

Screening solution

A metal manufacturer uses custom screening services to solve a metal powder screening problem.

Custom processor

A major metal manufacturer faced a dilemma: One of its customers needed an extremely fine metal powder with absolutely no oversize particles. The metal manufacturer produces many metal powders and could produce the powder the customer wanted. However, it found that for this material it couldn't guarantee that no oversize particles would get into the final product because its screeners weren't able to efficiently screen the dense, fine powder that has a tendency to agglomerate. The manufacturer wanted to take on this customer's job, but it would first have to find a way to solve this problem.

Without knowing how much business this job would bring in, the metal manufacturer was reluctant to consider a major capital investment, so it decided to look for a custom processor that could handle the final powder screening. It contacted several processors, but none of them could screen the powder to the required specification.

Then a technical staff member mentioned that in a previous job he had learned about a high-energy screener that might do the job. The metal manufacturer contacted the distributor, Minox/Elcan Industries Inc., Mamaroneck, N.Y., and talked with its president, Bob Grotto, about its screener technology.

Testing the custom processor

The initial conversations between the metal manufacturer and the screener supplier were very promising, and within a matter of a few days, the metal manufacturer had sent 1,000 pounds of the fine metal powder to the supplier for testing. It also sent a technician and its plant engineer to participate in the tests. In the meantime, the supplier had hustled to make the test center ready for testing the metal powder. Since the metal powder is potentially explosive, it would have to be run under a nitrogen blanket. Because the supplier had to eliminate all potential static electricity sources, it moved other all electrical equipment out of the testing area,



The metal manufacturer's material is processed in this bay of the custom processing and test lab facility.

painted the floor with a static-resistant paint, installed explosion-proof motors, and installed the nitrogen tanks and other necessary equipment.

One thing about the tests was simple: Only one machine had the potential to screen the metal powder successfully. That was a round vibratory screener developed by Kroosh Technologies Ltd., Ashdod, Israel, and distributed in the US by Minox/Elcan. “This screener is perfect for all of these metal powders. Metals, being so heavy and dense, require energy, and this machine produces exponentially higher energy levels than anything else available,” says Grotto.

The Kroosh ULS-48 is a 48-inch-diameter round vibratory screener with a multifrequency adapter that converts the single-frequency vibration of the screener’s motor into multifrequency vibration. To compare, consider how single-frequency vibration affects particles on the screen: The harmonic oscillations are stronger at the screen’s

edge and decrease as they move toward its center. In contrast, the multifrequency adapter, via a resonating unit mounted immediately underneath the untensioned screen, creates strong oscillations of varying frequencies and amplitudes throughout the screen, ensuring that all layers of the material on the screen are worked over and effectively screened. The screener’s multifrequency action is completely mechanical and affects the mesh only, not the screener frame.

Over the course of several hours, the screener supplier ran the 1,000 pounds of metal powder through the screener at 325 mesh. “The first batch went slowly because of the extensive testing we did,” says Grotto. “We ran for five minutes, then had a waiting period so we could safely open the inspection port and see what was going on inside. Then we ran for fifteen minutes and went through the same process. After that we ran for an hour, stopped to inspect the screen, and conducted a final run to finish the feed. After each screen inspection, we

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This small lab is a controlled environment for materials that require extreme purity or clean conditions. A 14-inch tumbler screener is shown processing material.

increased the feedrate and ended up with a layering [the bed thickness that controls dwell time] that was still on the supersafe side.”

In the end, the testing results were just what the metal manufacturer was looking for — nearly 100 percent efficiency.

Working with the custom processor

In September 2004, the metal manufacturer began using the screener supplier’s custom processing services. It ships the metal powder in drums to the supplier by truck. A drum dumper dumps the powder into an enclosed hopper above the screener. A volumetric feeder controls the material discharge from the hopper into the screener. At the same time, nitrogen is released into the screener at a controlled rate to prevent any reaction.

The screener’s action distributes the material over the entire screening surface, breaking down any agglomerates into individual particles and facilitating the particles’ rapid movement through the screen and into closed drums for shipping back to the customer. The less than 1 percent of oversize particles discharge into a separate drum and are returned to the customer for use in other products.

Things have consistently run smoothly. “Bob really knows his equipment,” says the metal manufacturer’s operations manager. “His advice has been good, and he’s very easy to work with, very willing to meet his customer’s needs.”

In fact, the screener supplier had to do quite a bit to accommodate this customer’s needs. As an ISO 9000-approved material supplier, the metal manufacturer had some stringent standards that had to be met. “After we initiated their services, we visited them again to audit their process,” says the operations manager. “They were very willing to participate in the audit. One requirement is that every process has to be done the exact same

way every time. The supplier was able to do this for us.”

