

**by Lori Lehner, Donaldson Torit Training Manager**

There is more to dust collection media than meets the eye and, not all dust collection media is created equal. How media is developed is far more complicated than most realize so consider the following five things about media and media development to ensure you optimize your collector's performance.

### **1 MOST INDUSTRIAL DUST COLLECTION MANUFACTURERS DESIGN FILTERS OR COLLECTORS. FEW DESIGN BOTH.**

The customer wins when a manufacturer understands the behavior of both the filter media and the dust collector and designs both. When a supplier can optimize the interaction between the filter media's performance and the collector's performance as a single consolidated system, the customer benefits by a more stable and dependable operation and lower operating costs.

### **2 EFFECTIVE FILTER MEDIA DESIGNS MAY REQUIRE THOUSANDS OF COMPUTER SIMULATIONS BEFORE INITIAL LAB SAMPLES ARE PRODUCED OR FINAL MEDIA GRADES ARE RELEASED TO PRODUCTION.**

Filter media development is very involved and includes the testing of raw materials and properties of filter media blends. Raw material testing and media development labs often evaluate media components using: high-performance liquid chromatography (HPLC), FTIR (Fourier Transform Infrared) Spectroscopy, TD-GC-MS (Thermogravimetric analyzer - Gas chromatography-Mass Spectrometry), and SEM (Scanning Electron Microscopy). These tools help ensure the optimal design and materials are being used to appropriately match the application conditions.

Development of Donaldson® media grades includes computer modeling to predict tensile strength, stiffness, permeability, and a variety of other filtration and efficiency levels. This modeling helps ensure a thorough understanding of the potential physical properties of a media recipe before a test recipe is even produced in the lab. When a recipe shows promise, samples are produced in the lab so physical testing can confirm the predicted properties.

Donaldson considers filter media development one of its core competencies. Even so, with all our background and experience, new media recipes still go through thousands of computer and lab iterations to achieve the

optimized characteristics before we begin production of a new media grade.

### **3 THERE'S MORE TO MANUFACTURING FILTER MEDIA THAN MEETS THE EYE.**

The general process of developing any filter media should begin by identifying the application requirements. Then specifications are determined for not only the finished media grade, but for the final filtration product in which the media grade will be incorporated (i.e. cartridge, panel, or filter pack).

Factors to be considered in media recipe formulation include: a cost level which makes sense for the market; minimum efficiency levels needed to achieve acceptable emissions; the type and amount of material being filtered from the fluid stream by the media filter; and the physical environment to which the media will be exposed. Other factors include: pressure, vibration, temperature, humidity, and chemical composition of contaminants.

Pressure drop, or the resistance necessary to cause fluid flow through the media, is considered critical to media design because this impacts the energy it takes to move fluid through the media and, therefore, the operating cost of the filter developed.

All of these variables are considered important, and they must be balanced against one another to formulate an optimized media grade for an application. For example, a formulation may use expensive materials and provide high efficiency, yet the very dense filter media might be expensive to operate in the collector because of the high pressure drop of the filter and its replacement costs. A dense filter media design might also compromise the performance of a cleaning system and could result in shorter overall filter life and increased maintenance material and labor costs.

On the other end of the spectrum, a filter media comprised of low cost materials with low pressure resistance may offer initial benefits. However, if the media does

not handle the physical challenges of the operation or becomes quickly plugged, the operational disruption and maintenance downtime and expense make it a poor choice. Optimizing the various performance measures is essential to overall collector performance.

## 4 SOME MANUFACTURERS OFFER 300+ GRADES OF FILTER MEDIA FROM WHICH TO CHOOSE.

Some manufacturers are so serious about providing exactly what the customer needs they offer hundreds of choices to the market, each tailored to meet specific challenges and requirements. If an appropriate media does not exist for an application, new media development may be undertaken.

## 5 EVALUATING DUST COLLECTION MANUFACTURERS PAYS OFF.

When evaluating dust collection manufacturers, look for one that offers media grades optimized for your application and for the collector in which they will operate. This will help optimize your filter efficiency

performance, extend your filter life, and lower your cost of ownership. Choose a company with a strong history of providing expertise and technical support.

If you're employed by a global company, consider a global dust collection manufacturer that can provide excellent customer support around the world – including stock inventory of common filters and parts so they are ready to ship when you need them. A company like this will provide you *exactly what you need*.

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