TEST CENTER

A gentle way to convey

A spiral conveyor manufacturer allows a tea producer to try it before they buy it.

When choosing a conveyor, it's important to look at more than conveying angles and throughput rates needed at your plant. You must also consider what kind of effect the conveyor will have on the particles themselves — especially if the product you are moving is fragile.

Automated Flexible Conveyors (AFC), operates a test facility to help you determine which conveyor is best for your product. The company manufactures spiral conveyors and feeders for use in many industries. AFC president Kevin Devaney said the company also produces equipment to complement the conveyors, including feed hoppers, dust collection equipment, a bulk bag unloader, and a bag compactor for empty bags generated during bag dumping operations.

Gently conveying tea leaves

Nearly ten years ago, a tea producer approached AFC when they were ready to expand their production. American Instants was adding a processing line to package loose-leaf tea into one-ounce tea bags. They needed a conveying system to gently move tea leaves to packaging.

"If you look at the tea leaves and particles under a microscope, there are fibers on the tea leaf that affect the flavor. To damage these fibers would affect the quality of the taste of the tea," Devaney said. "We actually went through tests a number of years back

Every conveyor model AFC offers is available for use in the test center.

with Lipton, and the final purchase decision on the equipment remained in the hands of a tea taster. All of this high-tech equipment and analysis of the product, and the bottom line — somebody pours a cup of tea and drinks it. But that didn't happen in this case."

The customer needed a conveyor to move tea at a 45-degree incline to a height of nearly 12 feet before unloading into the auger fill head of the bagger. The customer also required the conveyor to move the tea to the bagger at a rate of 185 lb/h.

Moving the tea to packaging

AFC personnel visited the customer's plant to gather information about the tea product and processing requirements. Based on the initial meeting and past experience with similar products, AFC determined which of their conveyors would work best for the tests.

"We anticipated addressing the degradation problem," Devaney said. "So we up-sized the conveyor and set it up to run very slow, to reduce the friction. We also used an ultra-high molecular weight polyethylene (UHMW) tube, which further reduced the friction."

The spiral conveyor operates similar to a screw conveyor, except its screw is helical in design. Without a center rotor, the spiral conveyor is filled with product.

To conduct the tests, the customer provided three cubic feet of loose leaf tea. The tea had no moisture content, and its particles varied in size. The tea's bulk density was near 20 lb/ft^3. American Instants's plant and operations managers were on hand at AFC's test center for each of six conveyor tests conducted with the tea. AFC conducted no tests in advance of the customer's visit.

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AFC plant officials duplicate the customer's plant conditions, such as feed rates and conveying angles, before conducting the tests.

"The initial test was to determine a conveying rate to select the rpm required to obtain the 185 lb/h," Devaney said. "That was obtained somewhere around 200 rpm. Once we established that criteria, we then conducted a series of one-minute cycle runs through the conveyor."

For the tests, AFC used their model 25F Spiralfeeder, equipped with a 2½-inch-diameter conveyor tube and a "flat-style" spiral. The machine was also equipped with wireless digital rpm readout.

"Sensors are set up on each conveyor drive that will read the rpm and transmit that back to our control panel," Devaney said. "The direct readout on our control panel tells us what rpm we are running. It allows us to make adjustments during any phase of the testing procedure."

The equipment sensors also alert operators when the machine is empty, which can be critical when conveying delicate products.

"What we didn't want was to have their conveyor running empty," Devaney said. "That would cause degradation of the product within the conveyor. We have to keep a fresh infeed of product."

The tea was put through the spiral conveyor for one minute and collected in a container. The material was placed on a scale after each run and visually examined to determine whether any product degradation had occurred. Some product was put through the conveyor six times.

"We would mark each sample accordingly," Devaney said, "so it could go through a screen analysis later."

Conveyor handles the tea with care

Over the course of three hours, the customer learned that the spiral conveyor would convey the tea at a rate of 185 lb/h without visible product degradation. The customer took the test samples to their own plant for further analysis and came to the same assessment.

"The feedback from the customer was very positive," Devaney said. As a result of the visit and positive test results, the customer purchased a spiral conveyor for their new processing line.

The initial equipment choice made when American Instants first began packaging loose-leaf tea into one-ounce bags has had direct impact on the plant. Over the past decade, the company has continued to rely on AFC's test center for further conveying applications, and they have purchased conveyors and other equipment, including a bulk bag unloading station.

Facts about the test center

Depending on the complexity of the tests, AFC conducts an average of three tests each week at its 2,000-square-foot facility located at Clifton, N.J. Besides spiral conveyors, the center includes a batch weighing system, a twin-deck screener, a bulk bag unloader, a volumetric feeder, digital scales, and an analog angle-of-repose gauge.

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Also among the equipment available for testing is a bag dump station designed to capture nuisance dust generated from unloading bags. Like other equipment in the center, the bag dump station evolved from AFC's conveying equipment line.

At the test center, AFC also conducts tests using the company's bulk bag unloader.

"It was just natural for us to go in that direction," Devaney said. "We were experiencing dusting problems ourselves in the testing lab and we saw a need for a companion to our conveyor system."

In a typical test, the customer first consults with AFC about the product's characteristics and the plant's handling needs. If the customer is located nearby, Devaney said, the center's staff may visit their facility. The customer then completes the test center's standard information forms, which are followed with a phone consultation.

"Personal contact is important. We try not to just gather information with the forms," Devaney said. "As standard protocol for testing, we try to accumulate as much information about the application as possible."

Devaney said the test center offers a full range of conveying equipment. In addition, plant officials try to duplicate the customer's plant conditions, such as feed rates and conveying angles, before conducting the tests.

"Our lab has every one of our available conveyors set up," Devaney said. "Every model that AFC makes is installed in our lab. That allows us to act on a moment's notice. We have had people call us in the morning and

show up here at noon to run a test. We were able to accommodate that.

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"This also works for someone who just wants to see a piece of equipment. The lab is also a showroom."

Depending on the complexity of the application, most tests can be completed within one to three days. For customers who are unable to witness the tests, AFC provides a videotape of the tests in progress. Once the testing is complete, the staff provides the customer with a written report of the results.

"Our ability to replicate a customer's requirements in our lab has made a difference in our testing," Devaney said. "A customer may come to us a little apprehensive about the process. But he leaves with an assurance that we have put on a good test and that the equipment has performed well."

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