Choosing The Right Metal Detector: Customized Systems

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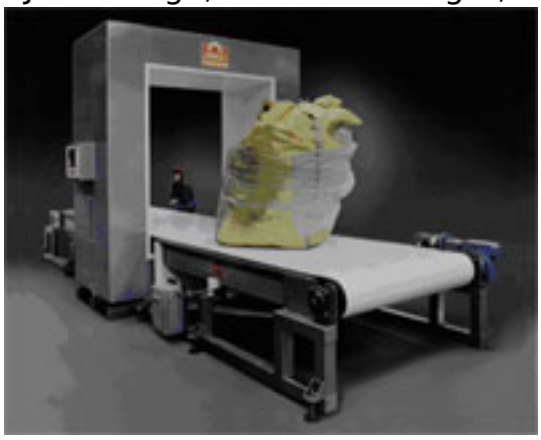

While many standard metal detection systems are designed to “pop into” an existing processing line, there are times when certain system components are requested for customization. The majority of custom components fall into the following categories: belt width and length, aperture size, alarm and reject device. Metal detector manufacturers can work with customers to incorporate these specialized components, but it requires some upfront planning and more lead time.

Belt width and length

The bulk of metal detector conveyor belts are available in 12, 18 and 24-inch widths and in lengths of 60, 72 and 84 inches, respectively. However, there are times when the dimensions of the product being scanned and the production operation itself requires a customized conveyor belt.

Some smaller packages, such as those found in the pharmaceutical and food processing industries, are better suited for conveyor belt widths less than 12 inches. In these instances, customers can request a belt width as narrow as 1-inch (depending on belt type) that would accommodate a standard size aperture.

On the opposite end, certain materials such as rubber slabs and fabrics are ideally suited for belt widths beyond 24 inches. These types of products can be transported to the aperture on conveyor belt widths up to and greater than 48 inches, provided there is sufficient clearance along the processing line.

Conveyor belts can also be custom-designed to a desired length that matches the processing operation. Metal detector manufacturers can incorporate belt lengths up to 10 feet and longer for those customers who cannot afford to stop their production line when contamination is found. A longer belt provides time for reject devices to pull the contaminated product from the line, especially significant when oversized packages are being scanned and processed. A stainless steel framed 30-foot long conveyor custom-built by Eriez can convey up to 2,600 pounds of material.

Another consideration for customization is the height of the belt off the floor. Standard belt height for the metal detector conveyor is 34 inches, plus or minus two inches. A customized conveyor belt height can be designed to accommodate the height of the in-feed and out-feed belt conveyors.

Still another consideration is the belt material. Standard belts are made from food grade polypropylene plastic chain, but custom belts can be produced using food grade fabric or PVC. Many bakery operations, for example, prefer the food grade fabric belt to meet FDA requirements and for easier processing of the baked goods as they pass through the metal detector aperture.

Aperture opening

The smallest *standard* size aperture opening is usually 8 inches high x 14 inches wide using a 12-inch wide conveyor belt. However, similar to belt widths and lengths, aperture sizes can also be customized to the specific product or package being scanned.

The metal detector can be built to match a specific belt width. For example, if a customer is using a 22-inch wide belt, the unit will be designed with a 24-inch wide aperture. Likewise, the aperture height can be built as low as 1.5 inches, while others are built more than 60 inches in height.

Alarms and reject devices

The most common alarm is a flashing beacon, activated by the metal detector output relay. A horn may also be used, with or without the beacon. Choosing the right alarm depends on the surrounding work environment and the proximity of operators to the metal detector. If the work environment emits high noise levels, a flashing beacon is the best way to attract an operator's attention.

Other commonly used alarm devices are flag drop markers and paint spray markers. In most cases, the alarm device is used together with a reject device, or at least with an interconnection that halts the feed to the metal detector. All options are available upon request by the customer.

Choosing the correct reject device involves more planning and knowledge of personnel and the processing operation. Manual rejection is the simplest reject device. Contaminated material that is fed to the detector is simply removed manually from the product stream when the detection alarm is activated and the conveyor belt or product flow is stopped. Manual removal requires an operator to be stationed continuously at the metal detector or close by.

Since many companies have automated product lines, they require automatic reject devices to physically remove the contaminated product without operator intervention. These are activated by timed relays in the metal detector and include retracting conveyor head pulleys, pusher arms, air blast, trap doors, diverter valves and others.

Choosing to customize a metal detector system with a specific reject device depends on the nature of the application and the product being scanned. Pusher arms are mounted to the side of the conveyor and are ideal for removing contaminated packaged goods from a conveyor. The spacing between the packages must be considered when designing this reject device.

An air blast operates similar to that of a pusher arm. Rather than pushing the contaminated product off the line, it is removed from the conveyor by a blast of air and blown into a catch bin. This type of reject mechanism is perfect for lightweight products and requires no moving metal parts, enabling it to be positioned closer to the metal detector.

A diverter arm swings out across the width of the conveyor belt to guide contaminated product to a reject lane or bin for disposal. Bulk materials, heavy packages and fragile products that are not easily pushed but still need a gentle reject are best suited for diverter arms.

Customized metal detectors need customer input

Designing a customized metal detection system is only as good as the initial information received from the customer. Metal detector manufacturers such as Eriez take information from plant operators, facilities managers and other company representatives before deciding which customized components to design and build into the metal detection system.

This information includes drawings or photos of the processing equipment showing the conveyor line, dimensions of the area where the metal detection system will be installed and the physical properties of the product being scanned. Product samples, which can be tested and scanned, also help to determine the best components, as well as application data.

No two metal detection conveyor systems are identical. However, when specified properly, they can serve an integral role toward adding value and efficiency to any production line.

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