U.S. based World Flavours Co blends and packages a variety of seasonings, powdered coffee and drink mixes. The process requires equipment that can prevent segregation of blended products and be sanitised quickly and thoroughly between changeovers, preventing cross contamination.

In addition, the company needs to handle large runs of particular products eg. 5.4 million kg/year of dry cappuccino, as well as meeting increased capacity requirements prior to holidays. In flavoured coffee drinks alone that equates to repeated blending of 3.660 kg batches.

World Flavours’ packaging manager, Russ Perry, who has been with the company since 1987, recalls the days before the company installed its flexible screw conveyors; the days when they scooped material manually into the filling machine hoppers.

The company now runs eight flexible screw conveyors – each 4.6m in length and 114 mm in diameter. Manufactured by Flexicon Corporation, the conveyors consist of a polymer tube that encloses a flexible stainless steel screw driven by an electric motor. As it rotates and self-centres, the screw propels material through the tube, providing sufficient clearance between the screw and the tube wall to eliminate or minimise product degradation. World Flavours standardised on the Model 1450 conveyor so spare parts could be swapped out and used across all the lines.

Three of the conveyors run on lines dedicated to cappuccino mix but at the height of the season, they run the cappuccino on six lines. The other conveyors run a variety of spice blends throughout the year ranging from sausage-patty flavourings and spice blends for pre-packaged sweet potatoes to pumpkin pie spice blends and individual spices such as cinnamon and vanilla.

As a purveyor of many blended products, World Flavours is diligent in preventing the separation of blended products, often comprised of disparate particle sizes and shapes, as they move from blending to packaging, Russ says, “The gentle rolling action of the inner screw moves blends with no separation throughout the entire length of the conveyor.”

Following formulas developed by World Flavours’ R&D, workers combine ingredients and then load each batch into one of seven blenders according to batch weight. Small batches weigh up to 135kg, medium batches up to 635 kg and large batches up to 3,625 kg. Uniform blends are discharged from blenders into rigid-plastic, 965mm x 965mm totes that hold 725 kg of the mix. After passing quality control, workers move the totes to a holding area.

When a production run is readied on one of the eight packaging lines, a forklift operator sets a tote on top of a flexible screw conveyor’s 950 mm high, 230L capacity hopper, which is configured with a cradle for the tote. The operator opens the 250mm slide gate valve at the bottom of the tote and the material flows into the hopper. When the hopper is full the operator activates the flexible screw conveyor, conveying the material through 45°, at a rate of 4.1m³/hr, to an elevation of 3.7m for discharge into the packaging machine. High and low level sensors in the packaging conveyor signal a controller to stop or re-start the rotation of the flexible screw when the machine calls for material.

The company performs a washdown procedure between a certain number of runs, depending on the flavours conveyed that day. The quick-disconnect

Conveying spice blends to packaging machines without segregation or contamination is all part of the handling mix for flavours and ingredients.
feature of the conveyor allows operators to quickly release it from the line and roll it to a dedicated area for a pressure-wash between runs. The removable, clean-out cap at the intake end of the conveyor tube permits reversing screw rotation for emptying and flushing of the tube, as well as disassembly and washdown of components.

When the time comes for complete sanitising, plant personnel disconnect the screw and tube from the hopper and motor drive and move the conveyor to the cleaning area where they remove the screw from the tube, allowing thorough washdown.

According to Russ Perry, if a hot, Italian-seasoning blend for sausages preceded a cappuccino mix, they would disassemble the conveyor, pressure wash and dry everything, reassemble the components and start running the next flavour within about 20 minutes.

Eight flexible screw conveyors feed spice blends to packaging machines