SUPPLIERS' TIPS

What signs should I look for to diagnose an underperforming dust collector?

Consider three main factors when diagnosing a dust collector: differential pressure, visible outlet emissions, and adequate capture velocity at the hood. With a quick visual assessment, operators can understand the current state of a dust collection system.

Differential pressure. For most dust collectors, a gauge reads the *differential pressure* or difference in pressure between the clean and dirty sides of the collector (or collector media). The differential pressure will start out low with newly installed filters and increase as the media becomes well-seasoned with dust. For a continuous-duty dust collector, typical readings may be between 2 and 4 inches water gauge with some as high as 6 or 8 inches water gauge. A high differential pressure reading (indicates dirty filters) will lead to more frequent pulse cleaning. When the filters can't be cleaned to an acceptable differential pressure reading, replacement is recommended.

Visible outlet emissions. Dust passing through the filter media is inevitable, especially during pulse-cleaning cycles. However, the dust is typically not enough to cause concern over outlet emissions. If there's a sudden decrease in the dust collector's differential pressure and an increase in visible outlet emissions, it could mean that there's a leak. Visual inspection of the clean-air plenum and the clean side of the filter media would show dust bypassing the media. If the leak path isn't clearly visible, you can introduce a traceable dust into the airstream to help identify any mechanical leaks in the dust collector.

Capture velocity. Maintaining adequate capture velocity at the hood (pick-up point) indicates overall dust collection system performance, not just in the dust collector. A system is sized based on required airflow and static pressure, so if the system fan can't generate the necessary airflow at the given static pressure, this will result in insufficient airflow at the hood. Conduct a thorough ducting and system design review to ensure adequate velocities and airflows are maintained throughout the dust collection system.

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When evaluating dust collection performance, it's important to consider the entire system, not just the collector itself. If the system isn't properly designed, common problems include improper hooding, low capture velocities at the hoods, insufficient conveying velocities in the ductwork, wrong fan sizing, or incorrect air-to-cloth ratios in the collector.

Other by-products of a poorly designed dust collection system include premature filter failure and frequent filter changeout, which could indicate that the collector is too small for the job. Occasionally, you may find the filter pulse-cleaning system may not be working properly, and you'll need to check the diaphragm and solenoid valves that regulate pulsing.

Another area to watch is the compressed-air system. If the compressed-air pressure is too low, the pulse-cleaning system won't clean the filters properly. If the compressed-air moisture content is too high or oil is present, the filters may plug or the solenoid and diaphragm valves could have problems. Moisture issues in compressed-air systems are especially prevalent in cold winter months.

An additional sign of an underperforming dust collection system is if air quality testing shows that your facility isn't meeting the OSHA permissible exposure limit (PEL) for dusts produced at your facility. OSHA has established limits based on an 8-hour time-weighted average for hundreds of dusts, which are available in annotated PEL tables at https://www.osha.gov/dsg/annotated-pels/. Note, however, even if your facility is in compliance with PELs set for your dust, some of your workers might still experience dust-related health symptoms. If this happens, you may need to set even lower exposure limits to ensure air-quality safety for all of your employees, change your filter media type, or re-evaluate your dust collection system to prevent emissions.

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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).

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