SUPPLIERS' TIPS

What type of bag filler and packaging material should I consider for my lightweight powder?

There are three truths to remember when packaging lightweight materials:

1. Even though you're filling bags by weight, you also have to think about the material's volume. Almost all 50-pound-bag filling machines are designed to handle around 40-lb/f^3 material, so if your material is a half or a quarter of that bulk density, you'll need a larger machine to maintain the same gravimetric filling rate.

2. The material picks the machine, not the other way around. A machine that can bag 30 pounds of ping-pong balls is a whole different machine than one that can bag 30 pounds of cotton balls. Every material has an optimal feeding method. You have to start with a feeding method (gravity, vibratory, screw, or air) that works with your material and then you can start working on upsizing the machine or decreasing the filling rate.

3. Speed is never going to be your friend. As bulk density goes down, usually the time it takes the machine to manipulate bags and allow material to settle and stabilize while maintaining good dust control increases. Be realistic about your filling rate expectations.

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Filling bulk bags with lightweight powders can pose two special challenges:

1. Densifying the bulk material. Many low-bulk-density materials are easily aerated and difficult to densify, which can cause a bag's volume to fill up before the desired filling weight is achieved. Aerated materials can also destabilize the bag, causing it to tip or compress during shipping and storage. Avoid feeding the bag filler using a pneumatic conveying system as this can further aerate the material. Also, specify a bulk bag filler equipped with a programmable vibratory deaeration deck that densifies the material at timed intervals during the filling process. This minimizes filling-cycle times while improving bag stability.

2. Dust containment. Since low-bulk-density powders tend to become airborne, use an enclosed conveyor or overhead storage vessel with dust-tight connections to the bulk bag filler to source the material. In addition, the bulk bag filler should be equipped with a fill-head port that vents displaced air and dust generated from the falling material to a dust collector or baghouse, preventing material and plant environment contamination.

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Generally, low-bulk-density powders have a small particle size, low to zero moisture content, low to no cohesiveness, and free-flowing characteristics. These powders also have at least a 10 percent difference between their tamped and untamped bulk densities. Often, these powders are easily aerated and can become fluidized when being conveyed.

To produce safe and stable filled bulk bags, you must deaerate or densify the powder while it's being filled into the bag. Ensure that the bulk bag filler you're considering can densify your powder to at least 95 percent of its tamped bulk density before the bag leaves the filling machine.

Given your desired bagging rate, the time for each task in the filling sequence can be calculated. The filling machine's method of densification must be able to achieve the desired bulk density within the allotted time. As the bagging rate increases, the densification time decreases, increasing the importance of the densification method.

Weighing accuracy and consistency is also important. As a powder's bulk density decreases, the weight gain in the bulk bag over time decreases. Therefore, the weighing system's resolution and consistency become critical, so the weighing system must be able to sense smaller weight variations. An increased bagging rate compounds the challenge and further emphasizes the need for a consistent, sufficiently high-resolution weighing system.

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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).*