Bulk Transfer System Triples Output of Dry Treatment for English 'Chips'

An automated product transfer system consisting of a bulk bag unloader and flexible screw conveyors tripled output of Drywite Ltd.'s dry ingredient for treating cut potatoes for mass consumption of fish and chips. The system allows the British company to satisfy growing worldwide demand for its 'Drywite' product, which preserves the cut potato prior to frying for a better and fresher presentation with less absorption of fat.

Previous System Limited Output

Prior to installing the new system, three operators continuously emptied 50-lb. bags of the Drywite bulk material and proprietary additive into a floor mounted hopper from which a rope disc conveyor carried the product to a 2200-lb. capacity silo. The mix was gravity fed to the auger filler packaging line. Changing formulations presented difficulties because the bulk material needed to be consumed entirely before changeover. Production was limited to 2-3 tons per day.

With the new system, designed by Drywite's own engineers and Flexicon (Europe)

Ltd., the flexible screw conveyors simplify the dosing procedure and convey bulk product more flexibly to and from two silos that feed the auger-filler packaging machines. A three-part detachable bulk bag discharger frame moves three times more material than before while accommodating a ceiling height restriction. The system consists of a three-part bulk bag discharger frame, a receiving hopper, inclined screw conveyor, horizontal screw conveyor, two silos, and a sack tip hopper with a volumetric feeder for dosing the special additive. The system is automated by two control panels-one located in the process line, the other in the packaging line-to allow operation from both areas of the factory. In addition, Flexicon installed a dust extraction unit.

3-Part Bulk Bag Frame Accommodates Height Restriction

 For operation under a low ceiling, the bulk bag discharger frame splits into three sections consisting of cruciform, intermediate frame and base frame. A forklift loads the cruciform with suspended bulk bag onto the intermediate frame at floor level remote from the base frame. The intermediate frame, with bulk bag in place, is maneuvered between two ceiling members and, with minimal clearance to the ceiling, is then lifted onto the base.

With the bulk bag in position over the receiving hopper, the bag spout is pulled through an iris valve and into the hopper intake chute whose quick release door provides access to untie or re-tie the bag spout without spillage.

The flexible membrane of the iris valve, which closes around the spout using a manual lever, controls the rate at which the bulk material discharges, preventing uncontrolled bursts of material into the receiving hopper and dust into the environment.

As the bulk bag discharges, 'Flow Flexer Plates' raise opposite bottom sides of the bulk bag at timed intervals to promote flow of free-flowing, non-free-flowing or compacted materials into the bag spout. As the bag empties, the stroke of the plates increases, raising the bottom of the bag into a steep 'V' shape, eliminating dead spots to promote complete discharge. A 'FlexiFinger' flow promotion device mounted on an interior hopper wall ensures uninterrupted flow of material into the flexible screw conveyor inlet.

Adjacent to the receiving hopper is the sack tip hopper, which doses the additive by means of a volumetric feeder, into the throat of the flexible screw conveyor feeding

both 2-ton capacity silos. The final compound is mixed as it transfers through the 14-ft. long flexible screw conveyor at 45° to the silos, which, feed the auger machines in the packaging lines via two flexible screw conveyors routed through a wall.

Level sensors in the base of the hoppers are linked to a control system that stops operation upon receiving a low-level signal, and alerts the operator, ensuring accurate dosage.

Wider Choice of Formulations

The two silos hold four tons of one formulation collectively, or two tons each of separate formulations. An additional ton of material is held on line in the bulk bag. When the additive is fully discharged, the operator may change the formulation. After opening a valve and reversing the conveyor screw to clean-in-place, the new additive can be loaded into the volumetric feeder and the process re-started. From the control panel, the operator activates a gate valve atop the first silo to divert product flow through a horizontal screw conveyor to the second silo. Thus, the packaging line can receive two formulations of the Drywite treatment.

Downtime for cleaning and changeovers is dramatically reduced. The automated product transfer system also provides capacity to expand production without further investment. Since the operator is only needed when sensor alarms signal for additional material, two-thirds of the time previously devoted to manual dumping is now allocated to duties elsewhere in the plant.