How can I control dust in my bagging operation?

Controlling dust in bagging operations involving fine powder ingredients is very important. OSHA has dust control requirements to prevent health risks from general nuisance dust, USDA 3-A has sanitary standards to prevent microbial growth and provide a hygienic environment, and OSHA NEP and NFPA have guidelines to prevent combustible dust formation leading to dust explosions. All of these are important standards and guidelines to follow.

In general, the major emission sources from bagging operations are open transfer points, spillage from feed nozzles, feeder shaft seals, and equipment flange and gasket joints. Leakage could result from an improper or weak bag that splits or from a badly sealed bag. In any manual or automatic bagging operation, accidents do happen, such as when a dropped bag with powder spills all over the packing room.

Here are some potential design measures that can help provide effective dust control:

- Select a proper bag material that’s strong enough to withstand your powder’s weight and also the weight of other bags when stacked on pallets for storage. Other important bag selection factors are moisture- and air-permeability and weather resistance during storage.
- Ensure that the bag clamp holding the bag mouth on your bagging machine is totally enclosed and fully sealed during the fill operation to prevent powder spillage.
- Properly vent the bagging machine’s fill head and maintain it at a slight negative pressure to extract and exhaust the fine expelled during the filling process. Depending on the powder grade, the dust can be returned back to the system or exhausted to a remote dust collection system.
- Preferably, bag mouths should be heat-sealed and not tied, and bag seals should be tested frequently for leaks. Also, avoid bag stitching because there’s always the chance that a weak thread or a bad stitch could cause powder leakage. With food powders, there’s also a chance of the thread harboring microorganisms.
- Monitor dust collector performance regularly. Maintain dust transport velocity from 3,500 to 4,000 fpm and dust hood capture velocity above 100 fpm (Refer to the American Conference of Governmental Industrial Hygienists [ACGIH] Industrial Ventilation Manual — for detailed recommendations.)
- If you’re handling food products, follow the USDA recommendation and make your packing area an enclosed room maintained at slight negative pressure to prevent dust drifting into the process or warehouse areas.
- Follow effective housekeeping practices by cleaning product spills immediately with portable vacuum cleaning equipment to prevent dust dispersion.

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It’s critical to control dust and residual product directly at the bag and the bagging machine. A properly closed and sealed bag that doesn’t leak is the best way to ensure product containment. A dust-collecting vacuum system is also important. This will remove any fugitive dust that may escape during the filling and bagging process. Another option is using a palletizing system that includes an additional bag-cleaning and -dedusting station installed after the bagging operation. This station will clean all sides of the bag’s exterior of any residual product using rotary brushes and a vacuum 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).