ANCHOR PRODUCTS' Reppau site has a new, automated packing line for filling bulk bags with sodium caseinate. It eliminates product aeration and cuts dust and packaging waste by 90 per cent, while achieving bag weight accuracy of one per cent.

The powder is automatically transferred and filled by a system comprised of two flexible screw conveyors, a 1500 litre capacity surge hopper, and a bulk bag filler. The bags are automatically conveyed from the filler to a heat sealer, then to bulk storage. The PLC-controlled system ties to the plant PLC.

The line was designed, built and commissioned by Flexicon Corporation's licensee, Fresco Systems, Ltd, Auckland, and B.W. Murdoch engineers, in a two-month timeframe. Anchor Products packs the sodium caseinate powder for export to a customer in Korea for use in manufacture of coffee creamer.

Anchor selected flexible screw conveyors as the most effective method to move this difficult-to-convey powder in a restricted 10 x 7 metre space.

Overcoming Aeration

Flexible screw conveyors provided the means to overcome the semi-free flowing powder's tendency to aerate. The flexible screw conveyors lie at a 20 degree 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.

The flexible screw conveyors transport the material through a UHMW 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-centres, providing clearance between the screw and the tube wall, and creating a gentle rolling action that prevents degrading of the powder, which would occur in a separator.

"Because we pack large quantities, we couldn't allow any air to mix with the powder," says Keith Mason, former site services manager who oversaw the installation.

The bulk bag filler's PLC-controlled vibratory densification/ densification bed removes air, and stabilizes and settles the material.

How It Works

The sodium caseinate powder enters the packing room from the

Flexible screw conveyor (top) transports sodium caseinate powder through transition discharge adapter to Flexicon automated bulk bag filler. The bulk bag fills to the preset weight according to gain-in-weight information transmitted to the controller (right) from four load cells under the filler frame. An inflatable connector and connection to the plant dust collection system eliminates dust. In front of the bag is an automated label printer and heat sealer. The bag automatically moves on the conveyor out of the room to a stacking gantry.

blending area after being spray dried and milled to the correct particle size and transferred to a packing bin in a weighed batch depending on the order requirement.

At the control panel outside the packing room, the operator directs the powder either to the four-station rotary packing machine to fill 20-25kg multi-wall sacks or to the Flexicon bulk bag filler.

The first 7.6 metre long flexible screw conveyor transports the powder from the packing bin at a 20 degree angle to a height of 1.2 metres. The powder falls through a transition discharge adapter and metal detector to the surge hopper, which extends through the floor to the lower level. The PLC turns the flexible conveyor on and off to maintain a set level of material in the hopper.

The second three metre long flexible screw conveyor, supported from the surge hopper, carries the powder at a 20 degree angle to

Water is a vital ingredient

If it needs filtering, disinfecting or testing contact Contamination Control

For sediment filters, cartridge filters, carbon filters, sterile filters, bag filters, strainers, UV sterilizers, chlorination, ozonation, MIOX generators, fly killers, test kits, UV tunnels and the benefit of oceans of experience from qualified staff.
the automated bulk bag filler. The operator selects the filling sequence, and the bulk bag automatically fills to the preset weight. The bulk bag filler frame is mounted on four load cells that transmit gain-in-weight information to the PLC proportional to the load of the bag and filler. The PLC slows the flexible screw conveyor's variable speed motor to dribble feed rate immediately prior to stopping the conveyor once the target weight is reached, achieving accuracy of +/- 1kg.

The flexible conveyors transfer the powder intermittently: five minutes on, one minute off. Packing rate is seven tonnes/hour.

An inflatable connector seals the bag spout to eliminate dust. The fill heads dust collection post connects to the plant dust collection system. Mason says, "Previously we were recovering upwards of 0.05 per cent dust per day while packing 20kg bags. This has dropped to 0.005 per cent."

**Automatic Conveyance**

Pneumatically actuated bag strap hooks automatically release the filled bag. The PLC instructs the printer to print labels for insertion in each bag. Labels contain date, product, weight and other data for traceability and stock control. A flat-belt conveyor transfers the filled bulk bag from the filler, while a second conveyor positions the bag under a heat sealer, which seals the bulk bag liner to ensure quality of product delivered to the customer. The bag continues out of the room on the conveyor to the stacking gantry, where the bag is weighed, placed on a pallet and moved into bulk storage for stacking.

To meet New Zealand Dairy Board Standard NZ0106, the packing line equipment is constructed of food grade materials, including UHMW polyethylene for the conveyors and type 304 stainless steel with interior welds ground and polished to a sanitary finish.

**Market Opportunities**

Other customers have expressed interest in receiving Anchor's sodium/calcium caseinate and retail milk protein products by bulk bag.

"We had to allow for packing these products on the same line," Mason says. The bulk bag filler accommodates variable bag sizes between 350-900kg.

A linear actuator raises and lowers the filling head for various bag sizes.

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**UV protection for feta cheese**

TO PREVENT contamination of feta cheese by micro-organisms during the production process, Clover South Africa has installed an ultraviolet (UV) disinfection system from Hanovia Ltd.

Feta cheese processing involves placing the cheese in brine for a set period after it has been moulded into the desired form. On contact with the feta, the brine solution rapidly accumulates cheese residues. The resultant solution is a potential host for yeast, moulds and bacteria, which can contaminate the cheese and shorten shelf life.

According to Mike Stafford from Guth, Hanovia's South African agent, what was required was a non-chemical brine disinfection system that would not alter the quality of the cheese and would also be easy to maintain.

"Clover chose UV disinfection because the treatment method does not affect the distinctive taste, colour or odour of the cheese," Stafford says. "In addition, they wanted a system that was simple to use, and the UV unit is automatic and requires little maintenance. In terms of capital and running costs, we also found that UV offers the most effective method of disinfection."

"We did consider using the more conventional heat treatment of pasteurisation, but the operating costs of UV are far lower than those of pasteurisation," he claims.

Equipped with a 2.5kW arc tube, the Hanovia UV system can disinfect up to 10m3/hour of low transmission brine.

The UV penetrates the tough outer coating of yeast and mould spores and deactivates the organisms. Frequent microbial checks on the brine show coliforms to be eliminated and moulds and yeast levels to be considerably reduced. Once it has been prepared and cooled, the brine is sent once through the UV system before being filled into the tube containing feta.

Hanovia UV disinfection equipment is available locally through Contamination Control.

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