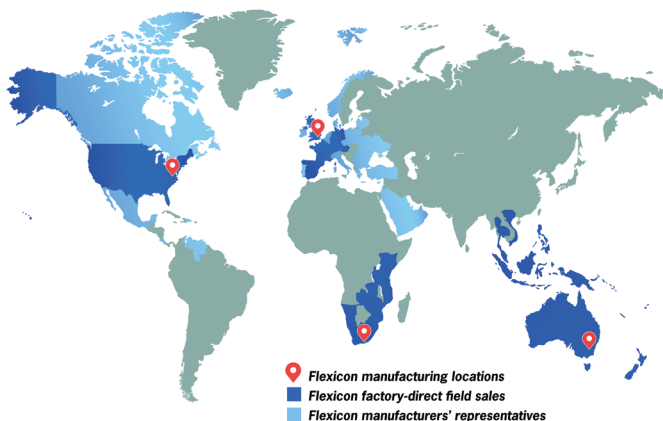




Packager of lawn and garden products ups blending capacity by adding conveyor

V-0805



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Packager of lawn and garden products ups blending capacity by adding conveyor

ST. JOSEPH, MO — RitePak, a contract packager of dry lawn and garden products and specialty feeds for animals, is in a situation that many companies might envy. The family-owned business has been growing at a rate of 20-30% in recent years and the growth shows no sign of abating.

RitePak formulates, blends and packages products for various clients, and for years the company has mixed them in a single ribbon blender. However, business grew to a point where the blending operation could barely keep up with the demand, so in the spring of 2005 the company revised the blending process and added a flexible screw conveyor that feeds the blender.

As a result, the cycle time for a typical 1,000 lb (453 kg) batch has been cut from 45 min or more to 15 min, says Fred Schneider, vice-president, and the 35 cu ft (3.25 cu m) capacity blender is easily able to handle the company's mixing needs. "The conveyor paid for itself in the first year through increased production," he says.

RitePak's production now totals 400,000-500,000 lb (181,440-226,800 kg) per week, in two 8 hour shifts, during the busiest season, which is from December to June. About 80% of the total volume is transported to the blender by the flexible screw conveyor. The rest of the products come ready mixed, or otherwise don't have to be blended, and are conveyed directly to the packaging line by a bucket elevator. In all, the company processes about 50 products, with an average of four or five ingredients per product.

"The problem with the blending operation was not the blender itself, but the way we were feeding the blender," says Schneider. The company receives most of the ingredients in 50 lb (22.7 kg) bags and each ingredient is weighed manually before being added to a batch. Under the former procedure, he explains, the person (or two people) formulating the batch added the ingredients directly to the blender, so that formulation took up part of the cycle time. "It was cumbersome and time-consuming," says Schneider, "but it worked okay when we didn't have a large volume of products."

In the new arrangement the ingredients are weighed and accumulated in a bulk bag until a batch is complete. The bag is then lifted by a forklift and the batch is dumped into a floor hopper, from which it is moved to the blender by the flexible screw conveyor. This ensures that a fresh batch is ready for loading when a blending cycle is complete, says Schneider.

The floor hopper and conveyor were both supplied by Flexicon Corp., Bethlehem, PA. The 8 cu ft (222,700 cu cm) hopper measures 36 in. square and has been designed to encourage the downward flow of material. The flexible screw conveyor is 20 ft (6 m) long and moves the product at a 45° angle from the bottom of the hopper to the blender, which is located on a 7 ft high (2.1 m) platform.



General views of the RitePak operation. Above shows a bulk bag being loaded into the floor hopper, from which the product is moved by the flexible screw conveyor to the blender at the upper left.



A bulk bag is readied for discharge into the floor hopper. The bottom end of the flexible screw conveyor is below and to the left of the hopper.



A rotating agitation device protruding from the hopper wall promotes uninterrupted flow of material into the intake adapter of the flexible screw conveyor.

The Model 1600 conveyor consists of a 6 in. (16.5 cm) O.D. polymer tube, housing a spiral screw that is powered from its top end by a 7.5 hp (5.6 kW) motor. The screw self-centers within the tube, thereby providing clearance between the screw and the tube wall and reducing grinding of the material.

A 1,000 lb (453 kg) batch is transferred from the hopper to the blender in 2-3 min, says Schneider. Mixing takes about 10 min and discharge 2-3 min, for a total cycle time of about 15 min. He adds that the conveyor can be quickly and thoroughly cleaned between batches simply by reversing the spiral.

RitePak's decision to buy the conveyor was based largely on the company's experience with two smaller flexible screw conveyors that it has used in its packaging department since the mid 1990s. Those machines, also supplied by Flexicon, "have always performed well and have been essentially maintenance-free," says Schneider.

An important consideration in the purchase of the new conveyor was the selection of an appropriate screw configuration. This presented a dilemma for RitePak, because the company makes a wide variety of products, thus the conveyor needed to be designed to handle a wide range of materials — for example, those that are free-flowing or materials that tend to agglomerate.

Prior to making a decision, Schneider analyzed the physical properties of two of RitePak's major products: Grass Patch, a mixture of grass seed, mulch materials and fertilizer, and Roach & Ant Killer. Grass Patch is inclined to matt and interlock, while the insect killer is free-flowing and tends to aerate and fluidize.

Since Grass Patch is blended in production runs of up to 100,000 lb (45,360 kg), and the insect killer in quantities up to 20,000 lb, one option was to buy more than one screw and change the screw between production runs. Instead, Schneider opted for a spiral design that would achieve maximum efficiency with the Grass Patch, while still functioning when working with Roach & Ant Killer. RitePak uses the same spiral for both brands, as well as for other products.

As it turned out, the spiral has proved more than satisfactory for the company's needs, says Schneider. "It does a bang-up job on the Grass Patch and an okay job on the Roach & Ant Killer, so we were able to kill two birds with one stone."

One reason Schneider is content with the present arrangement is that the formulation and blending operation is now faster than the packaging line. If that situation changes in the future and the blending throughput needs to be increased, the company may buy one or more additional screws to move their diverse products with maximum efficiency. "It takes only about half-an-hour to change the screw, and that's a short time when you have a long production run," he says.

Each product batch is discharged from the blender into a bulk bag and moved by forklift to the packaging area. There, products are filled into a variety of packages for retail, including 3 lb (1.36 kg) bags, 4 lb (1.8 kg) boxes, 7 oz (200 g) bottles and 1 kilo (2.2 lb) jars.



Although flexible screws are generally specified according to the flow characteristics of individual materials, RitePak opted to sacrifice efficiency with some products by using a flat wire screw for all products, until volume demands justify purchasing screws of other configurations.

There are four packaging lines, but two of them account for about 80% of the total volume. Each of these two lines has a storage hopper, from which product is carried to a filling machine by a 20 ft (6 m) long, 4 in. (10 cm) O.D. flexible screw conveyor. Each filling machine has a level control that automatically stops and starts the conveyor as needed.

Most of the other products are transported by a bucket elevator to a third packaging line without going through the blender, as noted earlier. Product goes directly from the elevator to a vibratory feeder, which discharges into a weigh hopper on the packaging line.

The fourth packaging line is a small, but growing operation where small-volume orders are filled directly from bulk bags during times of peak demand. However, "with business growing so fast, we are planning to upgrade that line by putting in a flexible screw conveyor," says Schneider.



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