis management procedures that define the role of suppliers within their contractual obligations. During normal operations, product inspection systems are strategically deployed to prevent contamination, uphold conformity, and check the correct information about ingredients and expiry dates is displayed on the labelling.

"But it is their ability to record events in real time that is invaluable in a crisis, ensuring critical data like batch codes and dispatch dates are readily available. Indeed, images from an X-ray system deployed immediately prior to dispatch can prove invaluable in demonstrating there were no foreign bodies in a pack when it left the bakery."



AIS X-ray ultra high-resolution X-ray system being used to detect 0.2 x 0.8mm stainless steel contaminant in a crumpet

Sophisticated approach

Equipment suppliers are meeting demand for increasingly sophisticated and sensitive X-ray detection equipment.

These include Advanced Inspection Services' AIS X-Ray Micron Scan, an ultra high-resolution sensor X-ray system designed to detect metal as small as 0.2mm and glass at 1.0mm.

If a manufacturer inspects a 15x15cm product with a standard food detection system, it would typically record 140,000 data points (the number of individual measurements), explains AIS. In contrast, the AIS X-Ray Micron Scan system achieves a resolution of nine million data points.

"This additional resolution provides detection of much smaller contaminants and is much less sensitive to the orientation and location of the foreign body within the product," says AIS founder Nigel King.

As ultra-high resolution sensor X-ray equipment currently cannot match the high speeds used on some production lines, this equipment is often deployed at near-line or offline locations.

Meanwhile, Mettler-Toledo has just launched the X34 X-ray system designed to detect very small contaminants in a wide range of small and medium-sized packaged products. It features a 100W 'Optimum Power' generator to maximise detection sensitivity, and a 0.4mm detector. These technologies ensure power and contrast levels are optimised for every product, says the supplier.

The X34 also features software enabling automated product set-up, which "removes the possibility of operator error and makes the X34 easier to use", says Mike Pipe, head of market and product management at Mettler-Toledo.

a quality issue," says Nigel King, founding owner of contamination prevention specialist Advanced Inspection Services. "This is still a major concern for brand owners as any contaminants are perceived as a lack of control in manufacturing procedures and quality assurance."

It is always advisable to conduct product testing to establish the most appropriate technology, advises Mettler-Toledo.

The effectiveness of inspection equipment depends on factors including the size, location and density of the contaminant, speed of the production line, and product packaging. The type of foodstuff is also a major factor.

"During the production of baked goods, raw and incoming materials such as milk,

gravy and fruit purees arrive in liquid, paste and slurry form, and are pumped through pipework systems before being mixed and blended," explains Warfield. "Detecting contaminants in such incoming materials early in the production process has many benefits. Liquid, paste and slurry products are often more homogenous and easier to inspect, and contaminants tend to be larger and easier to spot."

Unpackaged bulk products, such as flour, sugar, grains, cereals and pulses, can be examined for contaminants using equipment positioned over a horizontal conveyor or as the product falls under gravity conditions directly before processing or packaging.

Warfield adds that early detection can protect valuable processing equipment

from further damage downstream and eliminate contaminants before additional production value has been added, minimising waste.

Technological advances are helping bakeries meet particular challenges, with sophisticated software analysis rejecting false signals. Some systems use multiple beams to ensure there are no 'blind spots' when examining goods within complex packaging, says Mettler-Toledo. Equipment is also being developed that can identify very small contaminants (see above).

While neither metal detection nor X-ray inspection is infallible, they remain key to helping businesses prevent contamination and maintaining high levels of safety and consumer confidence.