New bagging line handles easily aerated material

Synthetic amorphous silica (SAS) is a lightweight white powder with absorptive characteristics that are useful in a wide range of industries. The material easily entrains air, which makes it a useful anti-caking, carrier, and thickening agent. SAS particle size and density can vary from application to application but the particles are often very fine.

For Huber Engineered Materials, an SAS producer in Havre de Grace, MD, the very fine particle size was creating problems when packing the material to ship out to customers. The company’s SAS production facility struggled to remove as much entrained air as possible from the material to adequately fill the bags for shipping. Because the material traps such a high volume of air, the company found it difficult to reduce the air volume while maintaining an acceptable bagging speed. Huber’s target was to densify the packed silica by 35 percent to increase filled bag and net pallet weight.

“With tightening regulations, broken bag quality complaints, increased freight costs, and a need to improve the overall environment, health, and safety, Huber needed to upgrade to market-leading packaging equipment and bags,” says Jon Fecteau, global product director, Huber Silica SBU.

Huber had been using air valve packers to fill paper valve bags via the forced flow, positive pressure technology used by most of the silica industry. The machines blow material into valve bags, which, because the silica is light and airy, results in excessive amounts of dust and the potential to release powder. The company considered using alternate impeller technology for paper bag filling, but there was significantly less improvement in payload or bag stacking due to excessive trapped air. The alternate of polypropylene woven bags was also considered but abandoned since the bags emit excessive dust during handling.

“When we were evaluating equipment suppliers, many commented that our material was the most challenging product to package that they had attempted,” Fecteau says. “As a result,
many suppliers simply stated that it wasn’t possible to package at the target rates we were requesting.”

An innovative solution

To find a better solution for packaging the SAS, Huber reached out to the Concetti Group, an international manufacturer of weighing, filling, closing, and palletizing lines for a wide range of bulk products. The supplier recommended two complete form-fill-seal (FFS) machines, each with a gross weigher and complex densification screw feeders, along with a double air evacuation process to reduce the amount of air in each bag.

“Multiple scale equipment tests in Italy were attended by Huber personnel,” Fecteau says. “Each test moved us closer to our target bags per hour and final product density in bags.”

The system replaced the old paper valve bags with stronger polyethylene bags. The bags have a greater tensile strength and make it easier to minimize dust and control the moisture inside. Minimizing the trapped air inside the bags improves stacking for more stable pallets during shipping, unloading, and warehousing. The polyethylene is also easily recyclable, which is integral to Huber’s commitment to sustainability.

The new FFS system can package the SAS at a density of 7.49 lb/ft³ and can fill 150 bags per hour. The entire bagging process is now automated and provides Huber with more compressed, tightly sealed bags. These improvements have lowered both production and transportation costs while reducing the amount of dust in the facility. The Huber site produces more than a dozen SAS and silicates in various particle sizes and particle densities. Since the flow and packing characteristics vary greatly from one product to another, it was important that the machines be able to handle a wide range of materials.

“The equipment needed to have broad set-point adjustment capabilities for a diverse list of products,” Fecteau says, “plus the ability to rapidly fine-tune to variations in bulk density feed to the bagging machine.”

Looking ahead

The new system provides Huber with consistent, automated production that can be monitored by a single operator. The company also plans to install more systems at more plants around the world. The system is installed at two sites, and Huber is currently evaluating possible installation of FFS technology at several additional SAS and silicate manufacturing sites.

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“From the first discussion through the development, design, adjustment, installation, and refinement phases,” Fecteau says, “we were extremely pleased with the cooperative effort and the high level of technical expertise throughout the organization.”

Note: Find more information on this topic in articles listed under “Bagging and packaging” in Powder and Bulk Engineering’s article index in the December 2015 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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