Multi-everything solutions enter the world of meat inspection

Meat processors and manufacturers operate in a world of multi-platform, multi-sites, multi-brands, multi-revenue, and even multi-business models. The list goes on and on. It appears that the multi-everything world is the new norm. Now, this approach is infiltrating the food inspection process, with an endless list of multi-terms being thrown about.

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Fortress is the only known company to offer a multi-aperture, multi-lane metal detector configuration, with the ability to monitor performance remotely across multiple sites.

From multi-frequency to multi-memory, multi-lane to multi-critical control points, multi-heads to multi-aperture, food inspection machine suppliers are implementing the multi-everything philosophy.

So, how do you go about choosing a multi-solution that will best achieve its single purpose of protecting your brand integrity and mitigating the risk of potentially harmful metal contaminants entering the meat food chain and reaching consumers?

Choosing your multi-checkpoints

Metal, still the most likely contaminant in food processing, can find its way into meat products and ready meals in many ways, most commonly through the equipment used in processing and packing environments. Tiny pieces can shred off cutting blades or grinders, or faulty packaging machinery can discharge a small shard of metal. More often than not these are stainless steel.

HACCP guidance states that critical control points (CCPs) should be located at any step where hazards can be prevented, eliminated, or reduced to acceptable levels.

Food manufacturers will typically err on the side of caution, inserting more than one metal detector between the beginning and end of the production and packing process. The checkpoints should correspond to the identified CCPs, depending on the predominant risks.

When assessing the risks, cost of the product at each checkpoint needs to be factored in. If, for example, you pushed your inspection solely at the end of the line, any contamination will be caught at the most expensive part of the production process.

Whether you are slicing cooked meats, mincing beef or cutting raw meat into smaller portions, the use of knives and meshes are widespread in production and packing facilities. Discovering a fragment of metal in minced or sliced product before packing might cost a business a few hundred pounds. Imagine however a contaminated batch of minced beef being cooked in a ready meal? An entire product batch could be contaminated with much smaller, potentially unidentifiable fragments. Here, the expense of wasted product, a recall and potential penalty fine may run into tens of thousands of pounds.

Making sense of multi-frequency

In order to reduce metal contaminant risks it is essential to identify the optimum frequency for any product and set it to the right level for your specific meat application. There are generally three technology options – fixed frequency, multi-frequency and simultaneous frequency. Sometimes, the latter two options can be referred to as multi-spectrum. A machine with a fixed frequency is good if you are consistently inspecting the same product day in day out, such as a bag of chicken nuggets. Yet, there are limitations if your product range is more expansive. On multi-frequency metal detectors, which perform well on a range of products passing down the same production line, the machine will dial into a select menu of frequencies. However, the sensitivity and performance may be compromised, increasing the risk of metal contaminants going undetected.

With simultaneous frequency, two frequencies are operating at the same time, helping to deliver a higher performance. This technology, used on the Fortress Interceptor range, is more sensitive as you can hugely reduce the product effect, making it ideal for wet products that vary in size and density, like cuts of meat or whole chickens.

Selecting from multi-memory menu

Often pitched to customers as a way to increase speed and ease of set up, plus eliminate human error, food inspection

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metal detectors might feature automatic learning or pre-programmed settings. A machine equipped with multi-memory suggests that different products require different settings.

Rather than operatives learning these settings, they can be saved and selected from a menu. Yet, this would mean bypassing user-friendly features like automatic single pass learning and calibration, which can deliver accurate metal detection set-up within seconds.

Machinery with multi-heads

Widely used in weighing systems integrated with metal inspection systems, multi-head technology applies purely to the weighing element. This multi-head can be a real benefit for snack and loose product suppliers bagging free-flowing products, such as dried meat snacks, crisps and nuts. There can be as many as 20 heads, providing a high speed pack weigh and fill system.

Typically, a single metal detector, which will only have one inspection head, is fitted beneath the multi-head checkweigher chamber, usually in a gravity configuration. Both the metal detector and checkweigher will work as independent systems, although there may be some degree of integration, including a single user interface.

Multi-lane versus multi-aperture

High-speed, multi-line packing operations have a number of options when it comes to contaminant detection. Manufacturers can channel multiple lanes through a single, large metal detection aperture.

The clear drawback here is that the larger aperture size sacrifices valuable levels of sensitivity. In addition, any reject system will remove an entire line of product across all of the lanes being checked, resulting in higher volumes of false rejects, creating unnecessary waste.

Finding a metal contaminant in raw ingredients may cost a meat processor a few hundred pounds opposed to tens of thousands if recalling an entire batch of ready meals.

Of course, there is the option of positioning a separate metal detector over each lane. This will mean product is only ever rejected from one lane, but the approach has major impacts in terms of cost and space efficiency.

Many of today's food factories are working around legacy equipment and have severe spatial limitations; therefore compact design is often a prime consideration.

To save on space and total cost of ownership, Fortress offers an alternative multi-lane option using its multi-aperture technology. Installed already in two, three, four and even five lane configurations, it comprises separate lanes which travel through a single search head, enabling operators to inspect and independently auto reject packs across multiple lines without the need for individual detector heads or conveyor systems.

Because each aperture is smaller, the machine can realistically detect metal fragments as small as 0.8mm ferrous, 0.8mm non-ferrous and 1.2mm stainless steel, regardless of the number of lanes travelling through the unit. On five conveyors, end-users can save up to 50% of the space required by individual metal detectors, around 17% of the installation cost, and up to 65% of the total cost of ownership, taking into account reduced maintenance and parts requirements.

Making multi-everything work

When it comes to innovation, food factories are quick to adapt, particularly in relation to business models and systems that boost their governance credentials and lower operating costs. Managed well, multi-everything technology can boost operational effectiveness and make meat processors and food businesses more responsive. As testimony, Fortress recently launched its Remote Management Software (RMS), enabling customers to connect and view the performance of multiple food metal detector units from any portable device, using cutting edge machine-to-machine (M2M) communication.

By providing centralised control, food manufacturers can analyse machine performance across multi-sites and troubleshoot technology issues, without having to be physically in front of their

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