TABLETS & CAPSULES
Solid Dose Digest
Insights, advice, and industry news about formulating, manufacturing, and packaging solid dosage forms brought to you by Tablets & Capsules *magazine*

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Ask an Expert

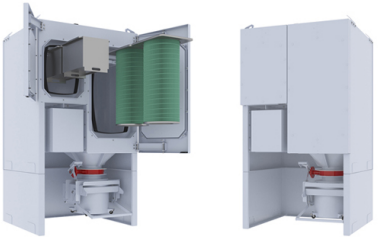
Dust collection with limited floor space

Q: What are the dust collection options for solid dose manufacturing facilities with limited floor space?

A: David Steil, Camfil Air Pollution Control, says:

Effectively controlling the dusts generated in solid dose processing is essential for employee safety, product quality, and regulatory compliance. Standard dust collection systems don't meet the requirements of pharmaceutical manufacturers, who need a system that has a small footprint but still provides integrated, high-efficiency particulate air (HEPA) filtration; bag in/bag out (BIBO) filter changing; and an option for integrated controls and fan.

Open (left) and closed (right) compact dust collectors



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Compact dust collectors that you can install indoors are available (photos). These units reduce the need for long duct runs and allow convenient, easy access to all maintenance functions. They are ideal for plant floors, maintenance areas, production suites, and even mobile cleanrooms. They can provide high-efficiency containment and the most effective filtration while complying with National Fire Protection Association (NFPA) standard 654, "Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids" [1]. These collectors can also offer easy installation and online cleaning technology that won't interrupt operations, saving time, energy, and money.

When researching compact dust collectors for solid dose manufacturing, consider the following key factors: continuous operation, containment, filtration, airflow, and explosion resistance.

Continuous operation

High-efficiency compact dust collectors that self-clean filter cartridges in segments, one quarter at a time, are capable of 24/7 operation. These

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collectors continuously clean without interrupting airflow or operations. This segmented cleaning facilitates the production process because the collector is always online. Cleaning individual segments of the filter element reduces airflow variations, which maintains duct air velocities and decreases pressure fluctuations in the ducting and associated process machinery.

Containment
Most pharmaceutical applications require isolation and containment because the dust generated can be extremely potent and must not be released into the surrounding environment. In addition to maintaining a safe workspace, a properly operated, contained dust collection system provides a physical barrier between the product and the environment, which significantly reduces the risk of cross-contamination.

Make sure the compact collector uses bag in/bag out (BIBO) safe-change systems. This will provide full dust containment to ensure safe changeout at the primary-filter, HEPA-filter, and dust-discharge stages.

Filtration
Ideally, select antistatic, carbon-impregnated, or polytetrafluoroethylene (PTFE) media for the primary pleated filters. Use antistatic filters where conveyed dusts generate static charges that require dissipation. You also should use cartridge filters with static-dissipative media in explosive-dust applications, conforming to NFPA requirements and reducing the risk of ignition due to static electricity discharges.

PTFE wide-pleat technology provides superior dust release, long filter life, and high filtration efficiency. These types of filter media offer exceptional dust release for extended life, energy savings, and reduced changeout schedules. They also prolong the service life of the second-stage HEPA filters that provide 99.995 percent efficiency to capture the finest, most harmful dust particles. The HEPA filter should also function as a tested flame-front barrier.

A properly pleated filter allows the collected dust to release from the filter media, keeping the resistance through the filter lower for a longer time than a filter with tightly packed pleats. When the pleats of the filter media are tightly packed, the dust collector's reverse pulse, filter cleaning system will have difficulty removing dust that becomes lodged between the pleats. Tightly packed pleats increase the air resistance through the filters and diminish airflow. With wide-pleat filters, 100 percent of the media is usable, which maximizes airflow.

Airflow
Determine if your solid dose manufacturing operation requires a compact cartridge dust collector with one or two primary filter cartridges. A single primary filter works well for processes that require up to 600 cubic feet per minute (cfm) of airflow. Air volumes between 590 and 1,765 cfm require a collector with two filters to increase filtration capacity and provide the proper air-to-media ratio for the application.

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On average, dust collectors used in coating and fluid-bed dryer operations require higher airflows and pressures than those serving tablet manufacturing. This is especially true for continuous coating processes because dust loads are heavier and additional moisture may require more frequent filter changes.

Explosion resistance

For solid dosage processing, a dust collector that is explosion resistant offers major benefits by providing the highest protection in accordance with NFPA combustible-dust standards. A compact collector can safely contain an explosion event without the need for additional expensive explosion-protection systems, and you can safely install the collector indoors close to the processing area. Look for a housing that is pressure/shock resistant and that can maintain its integrity with no damage during an explosion event. Ensure that both the primary and secondary filter stages can stop a flame front to double safety against flame propagation. And make sure the collector is fully antistatic, including paint, bonding, and grounding, together with full testing documentation from the manufacturer.

References

1. National Fire Protection Association. NFPA 654, "Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids." Accessed 2/12/19.

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