# Solutions to physical contamination challenges in meat production

The pressure to provide safe food is at an all-time high. To avoid brands suffering from the consequences of a publicised product recall, meat and poultry processors must do their utmost to ensure that no foreign bodies are present.

**by Russell Morgan, Mettler-Toledo. www.mt.com**

More stringent food safety standards, increasingly vocal and proactive consumers, new food combinations and globalised supply chains are all contributing factors to rising product recall figures.

This article reveals seven ways in which product inspection technology can resolve physical contamination challenges during meat and poultry processing and packaging.

**The pressure on meat and poultry processors and brand owners to provide safe food is at an all-time high.**

## CHALLENGE 1: The source of contamination

Physical contamination can occur at various points during the production process: the start of the process, during production or at the packaging stage. If unchecked, contaminants can enter the production process at the outset – for example, calcified bone in stewing steak.

During processing, machinery can fail: a blade breaking while slicing salami portions, for instance. In addition, personal effects like pens or jewellery can fall into processing applications. Finally, flaws can occur in packaging, for example in the lid, sealing or capping process.

### ■ SOLUTION

*The point(s) in the process where food safety preventative measures must be applied to eliminate physical contamination are referred to as Critical Control Points (CCPs).*

*A Hazard Analysis Critical Control Point (HACCP) or Hazard Analysis and Risk-based Preventive Control (HARCP) audit will identify where CPPs need to be established.*

*Following this, meat and poultry processors will be able to ascertain the most appropriate contaminant detection technology to integrate. In some instances, both metal detection and x-ray inspection may need to be deployed at different production stages.*

## CHALLENGE 2: Types of physical contaminants

Depending upon the ingredients and manufacturing process, the most likely contaminants could be metal, mineral stone, calcified bone, dense plastics, rubber compounds or glass.

The challenge is deciding which inspection technology is best to detect the foreign body.

### ■ SOLUTION

*X-ray inspection technology detects all of the contaminants listed above, whereas metal detection specifically identifies ferrous and non-ferrous metals plus all grades of stainless steel.*

*The HACCP/HARCP audit will help shape the technology investment required, plus manufacturers can futureproof their investment by considering upcoming product lines and their potential contaminant materials.*

## CHALLENGE 3: Size and density

The product size and density can affect detection sensitivity levels. The more homogenous a product is, the easier it is for inspection technology to identify physical contaminants.

Challenges can occur if the foreign body has a similar or lower density to that of the inspected product, for example a shard within a glass dish of meat paté, or if it contains components of varying density, such as ready meals.

Larger products with a greater mass or high moisture content can also present a problem for some inspection technologies.

In these cases the product can create its own signal, which can make it difficult for metal detectors to differentiate between the product and metal contaminants.

### ■ SOLUTION

*Advancements in contaminant detection technology ensure that both x-ray and metal detection systems have high sensitivity levels to detect small contaminants in challenging applications. Some metal detectors utilise multiple frequencies simultaneously to cancel out the signal in 'wet' products like*

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**Advancements in product inspection technology ensure that contaminants in challenging applications, such as ready meals, can be detected reliably.**

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*raw meat. Meanwhile, advanced x-ray systems automatically adjust the amount of power needed to maximise the image contrast according to the product being inspected.*

## CHALLENGE 4: Packaging

The shape, size and material of the packaging can make product inspection challenging. For example, detecting metal contaminants in metalised film packs – such as those used to package pepperoni and other spicy meat products – can prove problematic. Unusual packaging shapes can create blind spots that further obscure the visual field of x-ray technology, resulting in reduced detection sensitivity levels.

Large, bulky packs need to be securely transported on the conveyor belt so they are stable when presented to the inspection technology.

### SOLUTION

*Consider the most appropriate detection, conveyor belts and guide rail solutions based on the packaging. X-ray inspection systems utilising horizontal, split, combination or angled beams can detect glass fragments in glass packaging.*

*Certain x-ray systems can also be configured to ensure that blind spots in complex packages can be checked for contamination. Metal detection technology, using Multi Simultaneous Frequency technology and Product Signal Suppression technology, detects metal in product effect applications and those products packaged in metalised film.*

## CHALLENGE 5: Production line speeds

Line speeds are increasing to meet production targets and consumer demands. Dry, granular products and liquids like gravy or soup can be particularly challenging to inspect on very fast production lines.

### SOLUTION

*Specific metal detectors and x-ray inspection systems are designed for liquid and bulk flow products. They can operate at high throughput rates and belt speeds, maintaining productivity levels. Using intelligent software, both technologies can pinpoint the exact location of the contaminant and securely reject it, with minimal product waste and no downtime.*

## CHALLENGE 6: Continuous optimisation

Inspection systems must operate at the correct sensitivity levels to ensure contaminants are detected and safely removed. However, incorrect set-up can result in higher false reject rates, increasing product waste and reducing production efficiency.

### SOLUTION

*Software innovation has enabled both x-ray systems and metal detectors to offer semi- or fully-automated product set-up routines. By reducing the possibility of human set-up errors, detection sensitivity levels are maximised: thereby reducing false reject rates and saving associated waste costs.*

*To meet food safety standards, detection sensitivity levels should be regularly tested using physical test samples. Both technologies offer performance verification testing to keep the inspection systems in peak condition.*

## CHALLENGE 7: Reporting and monitoring

During day-to-day operations, reporting is essential to meet food safety compliance needs, improve production KPIs and support overall equipment effectiveness. In the event of a product recall, inspection data is essential for meat product manufacturers to demonstrate that they have taken all the necessary precautions to avoid or minimise contamination risks.

### SOLUTION

*All inspection activities can be recorded in real-time. Manufacturers and processors can easily retrieve data to provide the necessary documentation to prove they have exercised due diligence and support food safety audit requirements. When utilising advanced software and a centralised network infrastructure, the inspection data can be used to enable traceability of products, and in the event of a food safety breach, retrieve them. By selecting the correct contaminant detection technology, meat and poultry manufacturers will be able to stay one step ahead of new food and packaging trends, achieve faster throughput rates and comply with food safety standards.* ■

To find out more please download the free whitepaper on Ensuring Food Safety: https://www.mt.com/gb/en/home/library/white-papers/product-inspection/contamination-in-food.html

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