

SUPPLIERS' TIPS

What should I consider when choosing a dryer to handle fragile particles?

Drying fragile materials while maintaining their particle size is a difficult task. Consider the following questions to select the best equipment for this application:

1. How is drying accomplished? Many dryers use rotating components to disperse wet feed into the hot airstream. These rotating components are problematic because they cause particle impacts that break these fragile materials.

2. How is the dried product collected? Many dryers use a pneumatic conveying system to transport materials to be dried. The conveying system's air velocity, along with its various elbows, transitions, and discharge rotary valves, cause particle impacts that result in breakage. The dried product will typically discharge from the pneumatic conveying system through a rotary valve. Such a valve has a tight rotor-to-wall clearance, which also results in fragile material breakage.

3. How is the heat applied? Direct-contact dryers allow wet materials to dry in contact with heated air, without the close interaction with metal surfaces required in indirect-contact dryers. Indirect-contact dryers typically require a heated surface in close proximity to a rotating disc, paddle rotor, or screw to achieve heat transfer. These rotating components can damage fragile materials by pinching or impact.

Therefore, to dry fragile materials, a dryer that gently applies direct heat to wet material is required. Considering a slow-speed belt dryer or fluid-bed dryer is a good place to begin your inquiry.

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Drying fragile materials without damaging the product begins with selecting a drying technology that minimizes product agitation during the drying process. A single-belt conveyor dryer is well suited to drying fragile materials since the product is never reoriented as it's gently carried through the dryer by the conveyor belt. However, some products are even too fragile to be loaded and stacked onto the bed of a conveyor dryer. In these cases, it may be necessary to use a batch tray dryer. This often means manual loading of the material onto the trays.

In addition to gentle handling, fragile materials often require gentle drying to eliminate particle cracks that can result from the stresses induced by the drying process. This may mean drying at low temperatures or even using desiccated air or vacuum. For example, low-temperature tray dryers with desiccated air are common in the pharmaceutical industry.

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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, Assistant Editor, Powder and Bulk Engineering, *1155 Northland Drive, St. Paul, MN 55120; fax 651-287-5650 (kcarrigan@cscpub.com).*