Previously, dust was generated at the beginning of the process where gypsum powder is combined with a glue binder to pelletise seeds for packaging and sale. The powder is extremely free-flowing, with a bulk density of 400gm/l.

Bulk bags of gypsum were cut open and emptied into a V-shaped bin feeding an auger that transported the material to a rotary treater. Here, the gypsum is mixed with the seeds and pellets are formed by the rotating action. The machine also adds colour coatings, pesticides and fungicides to the seeds.

SPS solved the dust problem by installing a Flexicon bulk bag discharger. Gypsum flows from the bulk bag into a floor hopper, from which the material is transported to the rotary treater by two flexible screw conveyors. The enclosed process has essentially eradicated the dust problem, says Peter Pearson, operations manager.

The Griffith plant receives gypsum powder in bulk bags of approximately 350kg. Each bag is loaded by a forklift into the bulk bag discharger frame, where it is suspended by four loops, and unloaded into a 140l, V-shaped floor hopper. The bag is opened, the inner liner is cut, and the powder is discharged through an iris valve.

Bag discharge is aided by Flexicon’s Flow-Flexer™ bag agitation device — two pneumatically driven plates that raise and lower opposing edges of the bag to direct material to the outlet. As the bag empties, the stroke of the plates increases, forming the bag into a V shape and promoting total evacuation.

The iris valve essentially eliminates dust, says Pearson.

Nevertheless, the company also uses Flexicon’s Bag-Vac™ dust containment system, which is attached to the discharger frame and removes any residual dust.

“As a result we have a clean and tidy working environment that is safe for the operator,” he says.

Flexible screw conveyor ‘fits in’

Seeds are received in plastic or cardboard bins of approximately 750l capacity, or in 25kg plastic bags. In the case of bins, the lids are removed and they are emptied by means of a special bin tipper. Bags are cut open.

The containers are emptied into steel, wheeled V-bins that move the seeds through a series of process steps for the removal of plant material, soil, insects, stones and light, undesirable seeds.

The main processes are:

- Cleanup by size, using an air screen cleaner that has a series of screens for
scalping and sieving
• Sorting by length, using an indented cylinder that can pick up either the seed or contaminant, depending on the crop type
• Separation by weight, using a gravity table. The seeds pass over an inclined, oscillating mesh deck with a fan that blows air up through the seed
Other cleanup processes include colour sorting, spiral separation and washing.
Following cleanup, the seeds are dried to less than seven percent moisture content in drying bins, and then delivered to the pelletiser by a V-bin.

Rotary treater produces pellets
The pelletiser mixes seeds with gypsum-based powder and a glue binder (as noted earlier), forming pellets, which are easier to plant than single seeds. The machine can also coat the seed with a film containing colourant, fertiliser, fungicide or a pesticide, says Pearson.

Seeds are weighed and then discharged into the rotary treater, while gypsum powder is delivered by the flexible screw conveyors at a rate of 3.5kg/min.
Following the rotary treatment, seeds are dried and graded, then packaged for sale in woven polypropylene bags, plastic pails, cans and foil packages.
Seeds are sold by seed count per kilogram in packages that range from about 15kg for the bags, down to a few grams in the foil packages.
The company has installed a similar Flexicon system in its New Zealand sales warehouse in Pukekohe.

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