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Blending abrasives

Exterior coatings producer blends abrasives with no shaft seal wear

Since its founding in 1987, contractors have applied over 9.3 million square meters of Master Wall products – stucco, coatings, and exterior insulation and finish systems (EIFS) – on residential, commercial and industrial buildings.

Master Wall founder and president Steve Smithwick says the company's Aggre-flex EIFS system is "one of the most common commercial claddings in the country." Also termed synthetic stucco, it consists of a water barrier, adhesive, insulation, mesh, base coat and Master Wall's Superior Finishes topcoat – layered with a trowel. Similarly, Master Wall "Superior Finishes over Stucco" systems consist of a water barrier, a base coat and Superior Finishes topcoat. Superior Finishes over Stucco enhances building exteriors with custom colours and textures ranging from fine to coarse sand, to "Aggre-Flex Superior Stone Finish" resembling cut stone.

The topcoats are a challenge to blend, and require a durable, heavy-duty blender, explains Glen Smith, manager of process engineering at Master Wall. The high density topcoats, up to 1600 kg/cu m, are comprised of heavy, abrasive aggregates – coarse particulates of sand and marble – blended with pigments in an acrylic polymer binder. The material caused the shaft seals of Master Wall's blenders to wear and leak.

A succession of blenders

Master Wall's original mixer was a small two-speed propeller-type blade unit placed atop a 114 litre stainless steel pot, producing only three, 19 litre pails of stucco per batch. Master Wall soon acquired a 568 litre ribbon blender, and over the next 13 years added two more ribbon blenders (1703 litre, and 3407 litre) to the Lithonia, Georgia plant. The ribbon blenders combine the ingredients producing the water barriers, base coats and Superior Finishes topcoats. Today the plant produces thousands of 19 litre pails of products in one shift.

In 2006, Master Wall opened a plant in Payson, Utah to better supply the western US. The company specified a Munson HD-48-SS ribbon blender having a 2839 litre capacity equivalent to 150 19 litre pails per batch, to handle the heavy-duty coatings mixing jobs.

Ribbon blender performs heavy-duty task

When blending the coatings, ingredients are added to the 2.8 cu m ribbon blender in several steps. First, liquid acrylic polymer and water are metered by a pumping system. While the blender is running, 23 kg bags of pigments and fillers, together with various pre-weighed chemicals, are manually dumped into the blender. Next, pre-weighed aggregates are added from self-dumping hoppers using a forklift. Typically, the blend contains about 25% liquids and 75% solids.

The blender runs at full speed for the entire mix time of a batch, which is usually about 1 hour. Once mixing is complete, a sample



ABOVE: Operator adds pre-weighed aggregates from self-dumping hopper to the Munson HD-48-SS ribbon blender

is taken for quality control. An operator measures viscosity and pH, and visually compares the sample to a control. When the batch is approved, material is discharged through a manual butterfly valve into 19 litre pails, which are palletised for shipping.

The 1.6 to 0.8 mm clearance between the ribbon blades and blender trough minimises residual material after discharge. "The Munson blender blades sweep closer to the wall than our other blenders, resulting in less waste," reports Smith. Cleaning between batches is not usually needed (production is scheduled so that products with increasingly larger aggregates follow those with smaller aggregates); the blender is simply washed out at the end of the day. While batch sizes vary, the largest batch size is 2839 litres – about 453 kg of material – utilising the blender's full working capacity.

The blender's double helical ribbon agitator design is energy-efficient and offers faster blend times than other ribbon configurations. "With our other blenders we sometimes have to go longer than the desired time to fully homogenise the powders, but with the Munson we can sometimes mix in less than the set time due to the 2-to-1 length-to-width ratio of the double helical ribbon agitator," says Smith, noting that the 30 kw motor maintains consistent speed when heavy materials are added.

Air-purge seals solve leakage problem

According to Smith: "We run our machines hard." The blender withstands non-stop, all-day mixing of abrasive material without premature seal leakage. In ribbon blenders, packing glands create a mechanical seal where the shaft penetrates the blender wall. The abrasive material in Master Wall's blends was wearing away the braided Teflon packing of the blenders in the Georgia plant, allowing material leaks, requiring packing to be replaced monthly, and shafts to eventually be replaced, incurring two to three days of downtime.

To prevent the problem, the new blender is equipped with air-purge shaft seals that apply positive pressure to drive abrasive particulates away from the seals, which show no signs of wear or leakage two years after installation.

Blender features improve operator safety

Master Wall specified four safety grates that cover the top of the ribbon blender and trip "kill switches" if moved, enhancing operator safety. The safety grates and switches are integrated into the machine with a flush-mount sensor. Master Wall also specified lids with dust collection ports on the back half of the blender top that rest on heavy-duty stops when open. Negative pressure dust collectors pull dust out of the blender into a bag house, so that little dust escapes into the work area, despite the quantities of dusty material being used. Low noise levels are another plus for operator safety. The chain that transfers power from the helical gear motor to the blender's agitator sprocket runs through an oil bath, providing an added measure of safety by reducing noise.

Specifying a blender to meet Master Wall's needs

In planning the construction of the Payson, Utah plant, Munson representative Bob Jeremias of TEC Engineering helped engineer the blender and dust collection system while Steve Knauth of Munson configured a model to meet Master Wall's needs, including safety features and the air-purge shaft seal system. Smith says: "We needed a durable machine. Just looking at the blender you can tell it's a heavy-duty machine because of its sturdy construction."

The company plans to purchase the same brand of ribbon blenders for its Fortson, Georgia plant.

For more information visit: www.munsonmachinery.com



The double helical ribbon agitator blends rapidly



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