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Reliability is key

Insecticide and herbicide producer places heavy demands on rotary batch mixer

Indalva S.L. is Spain's largest toll manufacturer of insecticides and herbicides, producing approximately 5,000 to 7,000 tonne/yr of some 30 different products for about 20 companies, nearly half of which are located in other countries. Established in 1967, the family-run company is also Spain's oldest producer of clay microgranules, which, along with quartz sand, are used as carriers for its insecticides and herbicides. Indalva also sells clay microgranules to other formulators of agricultural and horticultural chemicals.

The heart of Indalva's operation is a rotary mixer of 51 cu m capacity that processes all the company's granular insecticides for soil application (the major product line). Built by Munson Machinery Co., Inc. (Utica, New York, USA), the Model 700-TSC-180 machine mixes liquid chemicals with the microgranules until the granules are evenly impregnated.

Since the rotary mixer is the only one used for insecticides, its reliable operation is critical to Indalva's business. "If anything



Workers package insecticide after it has been mixed by the rotary mixer

goes wrong with the mixing operation it is a big problem for us," says Cayetano Valero, chief executive officer (CEO), "but fortunately the mixer has proven reliable."

The mixer has been in service since 1988, operating up to 10–12 hr/d during the sowing season, and has rarely been offline except for its scheduled annual maintenance, when it is shut down for two or three days. Other than that, oil and grease needs are checked every two weeks.

Indalva puts raw clay through a hammer mill to obtain granules of 1–2 mm. This is done in a different facility than the formulation plant, to which the granules are transferred in 1,000 kg bags. Chemicals are received as powders or liquid in 25 kg bags or 200 kg drums.

At the beginning of the formulation line, bags of clay or quartz are lifted by a crane and emptied into a 10 tonne hopper. The material drops through a port in the hopper into a bucket elevator, which transports it to a 10 tonne hopper that is located on a platform above the mixer.

The hopper that feeds the mixer is set on load cells, and when the preset batch weight is reached, the conveyor automatically stops and the batch is discharged into the mixer. Batch sizes range from 3 to 5 tonnes.

How the mixer works

The Munson mixer is a horizontal drum that rotates on trunnion rings and rollers, located at each end of the vessel, eliminating the need for an internal shaft with bearings exposed to material. The mixer has a stationary inlet at one end and a stationary outlet, with a discharge gate, at the other. Mixing flights, or baffles, tumble the batch in a multi-directional manner, imparting minimal energy and intensity to the product.



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The hopper (on the left) feeds clay or quartz into the 700-TSC-180 rotary mixer. Chemicals are sprayed as the batch rotates

A product may consist of one or several chemicals, which are weighed, dissolved in water and added to the batch as it rotates. The premixed solution is pumped from a storage tank through a tube that runs along the centre, or axis, of the mixer, from which it is sprayed into the carrier material through nozzles. Indalva uses several different sizes of nozzles, for different liquids, says Valero, and they can be set for the appropriate spray pattern. Valero notes that clay microgranules absorb the chemicals, but in the case of quartz an adhesive is included in the aqueous mixture for coating the granule.

Although the mixer can achieve batch uniformity in approximately three minutes, the company runs it from one to two hours to condition the material. At the end of the cycle the discharge gate is opened and the product goes to the packaging line, where it is loaded into 1 tonne bulk bags or small bags of 1–20 kg.

Over the years the mixer has consistently produced a homogeneous, high-quality product, says Valero. He adds that the machine discharges each batch thoroughly, leaving no residual material that needs to be removed.

Due to the toxic nature of Indalva's products, cleaning the machine between batches of different insecticides takes anywhere from four hours to an entire day. "These are dangerous products and we have to clean the machine thoroughly to prevent cross-contamination," says Valero.

Since the avoidance of contamination is critical, Indalva uses no chemicals for cleaning. Also, employees cannot enter the machine because of the toxic atmosphere. Instead, the company uses an inert material—usually quartz—for cleaning. The quartz is loaded into the mixer and scrapes all internal surfaces clean while the machine rotates.

Maintenance has been routine

As for maintenance, most of this work has been during the annual shutdown, says Valero. "We have rarely had to do repairs between scheduled shutdowns," he says. "

Indalva's phytosanitary business has grown rapidly over the years, but it peaked at 10,000 tonnes/yr about five years ago, when the EU promulgated new environmental regulations that restricted or banned the use of some traditional chemicals. In response, the company reformulated its products and sales have been growing again for the past two years.

Anticipating continued growth, Indalva is now considering an additional Munson rotary batch mixer. "We have been happy with this machine," says Valero, "but need one that has more capacity."

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