

How can I prevent material degradation during screening?

Nature has determined that there are two major ways to screen a product — vibration and gyration. Gyration is generally the better choice when handling a friable material. The gyratory motion is significantly gentler because it uses a soft tossing motion to stratify and move the particles across the screen surface, whereas the vibratory method shakes the machine and vibrates the screen to accomplish this. It's easy to figure out which method will damage the material more.

There are two major contributors to material degradation during screening — the energy imparted to the material and the dwell time on the screen surface and in the machine itself. Many screeners leave material on the screen surface for a long period of time in order to improve the cut efficiency. However, the best dwell time is one that's controlled to eject the oversize materials off the screen as soon as the desired efficiency requirement is met. Tumbler screeners are often the best choice in these situations because they have an adjustable 3-D motion that can infinitely adjust dwell time. Additionally, the tumbling motion in these screener types are gentler than a vibratory motion.

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There are several things you can try to minimize material degradation during screening:

- Reduce the impact of the material at the feed point onto the screen mesh. This can be done by minimizing the fall of material onto the screen, which typically involves reducing the distance between the feed pipe and screen mesh. You could also use a velocity breaker and feed distributor at the screener's feed inlet to reduce the impact of material to the screen mesh. When dealing with inline screening in a pneumatic conveying system, use tangential inlets to reduce impact.
- Reduce the vibration amplitude in both horizontal and vertical directions.

- Minimize the material retention time inside the screener. For circular vibratory screeners, try using a discharge plough blade, sloped ramp on the discharge frame (reducing the lead angle), and 360-degree peripheral discharge.

- Resist using any high impact antiblinding device or top-side wiper assemblies.

To determine the optimal screener configuration to prevent material degradation in your process, have the supplier conduct tests in its facility. Most suppliers offer this service at no charge.

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The first and foremost way to prevent material degradation is to contact your screener or separator manufacturer or supplier and discuss your application in detail. By sharing information about your process and its challenges, your supplier should be able to work with you to find the necessary solution, whether it means purchasing a new piece of equipment or adjusting the unit to run more efficiently. Luckily, the screening industry has many professionals that have spent their careers helping, understanding, and getting involved with their clients. By effectively establishing an open communication with your supplier, you can explore opportunities to effectively screen your material efficiently and effectively.

For all separators, it's important to feed your material at the screen's center to use the entire screening surface. To help prevent material degradation from occurring during the feeding process, examine the speed and height your material is traveling and the impact it has. If the material is falling from a significant height and then impacting a splatter plate or landing directly on the screen, degradation is likely to occur.

Antiblinding devices, such as ball trays, plastic sliders, and ultrasonic technology, are great methods to help dislodge near-size particles from the screen mesh. However, these devices can add additional vibration, thus increasing material degradation. Your best bet is to contact your supplier if you're experiencing degradation problems.

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Equipment suppliers are a valuable source of information about equipment and processes. In light of this, we occasionally 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 Alicia Tyznik, Associate Editor, Powder and Bulk Engineering, 1155 Northland Drive, St. Paul, MN 55120; fax 651-287-5650 (atyznik@cscpub.com).