

**DRY BULK BLENDING
EQUIPMENT**

- Rotary Batch Mixers
- Ribbon/Paddle/
Plow Blenders
- Rotary Continuous
Blenders
- High Intensity
Continuous Blenders
- Vee-Cone Blenders
- Fluidized Bed Mixers

**SIZE REDUCTION
EQUIPMENT**

- Shredders
- Rotary Lump Breakers
- Heavy Duty Cutters
- Knife Cutters
- Pin Mills
- Attrition Mills
- Hammer Mills
- Custom Machinery

PLENCO

Five Minute Blending of Compounds Going on Four Decades

Munson Machinery Co., Inc.

PO Box 855
210 Seward Ave.
Utica, NY 13502 USA
Tel: 1-800-944-6644
(In NY: 1-315-797-0090)
Fax: 315-797-5582

info@munsonmachinery.com

Five Minute Blending of Compounds Going on Four Decades

SHEBOYGAN, WI — Plastics Engineering Company manufactures a wide range of custom-formulated molding compounds and industrial resins.

A big share of its production is dedicated to novolac and resol thermoset molding compounds — also known as phenolic resins — which it sells under the PLENCO trademark. These resins are highly adaptable and used across many applications. As a result, the company tailors its products to each customer's requirements. That could entail adjusting the molecular weight, moisture content, viscosity, pH, particle size, reactivity and other properties.

Immediately prior to packaging, the resins are blended with reinforcements, minerals, fillers and/or liquid additives, a task performed by two model 700-TSC-180-MS Rotary Batch Mixers which have been in service since 1983.

Five-minute tumbling prevents degradation

The mixers have no agitators, internal shafts or related bearings or seals. Instead, a horizontally oriented vessel rotates on external trunnion rings located at each end. Ingredients flow into the vessel through a stationary inlet at one end and discharge through a stationary outlet at the other. Within the vessel are mixing flights, also called baffles or lifters, which create a gentle four-way tumble-turn-cut-fold mixing action that produces on-spec blends in 3 to 5 minutes. Randy Block, a mechanical engineer at Plastics Engineering, says, "We get a good, thorough blend without degrading the product."

To fill the vessels, a pneumatic conveyor transports resins from compounding units to a holding hopper, which also separates out dust. When enough material accumulates in the hopper, it is discharged to one of the mixers as it slowly rotates.

After the mixer receives a dose of powdered additives from a loss-of-weight hopper above, a valve stops the flow and the mixer makes a preset number of revolutions. When called for, liquid additions are pumped through spray nozzles onto a wide bed of moving material within the mixing vessel. At the end of the batch cycle, the mixer's discharge gate opens while the vessel is still rotating. This allows the mixing baffles to guide the batch toward and through the discharge gate with little or no residual. "They do a good job of moving the material quickly and efficiently," Block says. "If we've got a straight dry material, there isn't much to clean out."

The gentle mixing action is critical, Block says, because it preserves product quality. "We get a good thorough blend but we don't degrade the product. If we used a typical paddle mixer, we would grind the granules against each other and create dust. That doesn't happen with the Munson blender." Continuous rotation of the drum during discharge



One of two Munson Rotary Batch Mixers, model 700-TSC-180-MS, installed at PLENCO in 1983.



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Continuous rotation of the drum during discharge prevents stratification of ingredients having disparate sizes, shapes and bulk densities, and empties the batch in a steady stream.

prevents stratification of ingredients having disparate sizes, shapes and bulk densities, and empties the batch rapidly in a steady stream. "That's important because it minimizes wait times at the packing stations," Block says. "Because of that quick discharge, we are more efficient when packing bulk containers."

"We've made the same product as a 5,000 lb (2,268 kg) order and as a 250,000 lb (113,398 kg) order," Block says, "and blending is just as uniform on short runs as it is across larger ones."

The mixing flights also create a dynamic bed of material, ideal for incorporating liquid additions. "We get a good consistent dispersion. The product doesn't get too wet in some parts and less wet in other parts," Block says. "A typical paddle mixer would give us a less even coating."

Since their installation in 1983, the mixers have rarely been idle. Over the last 12 years, one mixer has had 34 hours of downtime and the other just 4.5 hours.

"The longevity of the machines is a testament to my predecessors, who selected them," says Block. "We've been pleased with the lack of downtime and maintenance costs. They're quality pieces of equipment and just plain reliable."

Plastics Engineering Company

1-920-458-2121

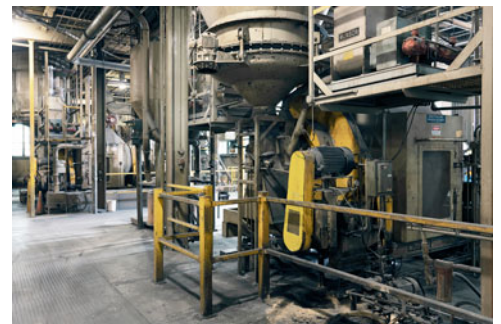
salesinfo@plenco.com

www.plenco.com

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The hinged doors on either side of the vessel provide access to all material contact surfaces for cleaning and visual inspection.



These Munson Rotary Batch Mixers have been in near-constant use since 1983. Records for the last 12 years show that one mixer has had 34 hours of downtime and the other just 4.5 hours.