

ServoBelt Rotary Has The Right Moves For Bottle Inspection

Avid Corporation makes good use of ServoBelt Rotary's large through-hole and easy installation in a unique vision inspection system for the packaging industry.



In bottle manufacturing operations, inspection is about more than just quality control. It's also a matter of productivity since technicians can spend hours collecting bottle weight and dimensional data to ensure that molding machines and tooling are running properly. Avid Corporation has been making that quality data a lot easier to collect for more than two decades.

The company builds a variety of automated and semi-automated vision inspection systems that increase the throughput and accuracy of quality operations. Some of these systems measure bottle wall thicknesses, neck profiles and weights. Others automate the volumetric measurements that help establish and monitor optimal fill heights. Still other systems inspect the dimensional parameters and weights of pre-forms, the plastic "blanks" that are blown up into bottles.

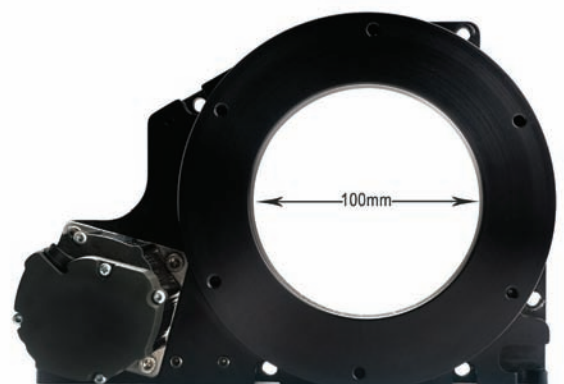
The gain in inspection productivity associated with Avid's systems can be dramatic. Jonathan Strater, the company's co-founder and president, estimates that measuring the output from a modern high-cavitation preform tool can take up to five days by hand.

Avid's most highly automated systems, which feature integrated conveyors and pick-and-place capabilities, can do the job in about six hours. "Just fire it up and forget it," says Strater.

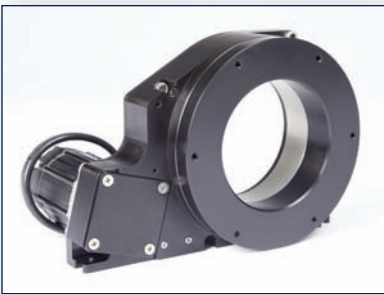
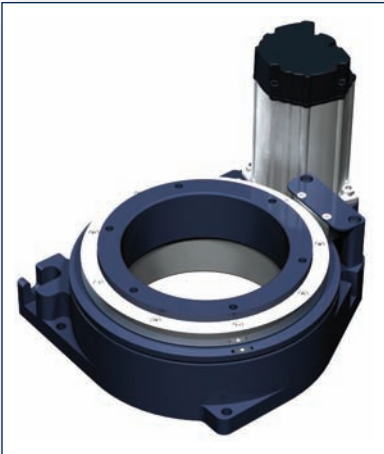
From an accuracy standpoint, the systems also eliminate the gauging errors associated with hand measurements. Whether fully or partially automated, Avid's vision systems typically offer accuracy and repeatability within 0.0004 inches on dimensional measurements and within 0.1 gram on weight.



ServoBelt Rotary offers two different through hole sizes—50 mm for the SBR 50 and 100 mm for the SBR 100.



CASE STUDY



Nowadays, inspection automation has something else going for it. It dovetails nicely with the packaging industry's big push toward bottles that use less material. "Monitoring the wall thickness and profile is more crucial than ever as the packaging industry comes up with bottle designs that have to maintain their rigidity with thinner wall sections. There's a lot less tolerance for variations in wall thickness," Strater says.

Avid's most recent measurement system looks at bottles in a whole new way—from the bottom.

While previous system focused on the wall thickness, the new WTS 1000 system shines a light up through the bottom of a bottle to measure its base thickness. An operator begins each semi-automatic measurement cycle by loading a bottle onto the WTS 1000's rotary stage. The stage spins the bottle over the stationary thickness gauge, allowing multiple measurements to be integrated into a thickness map of the entire base.

Avid created the system for use with Amcor's material-efficient PowerFlex bottle design, which eliminates the need for the structural panels and ribs found on traditional hot-fill PET bottles. "The thickness of the base is an important quality parameter with these bottles," Stater points out.

Strater had a couple of motion system challenges to overcome when designing and building this unique test system. The first involved finding a rotary stage with a through-hole big enough to accommodate the bottle and the light source. And the second involved a short development cycle that ruled out the use of custom motion components.

ServoBelt Rotary from Bell-Everman helped on both scores.

According to Strater, finding a rotary stage suitable for this system didn't turn out to be as straightforward as he expected given the number of companies making this type of motion component. A search on the Internet turned up many, many potential stages, yet he found that all of the traditional worm-gear-driven units didn't have enough through-hole clearance to give the illumination an unimpeded shot at the bottle base. "Just about everything I found had a 3/4-inch bore through the center, which was too small for what we're doing."

Strater also looked at direct drive rotary motors, but found them to be big, heavy and expensive for this application. "We're spinning an empty bottle that weighs less than an ounce, not a tank turret," he says.

Strater was getting ready to make his own custom rotary stage in Avid's machine shop, when he discovered ServoBelt Rotary. With its low profile at only 2.39 inches high and big 4-inch through-hole, the ServoBelt Rotary gives the laser gauge a clear shot at the entire bottle base. The only machining Strater had to do was for a set of top plates that adapt the rotary stage to different bottle sizes.

ServoBelt Rotary also helped Strater stay on his development schedule. He and his son, Jonathan Jr., designed and built the new test system largely by themselves in less than three months. So finding motion components that worked right out of the box was critical.

ServoBelt, which features universal mounting features, simply bolted to the WTS 1000 frame in minutes. Strater likewise found it easy to connect ServoBelt with the motion platform Avid uses for all its machines—Animatics Smart Motor integrated motor, controller and amplifier. "We actually had the whole motion system up and running in an hour and a half," Strater says.