

Finding a vacuum conveying system for your material

Test center provides answers to customer conveying questions.

Test center

A vacuum conveying system is a big investment. Knowing that your new system is going to convey material without any problems is crucial for keeping production on track and providing a quality final product. In 2015, Volkmann USA, Bristol, PA, opened a new 750 ft² vacuum conveying test center to ensure the performance of its vacuum conveying systems.

"Our tests are all about demonstrating that we do what we say we can do," says Nick Hayes, president of Volkmann USA. "The primary test goal is to meet the customer's requirements, but an equally important one is to make sure the client doesn't have problems. We need the equipment to work well."

Testing for proof of concept

The supplier's first US location didn't have any room for test equipment, so all testing needed to be done at company headquarters in

Germany. When the US branch moved into a warehouse a few years later, equipment was set up in the loading dock to do tests. When constructing the new Bristol facility, the supplier made a full-scale testing facility a priority.

The test center incorporates a wide range of the supplier's VS Series vacuum conveyors, various feed hoppers and lump breakers, and a weighing system to properly simulate customer applications. Two 150-foot runs of 1.5- and 2.5-inch conveying line, along with the ability to add up to 20 feet of vertical line, allows the supplier to recreate the client's working environment. All equipment is stainless steel and suitable for hazardous or abrasive applications.

"We have to be able to simulate however the customer receives the material," Hayes says. "Drums, bags, IBCs, bulk bags, etc. We need to replicate what the customer needs to convey from."



The vacuum conveying system is set up to mirror the client's application to find out if the equipment will move the material effectively.

The tests are free of charge, and each test is tailored to the client's application and concentrates on the area of greatest concern. This could be the conveying rate, potential for segregation or degradation, or the risk of explosion.

"Can you convey it? That's the first question," Hayes says. "And that has two parts: Will the material go into the system, and will the material come out the other end? The other questions: Do you change any of the material's properties during conveying? If it's a blended product, does conveying cause segregation? If it's a friable product, does it degrade? If it's an abrasive product, does it wear out the parts?"

Each material has ideal conveying conditions based on material characteristics, including particle size and shape, bulk density, and friability. Tests can be done in dilute-phase, dense-phase, or plug conveying conditions to verify which method is suitable for the client's application. The systems can convey materials from 3 lbs/ft³ to nearly 500 lbs/ft³.

"The test will likely follow at least a provisional proposal," Hayes says. "We always start with the proposal and the technical description of what the client is trying to achieve and replicate what the client wants as closely as we can."

The testing process

After the client's initial inquiry, the test center sends the client a test pack that includes a test number and test data sheets. The client then ships 4 to 5 ft³ of material to the test facility. In some cases, larger samples are needed for verifying whether segregation or degradation has occurred since, in that situation, the material can only be run through the system once.

The test center then receives the material sample and arranges a test date with the client. The supplier always prefers to have the client witness the tests in person but will provide a video of the test if the client can't attend and may add livestreaming of tests in the future.

"Witnessing the test results in a much better-educated consumer," Hayes says. "When the equipment arrives, you've now got an engineer

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The test center has various pieces of equipment available to simulate the client's process.



Clients can take apart, examine, and observe the VS Series of vacuum conveyors in the supplier's test center.

in that facility that was at the test and knows how to handle and maintain it."

On the day of the test, the client visits the test lab conference room to review the test method and objectives, receives a presentation on the major theory and advantages of the system, and then visits the static display and demo area to see the conveyor designs, take the machines apart, review the design, and watch a physical demonstration of plug-flow conveying. Once satisfied and equipped with safety equipment, the client enters the test lab and the test process begins. Most tests involve hands-on client involvement and using the equipment in the working conditions.

"Every test we do provides us with another example of a product and how different heights and distances and variables affect how a powder conveys," Hayes says. "Volkmann has close to 50 years of experience in testing various products and that's an invaluable starting point."

Finding an ideal solution

After the tests, the supplier sits down with the client to discuss which equipment works best for the material. The supplier provides a comprehensive test report for each test using a combination of spreadsheets, graphics, photographs, and written assessments of the testing. Each test has a defined objective, method, results, and conclusion with equipment recommendations.

Recommended equipment depends on the conveying phase required, the equipment the client has already, the feed method, discharge aids, and many other factors, which may include the client's knowledge of their own product. Following the test, the supplier returns all material samples to the client using an appropriate shipping method.

"Problem solving in powder handling is largely experience-based," Hayes says. "Our US staff has more than 100 years of powder processing experience and has seen a vast array of materials. Our test database is extensive. Tests begin using theoretical values and predicted performance and then are varied depending upon the witnessed results." **PBE**

Note: Find more information on this topic in articles listed under "Pneumatic Conveying" in *Powder and Bulk Engineering's* article index in the December 2016 issue or the Article Archive on PBE's website, www.powderbulk.com. (All articles listed in the archive are available for free download to registered users.)

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