# Conveying Competitive Edge for Bio-Based Detergent

Sticky powders present manufacturers and processors with unique material conveying challenges involving volumetric auger fillers that dispense powders, granulars, and flakes for packaging.

When the U.S. government decided to switch to a bio-based laundry detergent for the military and other government entities, the Association for the Blind and Visually Impaired (ABVI) had the potential to expand its manufacturing and fulfillment division by coming up with a system in which it could produce the detergent in an efficient and economical manner.

ABVI's manufacturing and fulfillment division employs approximately 60 individuals who are blind or visually impaired. Its mission is to prepare and empower people who are blind or visually impaired to be self-sufficient and contribute to their families and the community.

ABVI employees convert, assemble, package, and distribute a wide range of high-quality products for federal and state government use and partners with companies like 3M and Ecolab.

"This was a totally new process for us," says Leon France, quality manager at ABVI. "Our first step was to work with a soap manufacturer that could develop a bio-based product that met government specifications, and then create a production line that could give us the competitive edge."

After successfully developing a detergent with a supplier manufacturer, France contacted Per-Fil for an auger filling station to dispense the detergent into boxes containing two 13-pound cartons. However, he still needed a system that would

deliver the detergent to the auger filler from 2000-pound super sacks, and “Per-Fil recommended we contact VAC-U-MAX for a solution,” says France.

VAC-U-MAX, an early pioneer of vacuum technology best known for handling free and non-free-flowing powders, specializes in the design and manufacture of pneumatic conveyor systems and support equipment for conveying, weighing and batching of dry materials. The primary technology for conveying is vacuum, but positive pressure pneumatic conveying systems, as well as mechanical conveyors, like flexible screw conveyors, are used as applications dictate.

Detergents are challenging to convey due to their adhesive characteristics, and because moving and dispensing powder at high volume can potentially change the density, component blend and texture, producing inconsistent fill rates or volumes, causing production interruptions, and possible degraded particle size that compromises quality control standards.

With a vacuum conveying system, powder isn’t forced mechanically, and there are no moving parts to come in contact with the powder to disrupt it.

France says that when he contacted the conveyor manufacturer, and explained what ABVI was trying to accomplish and the nature of the product, the company requested material samples to ensure particle size distribution didn’t change upon vacuuming from a super sack into the hopper.

The conveyor manufacturer has a fully functional test and demonstration facility equipped with a multitude of equipment configurations and vacuum conveying tests to simulate actual conditions at customer’s sites and performs testing at no charge to potential customers.

Because the powder can change density in the auger filler head, leading to improper fills, keeping the head full and at proper density is critical. VAC-U-MAX utilizes a variety of methods such as specialized finishes and a proprietary designed coneless vacuum receivers that reduce powder sticking inside the system eliminating the need for external flow promotion.

France says, “we decided upon this system because the manufacturer invited us to their facility to demonstrate their equipment with our product, offered us a couple different options based upon our product needs, and we were able to make a decision of which way to go.”

Pneumatic conveying systems are flexible, and when working with an expert that has intimate knowledge of material characteristics and manufacturing processes, users can have semi-custom pneumatic conveying systems using standard components that are adapted to fit manufacturing needs.

Once ABVI was granted the contract, it commenced building a room with proper ventilation for the process and ordered the equipment.

Because the controls from the two systems needed to be integrated to signal the

vacuum system to convey more detergent when the auger filler hopper emptied, France says, “we wanted to make sure that when we got the whole system on site, the line would be fully functional and everything worked properly.”

To confirm this, the conveyor manufacturer set up its system at Per-Fil’s facility and demonstrated to ABVI representatives that the two systems were fully integrated and operational.

“We really appreciate the fact that VAC-U-MAX was willing to send someone to the auger filler manufacturer to guarantee their equipment was able to interface properly with the other equipment,” says France.

The conveying system vacuums the detergent from super sacks at floor level using a large wand that an individual moves around inside the sack when necessary, into the hopper of the filling machine.

The filling system has been designed so that individuals who are blind or visually impaired can operate the line. Audible alarms on the auger filler alert operators that they need to move the wand to a different location within the bag in the event that the conveying system is not sucking detergent into the hopper.

When the boxes are full, an audible signal lets operators know they can move it away from the filling station to another location where the box is sealed and packaged. The system also utilizes a touch screen for further assistance that provides audible explanations of whether the process is working properly or not.

The production line has a demonstrated daily capacity of 200, two-carton boxes and is staffed with three operators.

“The system runs very clean,” says France. “Overall we are impressed with the system and the expertise that VAC-U-MAX provided in the process.”

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