In Search of Metal Particles

Solid Protection for the Whole Production Line

The Vistus metal detector is available in various versions and can be used for testing raw ingredients as well as the final product at the end of production. Today the food retail industry requires its suppliers to monitor the entire process chain to avoid contamination. The Vistus metal detector covers a broad range of applications and detects metallic contamination quickly and safely. Despite the high detection sensitivity, Vistus devices also have a robust side. Regardless of whether the metal detector is used in a wet or dry area, it can withstand cleaning with a high pressure washer.

Metal contamination is not just dangerous for consumers but it also represents an incalculable liability risk for food manufacturers. A single contaminated product can lead to health problems and cause long-term damage to a company’s image. This is the reason why stringent quality control has been pushed right to the top of the agenda for food manufacturers in recent years. Metallic contamination is under particular scrutiny. Undetected foreign bodies in the production process frequently lead to high downtime expenses. These are often less to do with any repairs required, but rather with production cancellations. Metal contamination can occur through wear, abrasion or splintering of processing machines, carelessness by production employees or maintenance work on the process machinery. Even raw materials delivered to the company and the packaging at the end of the production process must be checked for foreign particles.

By detecting and rejecting contaminated products in time, faulty batches and therefore substantial expense can be avoided. Alongside the metal detecting device there are therefore also solutions for monitoring and safely removing contaminated products from the system, which help form the best system possible. The provision of complete and automatically recorded production data, such as results of test procedures with time, result and product name, detailed information of metal detects incl. time, date, batch, total count of contaminants, etc. is a matter of course.

In February 2011 Sartorius Mechatronics launched the Vistus metal detector worldwide. It has sparked widespread interest, especially in the food and pharmaceutical industries. Osman Antikoglu has worked in Marketing and Product Management for metal detection, X-ray inspection systems and checkweighers at Sartorius Mechatronics for the last four years.

Ian Healey asked him to explain what is important in metal detection technology today.

_FMT: How big a problem is metal in foods? Where does it come from?_

_Antikoglou: If the contaminants are not detected it could be a major problem. The current standards according to the HACCP principles determine checks where necessary. This is sensible, especially in questions of liability.

The contaminants can be due to wear and tear of equipment, abraded particles from processing machines, but also inattentiveness on the part of operators (jewellery, hair clips, etc.) or during maintenance (screws, bolts). The metal detectors protect consumers, of course, but also machines and processes downstream.

_FMT: What size particles can be found?_

_Antikoglou: This is more a question of the product which has to be inspected. The signal detected by a metal detector is always made up of the product signal (product effect) and the signal of the metal contamination.

Each product on the processing line, such as chocolate, cheese, frozen foods or yoghurt, has a different level of conductivity. In order to reject contaminated packages these product effects have to be learned by the metal detector. Depending on the product effects a threshold level is chosen by the metal detector. As products pass through the
Monitoring of critical points

The food industry uses process control points, established in accordance with the HACCP (Hazard Analysis and Critical Control Points) control regulations, as a basis for checking products for metal contamination. There are many quality and safety standards based on the HACCP principle, for example, IFS (International Food Standards) and BRC (British Retailer Consortium). To maintain these standards Sartorius offers various metal detectors, ranging from the cost-effective MDE line (economy metal detector) and a special solution designed for aluminized packaging (Observer), through to the newly introduced premium Vistus line.

The Vistus series achieves the highest level of detection accuracy and reliability thanks to the use of top quality components and a very wide frequency spectrum. The new metal detector therefore offers a choice of up to three frequencies within the range of 60-1000 KHz and so the low, middle and high frequency ranges can be used with one device. This means the metal detector can be very easily adapted to a wide variety of product properties and can achieve a very high sensitivity level for all magnetic and non-magnetic metals. Consequently frozen products can be tested just as reliably as cheese for example. Furthermore Vistus is able to analyze products automatically and save the required parameters. This makes it quick to switch between products during production.

Lots of variety

There are several versions of Vistus metal detectors available: from coils with rectangular apertures only a few centimeters or many meters wide to special detectors designed to test individual tablets. Vistus metal detectors are available with an optional, reduced metal-free zone. This applies both to rectangular and round apertures. Among other things, the reduced, metal-free zone is achieved by modifying the way the coil is wound. This modification creates a counter field to the primary field of the metal detector, thus limiting the electromagnetic field of the metal detector. This provides many advantages, especially when dealing with limited installation spaces, as is often the case with discharge chute systems.

Optimized user surfaces

Whether an administrator, person responsible for quality or maintenance, technician or user on the product line, all user groups place individual requirements on the operating system of a device. Vistus offers specific interfaces for various user groups and thereby reduces complexity during use. These were developed together with the →

metal detector, they are compared with the threshold level and rejected if they exceed it.

FMT: What products can be tested?
Antikoglu: In the food industry mostly packaged products are tested, such as cheese, chocolate, cookies, yoghurts, etc. But all kinds of dry and wet products are possible. Incoming raw materials are often in powder form.

FMT: What data is recorded?
Antikoglu: All relevant data like results of test procedures with time, result and product name, detailed information of metal detectors incl. time, date, batch, total count of contaminants. This tracking system is ever more important in the industry today. Sometimes you have to prove that a product was good, and not only that it wasn’t bad. All modern transmission methods are used, including the SPC@Inline software programs.

USB ports for data transfer and with print options are also available.

FMT: What other advantages are there to the new Vistus metal detector?
Antikoglu: There are several improvements and benefits. The whole electronics system has been reworked and updated. This means that the detection sensitivity is significantly improved, particularly for products with a high product effect. In addition various filters increase resistance to interference.

The 5.7” Touch Screen display can now be accessed at five different technical levels, from administrator through to basic operator and even in different languages, which can be personalized to the user and recalled by individual password login.

Up to four individual detectors can be controlled by one operator at a single display panel. That is unique to Vistus. In each individual Vistus machine, up to 200 products can be defined; these may be sacks of flour or individual chocolate bars.

The Vistus metal detector also has the advantage of needing very little space – the reduced metal-free zone – and not disturbing the production line.

FMT: So HACCP and other standards are insisting on the use of metal detectors and you have a top quality product. How has this been received by the market?
Antikoglu: The launch was very successful. We are glad to help offer maximum protection for consumers and manufacturers, whilst meeting the requirements of modern production lines and at a very competitive price.

FMT: Thank you Mr. Antikoglu for your time and help in explaining the details of metal detection technology.
Center for Human-Machine Interaction (ZMMI) in Kaiserslautern, Germany. Each user must log in with a password to access the system and their user-specific settings. These can include, among other things, touch screen settings as well as the language used for the device. This is a great advantage, for example, in the American market, because here metal detectors are used by people with varying native languages.

With the Vistus series, it is also possible to use up to three further devices through a master device. The relevant metal detector can be selected through the master, its status can be established or it can be fully operated. This allows remote and unlimited operation of any metal detector in the network. Especially in areas that are hard to access, this makes it possible to utilize the advantages of multi-head connections. Whether used in a wet or dry area, the devices can be cleaned with high pressure cleaners. Designs with reduced metal-free zones are available for both rectangular and round apertures.

Key No. 75698