No margin for error: the vital importance of meat product inspection

The meat and poultry industry in both Europe and Asia is expected to see steady increases in terms of production turnover in the years to come.

by Neil Giles, Marketing Communications Manager, Product Inspection Division, Mettler-Toledo, UK.
www.mt.com/pi

Example of glass contamination in a premium cut of beef.

According to recent figures, compiled by Mettler-Toledo, Asia Pacific will reach figures of over $460m by 2020, with Europe following at $350m. For manufacturers, profit margins remain notoriously tight in this industry, therefore producing significant volumes of product that is of a high quality and that is also compliant with food safety regulations is a daily challenge.

The meat processing industry is a typically harsh environment, and there are many elements to consider when putting together a product inspection programme. Food safety is of paramount importance of course, and meat processors will be subject to compliance with Hazard Analysis and Critical Control Point (HACCP) regulations.

An audit will be carried out to identify critical control points, at which product inspection systems are invariably placed in order to mitigate the risks outlined.

For meat processors, x-ray and metal detection systems are the most likely systems to be deployed.

In-line inspection

Once a manufacturer has identified the need for a product inspection system, the next challenge is to ensure that executing these inspection checks do not interfere with production.

Downtime is the enemy in any manufacturing environment, but when margins are slim it is even more important that lines are able to run unhindered.

This is where in-line inspection systems come into their own, as 100% of product is able to be inspected for contaminants without having to stop or decrease line speeds.

Where metal is identified as the main contamination risk, metal detectors are often positioned strategically on the line.

As meat is considered to be a wet product, the high moisture content can cause what is known as product effect – a phenomenon whereby the characteristics of the product itself can inhibit the equipment's ability to identify specific contaminants.

This can lead to a higher wastage level due to false rejects, particularly in products that are challenging to inspect – such as meat, poultry and seafood, for example.

Modern metal detectors available on the market today, such as the Profile Advantage from Mettler-Toledo Safeline, have been specifically designed to overcome product effect in challenging applications, ensuring wastage is kept to minimum and that profit margins are protected.

The ability to not only overcome product effect, but to also find smaller real life contaminants safeguards consumers and enhances brand protection.

X-ray systems are also often deployed on meat processing lines as they are capable of detecting a wide variety of contaminants in-line, such as calcified bone, glass, mineral stone, high density plastics and rubber and, of course, metal.

X-ray can be used in all applications for contaminant detection and is capable of highly accurate results at high speeds. Systems can often be found in bulk flow applications, pipeline systems and in the inspection of processed unpackaged and packaged products regardless if frozen, fresh or dried.

A wide range of benefits

Many may assume that product inspection systems have only one purpose – to detect contaminants – but there are many tasks that can be carried out simultaneously that can add value, improve productivity and improve product quality.

Checkweighers are often used to monitor completeness in packaged products. They are also able to interact directly with fillers, for example, to ensure regulatory compliance in areas such as weights and measures without wasting valuable product – either through giveaway or the need to rework. This additional quality assurance element adds value to manufacturers and their customers alike in terms of consistency.

X-ray systems are able to fulfil a wide range of tasks, such as checking packages for missing components or product defects such as holes or shape and edge defects. Packs of sausages are a good example of how these additional quality checks can be used to maximum effect. X-ray systems can also be used for mass measurement purposes, which is critical in applications such as fresh minced meat, for example.

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Other quality checks are also able to be performed simultaneously, such as fill level inspection and the identification of trapped product within the seal of a package to ensure safety and freshness of the product. As an example of how x-ray can boost product quality, the X39 system has the ability to check burger patties for contaminants, correct shape and also for any excess meat flakes on top of the burger that may have accumulated when they are frozen.

This last check is an important health and safety benefit that should be conveyed to buyers of frozen burger patties. In recent years, the excess flakes on a patty actually caught fire while being grilled, causing considerable damage to a restaurant facility.

Reject systems used in conjunction with product inspection systems can also be custom designed to suit a wide variety of applications. These provide a further level of protection against wastage as less good product is removed once a contaminant is identified on the line.

Conveyers will also be scrutinised ahead of installation to ensure there are no points in the inspection process where good product could potentially be lost and wasted.

Given the environment in which meat is processed and packaged, food safety regulations require very strict and often harsh wash-down to be carried out on all production line equipment.

Hygienic design is a must for meat

Compliance with food safety and quality standards such as BRC, IFS, FSSC 22000 or SQF is vital, therefore systems from Mettler-Toledo are designed to meet EHEDG (European Hygienic Engineering and Design Group) and NSF (National Sanitation Foundation) hygienic design guidelines.

This means that systems are easy to clean and are of full stainless steel construction. Surfaces are designed to be smooth, with no sharp angles, reducing the risk of harbourage of anything that could cause bacteria to build up.

Where appropriate, systems are also compliant with IP69 ingress protection ratings, meaning they can be washed down using high pressure washers and chemicals with no risk of damage to the electronics.

By installing a system that has been designed for use in a harsh environment, such as a meat processing plant, manufacturers can be assured that biological and chemical contamination risks are reduced, regulatory requirements are satisfied, and that the systems will stand the test of time due to the rugged design and construction.

In addition, systems from Mettler-Toledo are designed to be simple to clean to enable operators to reduce the amount of downtime associated with the process.

There are many different applications in the meat and poultry industry and it is vital to select the correct inspection systems based on both production and regulatory requirements.

For meat, product can be bulk flow, pipelined, unpackaged, packaged, cooked, raw, frozen, dried and everything in between. Whatever the product, when dealing with meat a HACCP audit will first take place to establish the critical control points. Then it is up to the business to ensure that those points are covered adequately and in a way that fits in with its overall quality control programme.

By working with an expert supplier of product inspection systems, manufacturers can be assured that the best possible solution can be found without exception.

Mettler-Toledo, for example, works in partnership with its customers to drill down into the true needs of a business ahead of suggesting an appropriate solution.

The company's ability to cover all of the bases in terms of technologies, and also to support those systems with a large network of expert support staff, has been instrumental in keeping its customers productive, protected and above all producing the very highest quality products. ■