

## Packaging Inspection Equipment

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By JOANNA COSGROVE

### **The right equipment not only preserves beverage purity but also can improve production line efficiencies**

For as long as there have been commercially produced beverages, there have been half-baked urban legends about sinister items like syringes and other unsavory things supposedly lurking inside beverage containers. Given the level of sophistication delivered by modern beverage inspection equipment, the odds of a mass produced beverage containing foreign matter is highly unlikely. But that's not to say the equipment doesn't have its work cut out for it.

Even transparent plastic packaging poses unique challenges in terms of inspection quality control, says Rick Reardon, product line manager, Teledyne TapTone, North Falmouth, Mass. "Packagers are faced with new and sometimes challenging applications such as liquid nitrogen (LN2) dosing containers at high production speeds. Hot filling plastic beverage containers or introducing a new cap or closure can also create special challenges for beverage manufacturers who traditionally packaged in glass," he says. "Quality control has become an issue we find many packagers are grappling with and leak detection in plastic containers has become a priority."

Teledyne TapTone's series of inspection systems are designed specifically to address the issue of leak detection in pressurized and non-pressurized plastic containers at full production speeds.

Designed with dual parallel chains suspended over an existing conveying system, the T1000 Dual Sensor Compression system detects micro leaks in non-pressurized plastic containers. As the container passes through the system, the dual parallel belts apply force to the sidewall of the container. This action compresses the headspace of the container, which allows a comparative measurement to be taken at both the infeed and the discharge of the system. Comparing the container to its reading at the infeed and discharge eliminates variations that can occur in the production environment.

The TapTone T1000 Force system detects leaks and low LN2 in flexible plastic bottles as well as low pressure in plastic carbonated beverage bottles and aluminum cans. Parallel belts transport the container past a load cell that measures the tension on the sidewall of the container. This action allows the system to measure the pressure inside the container and automatically reject all bottles that fall below or above the acceptable pressure range.

When "gremlins" plague a packaging line and threaten to compromise efficiencies, manufacturers can also turn to a video recording of the production line to determine the root cause of quality and production issues, says Jim Dechman, president and chief executive officer, Monitoring Technology Corp. (MTC), Fairfax, Va. "It's good to catch an issue before it ships to the consumer, but it is better to fix the problem permanently so it doesn't happen again," he says.

MTC's 20/20 Hindsight(gigE) transforms the notion of high-speed video into plug-and-play industrial device. Its gigabyte Ethernet (gigE) technology supports recording speeds in excess of 2,000-3,000 frames per second. The unit keeps hours of video in memory, allowing a bottler to point a camera at a suspected problem area and easily replay video after the next issue occurs.

### **Countering label mishaps**

Rogue cans — or mixed labels that could, for example, result in a sugared drink in a diet drink can or an alcohol drink in a soft drink can — have been a problem for years. However, recent changes in the neck diameter in the beverage can industry have led to a sharp increase in mixed label occurrences, says Bud Patel, vice president of business development at Applied Vision, Akron, Ohio. "With the need to shave cost from the cans, manufacturers are driving to standardize the 202 neck size," he says. "This increases the probability for mixed labels, since now all beer and beverage cans will be manufactured and filled with the same equipment."

There are currently a number of solutions in the marketplace to perform rogue can detection. These solutions work well when there is a clear distinction between two different cans but leave a lot to be desired when it comes to differentiating between similar labels or when decoration processes drift slightly in color.

In response to industry demand for a reliable mixed label inspection solution, Applied Vision developed a Mixed Label Inspection (MLI) system. During a two-month evaluation period conducted by two major can manufacturers, the system inspected about two million cans per day and detected all deliberately mixed label introductions with a negligible false reject rate.

Termed a self-learning system, MLI first learns the normal color and/or brightness variations of the production run, which builds a resistance to false rejects. Secondly, it self-learns during label changes. "When a new set of labels begins to pass by the Applied Vision system, it automatically learns what they look like and continues its mixed label detection on the new label," Patel says. This allows the system to run reliably without any operator intervention."

Quality, as it relates to container integrity as well as product quality, is paramount, comments Rick Cash, marketing technology manager at Thermo Electron Corp's Process Instruments division, a Minneapolis-based manufacturer of inspection solutions for both raw materials and finished products. "The beverage product has to be high quality and the container has to ensure the beverage retains the initial quality all the way to the consumer."

Looking forward, Cash sees the influence of new technology enabling beverage producers to maintain or improve quality with greater cost efficiency. "Our strategy is to transfer our considerable laboratory knowledge and technology to the production line, which will enable beverage producers to improve their process through direct quality measurements," he says. "In-line measurement also helps beverage manufacturers increase the productivity of their lab personnel by eliminating the need to do repetitive off-line tests."

Thermo Electron soon will release its new CrystalVision sensor for dissolved carbon dioxide, which uses mid-infrared light to measure carbonation within the beverage process stream. With no moving parts or consumables, the sensor continuously processes data and has the ability to measure true carbon dioxide. "Current methods of measurement are either manual sampling, systems that are affected by influences such as dissolved oxygen, or alcohol, brix and specific gravity, which must be factored out of the data analysis," Cash notes. "Carbonated beverage producers have told us the importance of accurate CO2 control, as it influences taste, drinkability, product waste and package storage. All of these metrics directly lead to the bottom line." BI