

The big cheese

By Ellen Fussell Policastro



Variable-frequency metal detector puts cheese packager on quality track

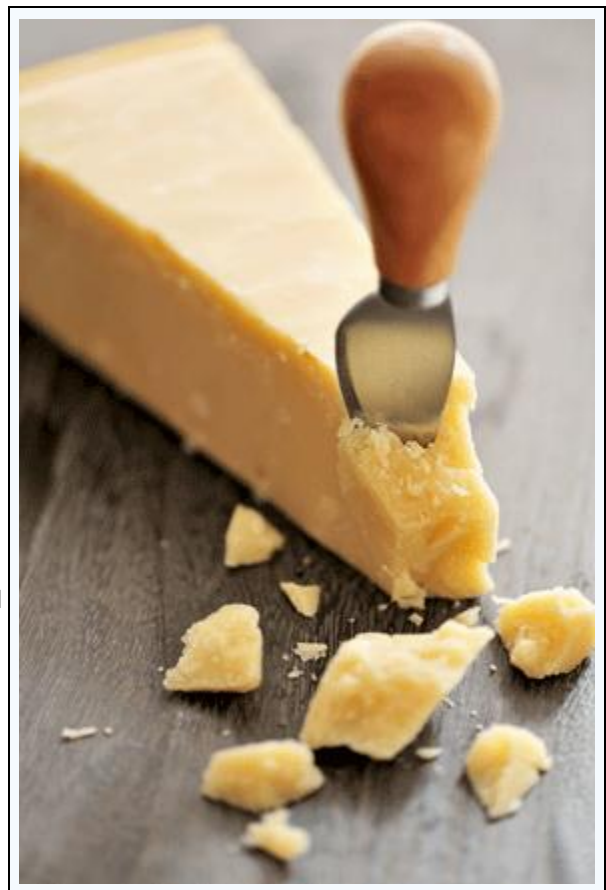
When Bill Stuart and a few fellow cheese aficionados in Monroe, Wisc., ventured out to form their own cheese packaging business in 2005, the result was Alpine Slicing & Cheese Conversion. The company provides slicing, cutting, and packaging services to cheese producers nationwide.

One crucial part of the slicing and dicing process is to make sure no metal ends up in the final cheese product. The team has since built more flexibility into their processes with variable-frequency metal detection, taking their quality control to new levels.

Alpine converts bulk cheese from different cheese plants into slices, chunks, and shreds. The end result usually ranges from an 8-ounce chunk, wedge, or package of slices to a 5-pound deli piece. The company converts all natural cheese products, including organic and kosher. To wrap the cheese, Alpine typically uses polyethylene-based structures on a wide range of packaging equipment, including vacuum, gas flushing, and (horizontal and vertical) form-fill-seal.

Pedal to the metal

Because Alpine was building a new operation from scratch, it was the perfect time to choose flexible equipment that would deliver the performance they were looking for. Historically, metal detectors operated on a single frequency, calibrated to specific product characteristics. With the introduction of two- and three-frequency units, those capabilities expanded, but sometimes results showed compromised statistics. But when the team found a variable-frequency metal detector, they knew it was just the thing to help the company raise its quality control.



“We run a combined total of 78 different products and sizes through our metal detector,” said Bill Stuart, Alpine’s plant manager. “Before variable frequency came along, you’d have to set the metal detector at a compromise point that would work for your products across the board,” he said.

Because Stuart’s team converts cheese from other vendors into consumer-sized pieces, the product goes through cheese cutters and slicers, so it is important to detect any metal in the shavings. “We use the metal detector at the end of the process to make sure there is no metal found in the make process or in the process of slicing or chunking,” he said.

Variable frequencies get specific

The variable-frequency metal detector gives users dramatic choice in the way they can use a metal detector, said Don Hannes, regional sales manager at Loma Systems Inc., a manufacturer of metal detection, check-weighing, X-ray inspection, temperature measurement, and management information systems out of Carol Stream, Ill.

The detector analyzes product affect (temperature, moisture, salt content, speed, packaging material, etc.), reviews a broad band of frequencies, and offers the right one for the specific application within seconds. The automatic calibrate/learn process of the metal detector analyzes the product characteristics through multiple product passes. “Through the learn process, the metal detector learns the product signature and its product signal as the means to identify it, and differentiates metal-free product from metal-contaminated product,” Hannes said. It also can differentiate unnoticed and unwanted product changes. “Dependent on the value of the product effect signal it analyzes, the detector will choose the frequency that is sound/optimal for the product. At any frequency setting, when a new product is analyzed and the product effect signal is too high, the detector will automatically reduce the frequency setting appropriately to establish the sweet spot for smallest metal detection,” he said.

