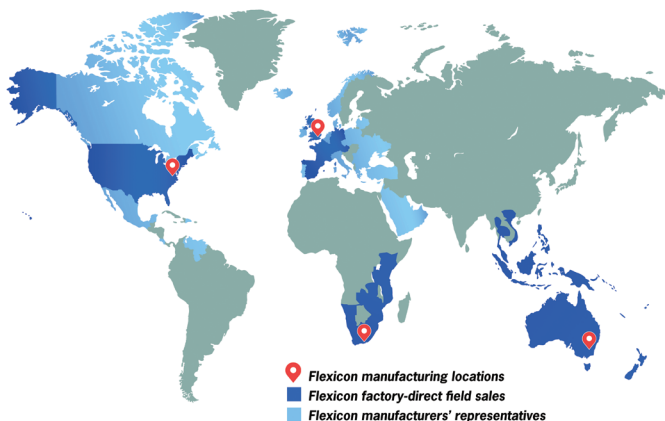




Automated Bulk Bag Unloading, Flexible Conveyor Improve Filtration Effectiveness at Winery



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ST. HELENA, CA — Beringer Wine Estates, St. Helena, CA, improved filtration effectiveness in its diatomaceous earth (DE) unloading and winery waste filtration area by an automated bulk bag unloader and flexible screw conveyor. The winery replaced a manual DE unloading setup with this automated, enclosed unloading and conveying method from Flexicon Corporation.

The automated bulk bag unloader lifts 1000-lb bulk bags of DE via an electric hoist and trolley at the top of its 16-ft high cantilevered I-beam frame. Aided by flow-promoting devices, the unloader fully discharges bulk bags into the 30-in hopper below. From the hopper, a flexible conveyor, at a 45° angle, moves the DE to two 12-ft high, 1500-gallon slurry tanks of winery waste.

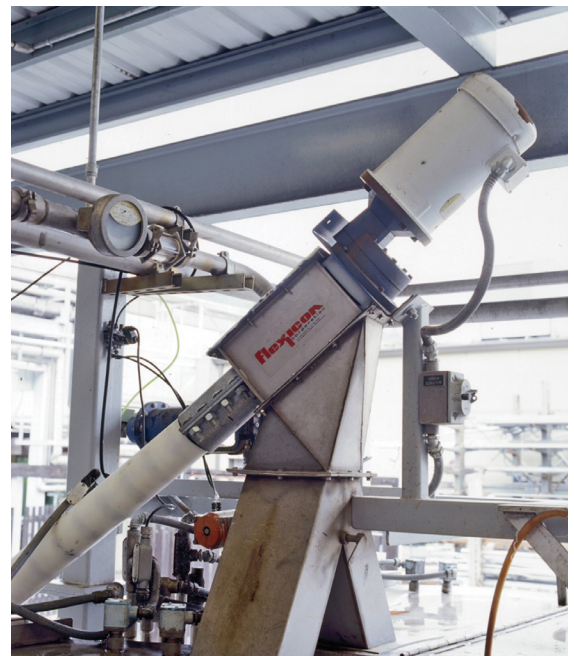
Optimal Filtration

Filtration efficiency was optimized by the bulk bag unloader's loss-in-weight control, which precisely meters diatomaceous earth into the two 1500-gallon slurry tanks. The bulk bag unloader is mounted on load cells, which transmit loss-of-weight information to a controller. As the flexible conveyor feeds the slurry tank, the controller, on reaching the set weight, slows the speed to dribble before stopping the conveyor, delivering the target dose.

"Dispensing accuracy gives us more filtration runs per amount of DE consumed," says John Pepe, director of cellar operations. "Otherwise, adding too little DE would allow effluent to plug the filters following the slurry tanks. Or too much DE would clog the filters with DE. Both situations would prompt more filtration runs than needed." Beringer Wine Estates recouped its investment for the automated system in less than three years out of savings from the dispensing accuracy and buying DE in bulk bags rather than 50-lb hand sacks.

Previously, workers manually opened and dumped palletized 50-lb hand sacks of DE from a work platform into the two slurry tanks. The automated unloading and conveying eliminated the manual effort at a time when winery production has increased. The flexible screw conveyor moves the DE through a 4.5" diameter polyethylene outer tube enclosing a rugged, flexible stainless steel screw, driven by a small, 3-hp electric motor. Only the inner screw contacts the material. As the flexible screw rotates in the tube, it self-centers to provide clearance between the screw and tube wall. This simple design lacks the filters, external compressors, blowers and separators that make other conveyors expensive. The flexible tube can be routed vertically, horizontally or at any angle.

The enclosed flexible screw conveyor and bulk bag unloader also eliminate dust. The enclosed hopper intake chute underneath the unloader provides dust-free opening of the bag spout as the contents empty into the hopper. A flow control valve safely and gradually opens and closes the bag spouts and varies discharge rates.



Modified System

In installing the bulk bag unloader, Flexicon modified an existing bulk bag frame from an earlier attempt by Beringer to automate bulk bag unloading. The former system metered the diatomaceous earth to a horizontal screw auger. The unloader was controlled based on timing rather than weight. "We got inaccurate weights and spillage. It didn't work right," Pepe says.

During early operation of the new system, some bridging and caking of DE occurred in the hopper feeding the flexible conveyor. (DE tends to cake because of the microscopic diatoms' irregular sizes.) Flexicon added an agitator, and steepened the slope of the sides to keep the material moving out of the hopper.

Flexicon also changed the conveyor screw to its BEV-CON™ design. Instead of the original rectangular wire screw, the BEV-CON™ screw is machined to a pointed edge. At the same time, the clearance narrows between the outer diameter of the screw and inner diameter of the conveyor tube. Both changes exert less compression on the material. The system has since run with no problems.

Pepe learned about bulk bag unloaders and flexible screw conveyors through trade magazines and by observing how other wineries handle their waste. Flexicon tested samples of DE on its flexible screw conveyors, then recommended and designed Beringer's conveyor, hopper and bulk bag unloader.

The automated bulk bag unloader and flexible screw conveyor system provides high capacity to filter waste at Beringer Wine Estates in a clean working environment as production increases. "It's a good way to manage your winery waste, and is not prohibitively expensive," Pepe concludes.



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