Sweet success in candy conductivity challenge

One of the biggest challenges when using metal detectors to inspect food for contaminants has long been ‘product effect’. It occurs when a product has a conductive property, such as high moisture or mineral content, which affects the magnetic field generated by the metal detector. Candy wrapped in metallized film is especially vulnerable to this phenomenon.

To help conquer this product effect, Fortress Technology launched the Interceptor range.

What causes this product effect in a seemingly dry confectionery product, such as cookies, chocolate bars or candies? It’s all linked to the extensiveness of a product range. Candy is sold in so many different formats. Ranging from miniature to family sized chocolate bars, to hardboiled sweets, fondants and jellies. This means that even similar products have high variations in density. Because of this, the aperture size of the metal detector is vitally important, as the smaller the aperture the more sensitive the metal detector is.

For metallized film, which is made up on aluminum dots on film, density creates an added challenge, with the product effect changing according to the format and quality. It’s not so much of an issue for manufacturers producing a small range of candy bars, but those manufacturing and packing an extensive range using multiple types of wrappers, the metal detectors sensitivity is usually set to the worse case wrapper scenario. To further complicate matters, orientation effect may also need to be considered, especially with sealed packs, such as gum, as this creates a dense line of metallized dots.

Very often, sweet manufacturers inspect sugar-based products when in ‘rope’ format using small, high performance metal detectors. Here, the sensitivity levels are extremely high and looking for extremely small metal fragments.

Originally designed for a bakery production facility, the Interceptor can be deployed on numerous checkpoints. Fortress Technology advises confectionery producers to consider installing metal detectors at specific checkpoints along the manufacturing process. For example, on a vertex machine that’s inspecting raw ingredients, such as sugar, on a pipeline machine that is processing liquid and semi-liquid product like melted chocolate, and then later down the line in the packing section.

Rather than tuning into specific frequencies, the Interceptor splits and simultaneously analyzes the low-frequency and high-frequency signal. This means the metal detector can clearly differentiate between the signal generated by the product effect and any metal contaminant.

The result is a more reliable and accurate reading regardless of size, shape and orientation of metal particles and an improvement in detection capabilities of up to 100% with stainless steel, especially when inspecting traditionally difficult “conductive” products or using metalized film during processing. In real terms, halving the test sample sphere size to 0.5mm equates to picking up a wire length contaminant of 25mm.

As well as protecting brand reputation, candy manufacturers are under equal pressure to reduce – or eliminate – false rejects. These can add up to exorbitant sums of money and primarily occur when a metal detector cannot discriminate between ‘product effect’ and a metal contaminant. Equally, the time spent checking the performance of equipment and investigating false rejects are bound to impact line productivity and OEE.

Take the example of sweet multi-packs. Inspecting at the end of the line when there are multiple products in the pack will increase waste considerably.
For ease of use, the Interceptor learns and recalls the signature of any given product with just one pass. FM Software is integrated, bringing a predictive element to the analysis of signals from the metal detector.

Customers can choose either Wi-Fi or Ethernet connections for easy and accurate data collection. To reduce the risk of human error when manually testing the performance of the detection system, Halo automatic testing can be added.

Images

A number of issues can occur when inspecting candy wrapped in metallized film, particularly multi-packs, with the Interceptor model can address.

Detection checkpoints are advisable at all critical stages of production.

In real terms a 0.5mm change in test sample sphere size equates to 25mm in wire length.

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