“More and more companies won’t do business with you if you don’t have metal detectors,” Stuart said. “We need variable-frequency detectors because we deal with all different kinds, shapes, and sizes of cheese. In our business we’re not running one product all the time, we change to different products, and the variable frequency gives us flexibility to do that. If you ran an 8-ounce cheddar piece through, the machine would be calibrated to that. But because it’s variable frequency, you can have it programmed for a 2-pound piece of mozzarella. A lot of times, metal detectors are set for one size and type, but the variable frequency gives you the option to run multiple sizes and shapes,” Stuart said.

Forget fixed-factory settings

Most metal detectors are sold with a single fixed factory setting that is manufacturer determined through their history and experience. Even with two or three frequency settings to address some end-user product variations,

the user is still limited. But users now have the additional facet of frequency choice at their disposal to program the metal detector for the product, Hannes said.

The continuing challenge from the market is to obtain smaller metal detection with technological advances, Hannes said. Users can now have 70 established frequency values in the software. "All previous required parameters for correct set-up of the metal detector for the product remain the same. The added parameter is the user's ability to have the metal detector choose the optimal operating frequency for the product, rather than a suitable, but perhaps not optimal, factory-chosen frequency."

Hazard analysis help

The new variable-frequency metal detector takes things to an even higher level by offering Stuart's team sensitivity and stability. The ability to detect small particles accurately has really improved with the new equipment, Stuart said. "It's just one more tool for us to meet our HACCP requirements."

Hazard analysis and critical control points (HACCP) can see use in food manufacturing sites to keep food as safe as possible. There are seven guiding principles to a sound HACCP program, Hannes said. "Each individual food manufacturer develops a specific HACCP program suitable to their overall process. The food processor will determine the metal detection standards to employ for finished product or in-process product inspection. Generally, the metal standards used reflect the technological capability of the metal detector manufacturing industry."

Case, coil offer choice

The detector's capabilities are a result of the latest in case and coil geometry, which deliver immunity from vibration, electrical interference, and thermal shock. Instead of a rectangular shape, the case design has a formed top and bottom with additional bends that increase the rigidity of the metal form. "Using an energized three-coil arrangement creates the electromagnetic field of inspection," Hannes said. "The coil design is what allows a true variable frequency metal detector with 70 choices, instead of two or three."

Users usually want a metal detector to provide the smallest metal detection possible and to do it with zero false positives," Hannes said. Having so many variable frequencies enables increased stability, which means fewer false positives. A false positive is a reject signal that occurs when detectable metal is not present in the food item. It can occur when product characteristics change, "such as when expected frozen product is not frozen, or the metal detector has not learned the new product being inspected," Hannes said. "The unfrozen product will exhibit a vastly different product signature and a product effect signal that will exceed the detection threshold of the metal detector."

HMI serves diverse work culture

Stuart said his team is more productive with the HMI capabilities the detector offers—a language-based interface with multiple choices and user ID options with varying levels of security access. A graphics-driven touch screen simplifies communication and operation issues in a culturally diverse workforce that speaks multiple primary languages. “The touch screen is employ friendly,” Stuart said. “Before it was very elaborate to set up, but now you can just enter in the program you need,” he said.

“We don’t need the frustration of a new piece of equipment not working. But the installation of these machines was flawless,” Stuart said.

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Metal detection across industries

Food companies worldwide use metal detection to ensure the safety of their food items. Metal detectors also see use in glove, clothing, and sport-shoe manufacturers to ensure sewing needles are not left in the products when they leave the plant. Some technology will detect sewing needles and overlook the presence of other metal ornaments on the clothing, such as zippers, metal buttons, or snaps. The wood industry has used metal detectors to ensure nail-free logs prior to sawing into boards, preventing high-speed saw or planer blade damage. Plastic bag manufacturers have used metal detection in a reverse-detection manner to ensure the presence of the wire twist tie bundle in the package.

Producers of paper products use metal detection to ensure tramp metal is not in the packaging for food items. “If it were, that would cause a reject action in the food plant when the food product is safe, and it was actually the packaging that caused the reject,” said Don Hannes, regional sales manager at Loma Systems Inc. in Carol Stream, Ill.

The alternative wood pellet heating industry, ethanol, and biodiesel industries can use metal detection to prevent contaminant metal from getting into their processes, potentially damaging grinders or greater machine breakage. Commercial laundries servicing the healthcare industry use metal detectors to search for medical sharps prior to personal handling and sorting.