For smooth line performance, pay attention to powder packaging and storage

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Anyone with finishing experience knows that to slow solvent evaporation, a liquid paint must be kept in a closed container in an area that has a moderate temperature. But powder coatings are solvent-free solids, so who cares how they're stored—right? And, a box of powder is a box of powder, so the type of container powder is packaged in doesn't affect the performance of the finishing line—correct? As they said in the movie “Wayne's World”—“Not!”

Like most things in the paint business, powder packaging, handling, and storage aren't totally simple or impossibly complex. It's worth an end user's time to learn about them because they play a part in determining how efficiently a line runs.

Powder packaging and handling

Generally speaking, the volume of powder a job requires and the number of color changes and powder chemistries involved should determine the size of the powder shipping container. If a job requires small quantities of powder, frequent color changes, or the use of more than one powder chemistry, then standard 50-pound boxes are the best choice.

If the job entails long production runs that use moderate-to-large amounts of powder, one or few colors, or powders based on a single chemistry, then the end user should consider requiring that powder be packaged in 300-pound cardboard drums or in 1,500-pound Gaylords (straight-sided, returnable cardboard containers).

Powder received in larger containers offers the end user advantages in cost and housekeeping. In terms of cost, powder vendors give end users a price break for receiving powder in larger containers. In terms of housekeeping, when an end user receives large containers, the containers are handled infrequently, and housekeeping improves. But when an end user who uses moderate-to-large amounts of powder receives powder in 50-pound boxes, housekeeping suffers. Fine dust escapes every time a box is opened, moved, and emptied to empty it into the hopper. And in a system that uses moderate-to-large amounts of powder, boxes are emptied constantly. By the end of the week, a fine film of dust covers everything in the application area.

Using large containers has disadvantages, however. Disposal is one. It is often easier to find a disposal source for 50-pound boxes of powder than it is for larger containers. Another disadvantage is that large containers can't be emptied by hand.

An automatic vacuum pickup system or other automated system is needed to empty them.

In addition, powder compacts when it's shipped in large containers, especially when it travels a long distance from the powder manufacturer to the end user. When the container is connected to a vacuum pickup system, the operator will have to monitor the powder closely to keep it flowing. If it compacts, it will form a rat hole, bringing the pickup process to a halt. One method of avoiding rat holing is to use a tilt-over dump unit instead of a pickup system. The dumper hoists and tilts 300-pound drums, emptying them by using the tilting action and gravity to overcome powder compaction.

Tilt-over dumpers don't work with 1,500-pound Gaylords, but a method exists for emptying them also. This system empties the powder in the Gaylord into a large feed container. A funnel-shaped feed area in the bottom of the feed container pressure feeds the powder to the hopper.

Powder storage

Once the end user decides which types of containers are optimal for the various jobs the line runs, it's time to consider powder storage conditions. Powder storage is important: When application problems
arise, especially in the summer, powder storage, not mechanical problems, may well be the culprit.

Moisture control. The key to successful powder storage is humidity control. The best place to store powder is in an air conditioned room located reasonably close to the application area. Relative humidity should be maintained in the range of 40 to 60 percent.

Temperature control. Temperature is less critical than humidity in powder storage. Ideally, the temperature in the storage room should be about the same as that in the application area. A storage area kept between 40°F and 85°F is fine, though, and temperatures can even reach 90°F or 95°F without causing a problem. Many powders will not fluidize or spray correctly if they are stored at 100°F, however. Unfortunately, it's impossible to tell by looking at them whether they will cause application problems. The safe practice, therefore, is to keep the storage temperature below 95°F. Some users store powder in ambient conditions. About a day before they plan to spray the material, they move it into the application room and allow it to come to room temperature.

Increasingly, end users are demanding powders that cure at temperatures below 300°F. Such powders require careful storage, and powder suppliers should make it a point to request that end users control storage conditions tightly. Low-temperature-cure powders have no tolerance for warm, moist conditions, so the storage area must be kept at a moderate temperature and at low-to-moderate levels of humidity. Some users build the application room larger and store low-temperature-cure powders in the application area. Others simply add a small room and condition it with a duct from the application room's air conditioning system. Or they use residential room air conditioners, which work very well.

It's important to remember that no matter where powder is stored, if an open container of powder isn't emptied completely, the poly bag in the container should be closed to keep moisture and dirt out of the powder.

that remains. Keeping a powder line running smoothly depends on paying attention to small details such as this.

Note

1. A rathole forms when compacted, stagnant powder gains sufficient strength to remain in place. When this happens, the feeding operation halts as little or no powder is free to flow to the pickup tube. (Sources: (1) M.E. Payed and L. Otten, eds., Handbook of Powder Science and Technology. (New York: Van Nostrand Reinhold, 1984), 381. (2) Pneumatic Conveying Systems and Components: Pickup Adapters. Publication No. 1016. (Belleview, N.J.: Vac-U-Max, 1960), 1-2.)

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