Automated Line Provides Sanitary Filling of Bulk Bags

REPOROA, New Zealand — Anchor Products’ new, automated packing line for filling bulk bags with sodium caseinate eliminates aeration experienced with a rotary sack filler, and cuts dust and packaging waste by 90%, while achieving bag weight accuracy of 1%.

The powder is automatically transferred and filled by a system comprised of two flexible screw conveyors, a 1500 liter (390 gal) capacity surge hopper, and a bulk bag filler. The 1500-lb bags are automatically conveyed from the filler to a heat sealer, then to bulk storage.

The line was designed, built and commissioned by Flexicon Corp.’s licensee, Fresco Systems, Ltd., Auckland, NZ, and New Zealand’s B.W. Murdoch engineers, in a two-month timeframe. Anchor Products, the largest business unit of the New Zealand Dairy Group, packs the sodium caseinate powder for export to a customer in Korea for use in manufacture of coffee creamer.

Overcoming Aeration

Flexible screw conveyors provided the means to overcome the semi-free flowing powder’s tendency to aerate. (Bulk density is 26 lb/cu ft, angle of repose 45°-60°.) The flexible screw conveyors lie at a 20° angle, which combats aeration by imparting less energy into the powder than would occur at a higher angle. The screw is a wide, flat spiral, which presents a wider carrying surface than the typical round-wire screw. The flat screw applies a positive forward force while reducing the radial force against the outer tube’s walls.

Anchor rejected pneumatic conveying, which needs a de-aeration station. “A separator would reduce packing time and increase fines losses,” says Keith Mason, former site services manager who oversaw the installation.

The flexible screw conveyors transport the material through a polyethylene outer tube enclosing a rugged, flexible stainless steel screw, driven by a low-power electric motor. As the flexible screw rotates in the tube, it self-centers, providing clearance between the screw and the tube wall, and creating a gentle rolling action that prevents degrading of the powder.

“Because we pack large quantities, we couldn’t allow any air to mix with the powder,” Mason continues. The bulk bag filler’s PLC-controlled vibratory densification/de-aeration bed removes air, and stabilizes and settles the material.

Expands Market Opportunities

Other customers have expressed interest in receiving Anchor’s sodium/calcium caseinate and total milk protein products by bulk bag. “We had to allow for packing these products in the same line,” Mason says. The bulk bag filler accommodates variable bag sizes between 250-900 kg (770 to 2000 lb). “The customer is very pleased with the packing line’s performance, says site manager Gerard Gunnell.

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With the Flexicon automated bulk bag filler the bulk bag fills to the preset weight according to gain-in-weight information transmitted to the controller from four load cells under the filler frame.