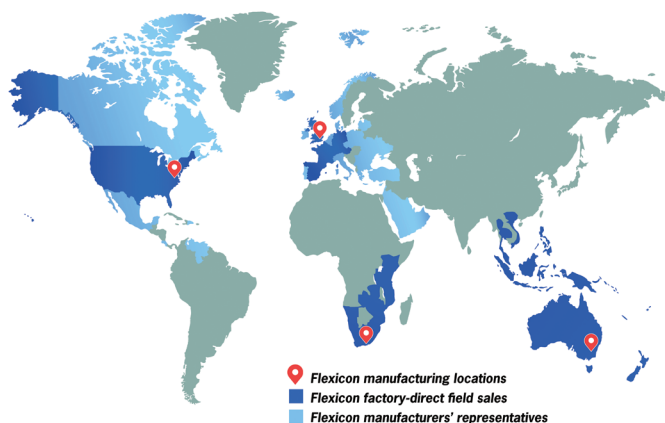




Bulk Bag Unloader, Flexible Screw Conveyor Help Soap Maker Expand Production

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WEST WARWICK, RI — Original Bradford Soap Works, Inc. is a private manufacturer of high quality kettle and synthetic bar soaps that intends to “clean up” in the synthetic soap business.

To scale up production and sales, Bradford Soap redesigned its material handling system from manual bag dumping to automated bulk bag unloading to deliver large quantities of raw material. The company also introduced flexible conveying to transport raw material in a tight vertical space and weigh-batch, under automated control, to accurately charge a large agitated tank.

As the result of the scale-up, Bradford Soap boosted the output and productivity of its synthetic soaps, while improving product quality, worker ergonomics and workplace environment. The expanded production arrangement paid for itself in less than two years.

Limitations of Manual Unloading

Bradford Soap switched from manually dumping 50-lb bags of incoming granular surfactant to automated unloading of 800- to 1200-lb bulk bags. The small bags were originally emptied into a smaller tank on ground floor level, but their disposal incurred higher costs. Purchasing fewer bulk bags and disposing of fewer empty bags reduced costs.

Manual dumping posed other problems. Paper contaminants from cutting open the bags affected product quality. Dust accumulated in the plant atmosphere. The effort of lifting bags, especially by smaller workers, presented ergonomic issues, while cutting bags open with knives raised safety issues.

Now the incoming flakes are handled by an automated bulk bag unloader from Flexicon Corporation, which lifts the 800-1200-lb bulk bags via an electric hoist and trolley at the top of its cantilevered I-beam frame. The 12-ft high unloader fits between the joists supporting the mezzanine on which the agitated tank sits.

Aided by flow promotion devices, the unloader discharges bags into a hopper below. Bag activation devices fully empty the bags by raising and lowering the opposite bottom edges at timed intervals. The enclosed hopper intake chute, with flow control valve, provides dust-free opening of the bag spout as it empties into the hopper. The enclosed flexible conveyor, which travels from the bulk bag unloader to the agitated tank sitting on the 12-ft high mezzanine, contains dust.

The flexible screw conveyor transports the surfactant flakes 26 feet at a 42 degree incline, making a slight bend, through a 6-in hole cut in the mezzanine to the agitated tank. Vertical space constraints, which discourage heavy antiquated conveying methods, favored this lightweight, screw-conveying conveying system.



Conventional Conveyors too Heavy

Andy Moniz, chemical process manager, says he first considered gravity feed, then a stainless steel rigid auger conveyor. The 12-ft height under the mezzanine was insufficient for a gravity system to discharge into a floor-mounted tank.

Although Bradford Soap operates rigid auger conveyors in other areas of the plant, such a system would be too cumbersome and heavy to install in this restricted space. "Not to mention pricey," Moniz adds. The conveyor must travel through a hole cut in the steel-supported mezzanine to the 5-ft high agitated tank. "Neither could a stainless steel auger conveyor flex into the position we wanted," adds Moniz.

The initial reactions to make the liquid base for synthetic soap take place in the agitated tank. The agitation turns the easily melted, breakable surfactant flakes and added ingredients to liquid, which is pumped to downstream operations. These include chilling, flaking, adding dyes and fragrances as the liquid gels into mild synthetic bar soap.

Gentle Handling

The soft, granular surfactant flakes (27 lb/cu ft density) require gentle handling and conveying since they have a low melting point, and tend to pack and fuse together under friction and pressure.

The flexible screw conveyor moves the flakes gently without the crushing that can occur with other conveyors considered. The flakes move through a 4.5" diameter polyethylene outer tube enclosing a rugged, flexible stainless steel screw, driven by a low-power 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. The product's gentle rolling action prevents packing, breaking, or fusing of flakes.

To accurately weigh the amount of flakes discharged into the agitated tank, the bulk bag unloader is mounted on load cells, which transmit loss-of-weight information to a controller. As the flexible conveyor feeds the tank, the controller shuts off the conveyor on reaching the set weight.

Flexicon designed the material handling system after evaluating the surfactant material in its test laboratory. According to Moniz, the new system moves more material, more safely, more cost-effectively in a cleaner plant atmosphere. Product quality is also better.

"Without the flexible conveyor, we couldn't have done this very easily," Moniz says.



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