SUPPLIERS' TIPS

What can I learn from grinding tests of my material in a manufacturer's test equipment?

While past experience is a factor in selecting a mill for your application, testing in the manufacturer's equipment will give you confidence that you've selected the appropriate machine. Many suppliers don't charge for testing in their equipment, so it's to your benefit to take advantage of this opportunity.

Testing at the manufacturer's facility will:

- Determine application suitability. Product testing in a manufacturer's equipment is very important in determining whether a particular machine is suitable for your application. While different machines from various manufacturers — and from the same manufacturer — may be capable of performing the specified function, testing will show which machine will excel in performance as opposed to being only adequate for the task.
- Determine equipment sizing. Testing will determine the throughput rate under particular conditions. Various operating speeds, classifying screen sizes, and feeding methods can influence the throughput rate and are important factors in determining the equipment size required.
- Determine any equipment modifications needed to optimize performance. Testing will show how the machine has to be configured for efficient use in your production line.
- Determine any issues that need to be addressed with upstream and downstream equipment. Testing allows you and the manufacturer to discuss which methods are best for introducing your material to the machine and which collection methods are suitable. This is also a good time to discuss what needs to be done to interface with ancillary equipment.
- Address other issues, such as whether a design is easy to service and maintain and whether cleaning will be an issue. While one particular machine may perform a task well, another may ultimately prove more cost-effective or efficient in the production environment. Service downtime, screen changeover, cleaning, and component wear are all important considerations when selecting equipment.

Inspect the manufacturing facility and meet key personnel. This will build your confidence that you've chosen the right manufacturer to build your machine. Reputable manufacturers want you to be pleased with their equipment after the purchase, so product testing ultimately benefits both you and the supplier.

Steve Knauth, sales manager, Munson Machinery, 800-944-6644

How can I choose a mill that will handle my slightly oily material?

Grinding an oily material can be challenging, but it's not impossible. Selecting the right mill will depend more on the application than the amount of oil in your material. Generally, both roller mills and hammermills can process oily materials. Hammermills are typically used for fibrous or tough-to-grind materials and for fine grinding applications. Roller mills tend to suit friable or easy-to-crack materials.

You can take steps to reduce the difficulty of grinding oily material. With a hammermill, important factors are screen area, screen mesh size, air volume and velocities, and feedrate. Using too much air will result in passing the oily material into your fan and ductwork, requiring more frequent cleaning. With a roller mill, important factors are roll surface area and corrugation profile, roll gap, and feedrate. Surface area and rate are key for both hammermills and roller mills — the larger the area to distribute the workload, the longer the mill can run without interruption from material blinding the screens or corrugations.

Chris Obermeier, applications engineer, CPM Roskamp Champion, 800-366-2563

When milling slightly oily materials, first determine your particle size distribution requirements. What is the starting particle size and oil content? Is oil present from the start, or does it increase as the particle size is reduced? A multiple-stage milling process moving from coarse to fine may be required. Also, review the temperature limitations of the material and its oils. The grinding process will be putting energy into the material, generating heat that could damage the material or its oils.

For coarse to medium-fine applications, consider using an impact mill, but try to avoid using screens, which may cause material buildup, machine clogging, or both. You may need to consider cooling your process air or full cryogenic grinding depending on your material's fineness, oil content, and temperature sensitivity. Cooling may also help increase the benefits from impact and reduce material smearing or buildup in the grinding system. For example, many spices are impact milled using cooling or cryogenic grinding because cold grinding helps embrittle the material for a more efficient use of the grinding energy. This also prevents the essential oils from volatilizing, maximizing the quality of the spice.

When designing a system, minimize areas where material can build up in the grinding chamber, use polished finishes on metal surface areas, and maximize radius bends in any conveying ducts.

If very fine particle size is required, consider using an air classifier mill or jet mill. Alternatively, if the material will end up wet in its final stage, then consider using a wet media mill. All of these fine grinding operations will most likely require pregrind steps to first reduce particle size.

Patrick Salvi, northeast regional manager, NETZCH Premier Technologies, 800-676-6455

Equipment suppliers are a valuable source of information about equipment and processes. In light of this, each month we ask suppliers a question of concern to our readers. Answers reflect the suppliers' general expertise and don't promote the suppliers' equipment. If you have a question you'd like suppliers to answer, send it to Kayla Carrigan, Associate Editor, Powder and Bulk Engineering, *1155 Northland Drive, St. Paul, MN 55120; fax 651-287-5650 (kcarrigan@cscpub.com).*