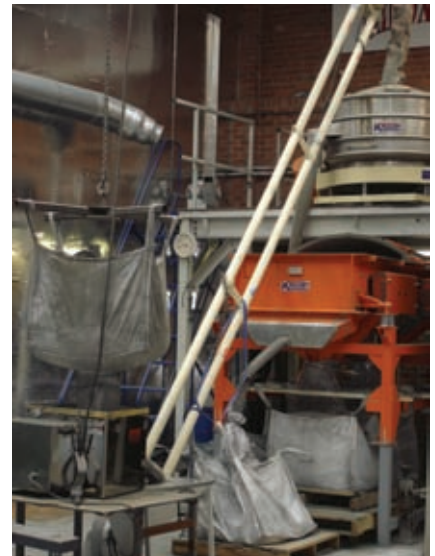
In the first year of their relationship, the screener supplier has processed the metal powder nearly monthly, for a total of 156,900 pounds. The metal manufacturer has also had the screener supplier screen another, more granular material for another customer, and it’s used the screener supplier’s testing services. The metal manufacturer expects to continue using the screener supplier’s services for the foreseeable future.

About the custom processor

Minox/Elcan supplies various screening equipment, with Minox tumbler screeners and Kroosh vibratory screeners being its main product lines. Until a few years ago, the supplier did an occasional custom processing job in its test lab. But in 2000, with the economic slowdown, the supplier began seeing more customers who were reluctant to make capital investments but were interested in having custom processing done. Companies that couldn’t justify significant capital expenditures still needed to do screening.

In fact, this is one of the primary reasons companies decide to use custom processing services. While in the long run it might be more economical to purchase equipment outright, the resources aren’t always available, or a company may be testing a new product and not be sure of how the market will accept it, so it doesn’t want to purchase equipment that it will end up not using for long. Sometimes a company simply doesn’t want the complications of buying and using yet one more piece of equipment.

The supplier found that as its custom screening jobs increased, doing them in the test lab wasn’t convenient. While doing a custom job, the supplier couldn’t do testing for customers. The supplier would also have to move equipment around and had to rent space near the plant to store



This is the facility’s primary large tolling bay. It has multiple configuration possibilities with various screeners.

equipment and material not being used during the custom job.

The toll processing center now has 7,000 square feet, five bays that together can accommodate several tolling or testing jobs simultaneously, and two separate, enclosed laboratories for running tests and jobs that require absolute purity.

Because Grotto was convinced that demand for his company’s custom processing services was going to grow, he began looking for a way to acquire more space. In June 2001, the company moved into new quarters. The toll processing center now has 7,000 square feet, five bays that together can accommodate several tolling or testing jobs simultaneously, and two separate, enclosed laboratories for running tests and jobs that require absolute purity. “We can pressurize these labs,” says Grotto, “and really keep it pure and clean in there.” The new space also has plenty of storage room and a wide open layout that allows operators to move



This lab can be closed off to prevent cross-contamination with materials being run in other tests or custom jobs.

themselves as well as bulk bags of material around with ease.

Potential custom processing customers provide MSDS forms and also fill out a questionnaire that asks for detailed information about the material to be screened and the desired results. Then the customer sends a sample of material to be tested on one or more of the several available screener types. Grotto says he always requests a minimum of 1-hour-running of material, “but it’s great if we can do more. If you run a test for five minutes for someone, you really haven’t shown them what a machine can do. In the first five minutes, a lot of screeners do fine, then they start to blind, or screens start ripping, or all kinds of other catastrophes can happen.”

He also says that when he’s able to do longer tests, he has enough material and time to really focus on that one material and perfect the running of the screener with it. He can make all the little changes and nuances that make the screening go well.

“When you have great technology, it’s not just the screener,” he says. “It’s technique as well. I say we’re seventy percent technology and thirty percent technique. And that technique of making this really good equipment run well is what we do best.”

Grotto says he can screen just about any kind of material — minerals, cosmetics, crumb rubber, high-grade plastic resins, and nearly anything else imaginable. Currently, the company custom-processes from about 100,000 to 1 million pounds of material per month.

He says that toll processing is one of the most important additions he’s made to the business: “It’s not only a revenue source but a real proving ground for our customers who are interested in purchasing a screener. I had one company that had us run 40,000 pounds of material to make sure it would work the same through the whole run. It did.” **PBE**

Note: To find other articles on this topic, look under “Screening and classifying” in *Powder and Bulk Engineering’s* comprehensive article index at www.powderbulk.com and in this issue.

Minox/Elcan, Mamaroneck, NY
800-283-5226
www.minox-elcan.com