

Reduce Energy Costs with a Fluid Bed Dryer



One construction dry products manufacturer realized energy savings and improved productivity following a switch to fluid bed drying.

At construction sites in northern Illinois and southern Wisconsin, particularly at those for major building projects such as schools, hospitals and shopping malls, it is commonplace to find 25' high white silos with the blue stripe and Maxit logo.

Contractors have known for years that the Maxit m-tec silo system is a perfect solution for supplying materials at large construction jobs. The silos, equipped with either a mixer or a pump, are transported to construction sites and filled by trucks, constantly providing preblended mortar, grout and plaster for construction. In some cases, Maxit silos have been on site for as much as two years.

Maxit, known as Silo-Mix until 1997, is the U.S. operation of Heidelberg-Maxit Inc., Breisach, Ger-

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Sand is the common and most critical component for all Maxit products, says Arnold Germann, president of Maxit U.S. The Antioch plant processes more than 70,000 tons of sand annually, ranging in size from fine (up to 1 mm) to coarse (between 2.5 and 4 mm) to pea gravel, first drying it before blending into mortars, flooring products and concrete.

But, the rotary drum dryer that Maxit used to dry the sand had proven a hindrance to production, and Germann was not happy about it.

THE SHIFTING WINDS OF CHANGE

One shortcoming of the rotary drum dryer, which was outside behind

the plant, was that sand used in blending building products had to be dried at a very high temperature — between 400 and 500°F (204 to 260°C), so cooling it after drying was a long and difficult undertaking, Germann says. Once the sand exited the cooler drum, its temperature normally was between 150 and 200°F (66 and 93°C).

“Also, because the rotary drum had so many movable parts, with a drum for drying, a drum for cooling and connections between the drums, it was hard to maintain and repair, so downtime had become a major issue for us,” Germann says.

Then there was the wind. “The drums were not sealed completely, so when we had a strong wind from the west or east, it affected our production,” Germann notes. “If the wind was from the west, it added air to the back of the flame, so it was drying better. But if the wind was from the east, it pushed the flame back, so it was drying slower. The difference wasn’t huge,

maybe only two tons an hour, but when we're doing 70,000 tons of sand a year, that's a lot of hours if you get slowed down."

Germann needed a solution to rotary drum dryer's inadequacies, and found it at Ventilex USA in Cincinnati, Ohio, in its fluid bed dryer and cooler with a heat recovery system.

Germann says that even though he was familiar with the efficiency of Ventilex dryers because they are used in Maxit plants in Europe, he studied fluid bed dryers from several other companies during his search for an alternative to the rotary drum dryer. The other candidates didn't make the cut for final consideration, however, because they all seemed to have too many movable parts — not unlike the rotary drum, Germann noted — and he feared that maintenance would be problematic.

A QUESTION OF THERMS

Maxit U.S. chose Ventilex's fluid bed dryer because it is a simple, easy-to-operate and efficient dryer with a proven history of low maintenance and high productivity, Germann says.

The improvement in heating and drying temperatures has been dramatic. The fluid bed dryer dries sand at 200°F and the sand exits the cooler between 80 and 100°F (27 to 37°F), both less than half the temperature of the rotary drum dryer.

In addition, the Ventilex fluid bed dryer proved much more sophisticated than the other dryers he investigated, Germann says. "For example, all the dryer's electric motors have two speeds, which means they start out slow to reach a certain RPM, then kick into full speed. What's more, we get a signal back from the motors to our control panel that communicates everything that is going on with the motor. We always know how the motors are behaving, so if there's a problem, we can turn off the dryer before any damage is done."

Germann said he was assured that the fluid bed dryer's heat recovery system would cut energy costs, but he had no idea that it would save as



Maxit's President Arnold Germann explains his savings to Marc Bazilovic of Church and Dwight.

much as it does.

"I figured that we would save a little on energy but I was mistaken — in reality we're saving almost 50 percent in energy costs with the Ventilex, and that is just unbelievable," he said.

Germann proved the energy savings to himself with a simple comparison test. In one month, the old rotary dryer processed 5,375 tons of sand and consumed 18,000 therms of energy (one therm equals 100,000 BTUs), or 3.34 therms a ton. After the Ventilex was installed, a similar analysis revealed that the fluid bed dryer processed 5,031 tons in a month and used only 10,500 therms, or 2.09 therms a ton.

"I didn't believe the savings would be that much. And while we're cutting energy costs, we're maintaining production rates because the fluid bed dryer is exceeding the output of the old rotary drum dryer," Germann noted. The rotary drum dryer's output could vary widely between 15 and 27 tons an hour while the Ventilex fluid bed dryer consistently throughputs from 23 to 28 tons an hour.

HIGHER THROUGHPUT, LOWER COSTS

The Ventilex fluid bed dryer heat recovery system saves money on gas bills because the control system has been refined to accurately regulate the product moistures after cooling — even with varying inlet moistures. Product throughput is adjust-

ed to maximize and reduce energy consumption.

Normally, sand dried in a fluid bed dryer must cool before it is sent to the silo or bagging line because of its high residual heat. But by passing ambient air over it during cooling, then recycling the warm air to the burner inlet section, the Ventilex fluid bed dryer conserves great amounts of energy and lowers the amount of energy needed to raise the air temperature for drying.

The ability to heat air to temperatures as high as 1,000°F (550°C) means the fluid bed dryer can be engineered smaller and less expensively, substantially reducing the footprint of the equipment and saving money on floor space. The fluid bed dryer is only half the size of a rotary drum dryer with the same capacity.

The Ventilex fluid bed dryer utilizes shaking to convey sand, accomplished with a simple cam action that raises the amplitude and greatly lowers the frequency of the vibration. The result: no stress cracks, no loose nuts, bolts, screws and rivets, and trouble-free product transportation, in direct contrast of the usual damaging side effects found in vibrating fluid bed dryers.

Reaction to the fluid bed dryer has been extremely positive throughout the Maxit plant, Germann says, "because it is fully automatic and easy to operate — simply adjust a couple of settings and the dryer will run all day."

Previously, only one employee in the plant possessed the expertise to operate the rotary drum dryer because he knew exactly what must be adjusted when the wind shifted. Now, any of four employees, including Germann, can run the dryer because it is so easy to operate. "We don't have to be weathermen to operate the Ventilex," he added, laughing. **PH**

For more information on Ventilex's fluid bed dryers:

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