

# What key factors about my material and process must I consider to select the most efficient filter media for my dust collector?

To accurately choose the most efficient filter media for your dust collection system, consider the collector's net can velocity, particle size and distribution, chemistry, and temperature. The hardest decision comes when you are comparing several suppliers to determine which one offers the best media for your equipment. Visit the EPA's tested fabric media Web page, [www.epa.gov/etv/vt-apc.html#bfp](http://www.epa.gov/etv/vt-apc.html#bfp), where you can find out which media is certifiably tested. The test data provided on the Web site allows you to compare various media's efficiency as well as the differential pressure they maintained during testing and the number of cleaning cycles it took to maintain that level. This data will give you a better idea of how various media will affect your operation once in service. For example, if media X takes 25 percent more cleaning cycles than media Z to maintain a higher differential pressure across your bags, then media X will cause more wear and tear on your bags and incur higher operating expenses for your dust collector in compressed air use.

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The first factor to consider when choosing filter media for your dust collector is the maximum allowable emissions for the dust you're filtering. OSHA sets the standards for indoor air quality, and the EPA controls limits on air exhausted outside. Toxic materials such as pesticides and herbicides, potent pharmaceutical compounds, hexavalent chromium, cadmium, and lead have very low emission limits and almost always require HEPA after filters downstream of the dust collector. The more efficient the dust collector, the less often HEPA filter changeout is required. Dust exposure during changeout of both the primary and HEPA filters may require bag-in/bag-out containment features.

Some industries are restricted to the amount of dust emitted each year. Their production can be limited or even shut down if they go over their permitted emissions. In those cases, higher-efficiency collectors can allow increased production.

Returning the air from the collector to the workspace can save huge amounts in heating and cooling costs. However, even with less-toxic dusts like paper, it makes no sense to return the air unless it's at least

as clean as the Permissible Exposure Limits (PELs). A typical PEL for paper dust is 5 milligrams per cubic meter or 0.002 grains per cubic foot. Using media that the manufacturer only guarantees at a higher level than the PEL could put you out of compliance with OSHA. Also keep in mind that many dusts are explosive, so remember to follow all National Fire Protection Association (NFPA) guidelines when returning any air into the plant.

Some media have higher pressure drops that can add to fan horsepower, increasing energy costs. In addition, the cleaning system may require more compressed air to maintain a stable pressure drop across the filters. The cartridge can be designed and pleated to help lower or eliminate the added pressure drop and reduce the total energy needed to run the dust collector. Wider, evenly spaced pleats can allow air to move through the filter without the added pressure drop and also allow the dust to be easily pulsed out.

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There are a lot of factors to consider when selecting filter media, especially your material's particle characteristics. Consider whether the dust is hygroscopic, agglomerative, crystalline, or abrasive. Also think about the particle shape and size, temperature, process humidity, and how much air passes through your dust collector. All of these factors affect how the particles will react when they hit different media. The correct media will enable the particles to build a dust cake that increases system efficiency.

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When selecting efficient filter media, remember that your material and process go hand in hand. In general, a filter media's potential efficiency and price are directly related. There are several filter designs that range in separation efficiency, from HEPA filters to well-designed cyclones with several choices in between.

Your first step is to review the material's particle size distribution and any associated hazards — an independent lab or baghouse vendor can help you determine this. Then evaluate the material's behavioral attributes, including hygroscopic, cohesive, oily, and adhesive attributes that can require special treatments or fabrics, such as a PTFE membrane on filters handling sugar.

Process considerations include the volumetric rate of the gas to be filtered, the air-to-cloth ratio, and the can velocity. If the can velocity is too high, the filters will blind over in an unduly short time.

Also consider the degree of reverse-jet pulse cleaning and how it affects overall efficiency. During a cleaning cycle, a minor material amount is dislodged and sometimes passes to the exhaust. Running the cleaning cycle only minimally or based on the filter media's pressure differential will improve efficiency and save compressed air costs. If the filter separator has offline cleaning from the process, design steps can be taken to improve efficiency.

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Consider the operating temperature, moisture content, and dust-laden grains when choosing efficient filter media for your process. Also, pay close attention to the change over time and the material cost of each media's fabric.

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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).*