Donaldson Torit®

PLEATED BAG FILTERS

PROBLEM SOLVERS IN THE GRAIN, FEED & SEED INDUSTRIES

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Grain, feed and seed facilities are increasingly challenged to generate more revenue without adding capital investment. And when it comes to dust control, this means a high percentage of baghouse dust collectors currently in service are being pushed well beyond their original design parameters. A new generation of pleated bag filters is making it possible to meet these challenges, as well as, meet current air quality requirements.

With current air quality standards requiring better filtration efficiency than traditional 16 oz. polyester filter bags can often deliver, pleated bag filters are now providing a cost effective solution for the most common issues affecting baghouse dust collectors today.

WHAT IS A PLEATED BAG FILTER?

A *pleated bag* is often a long, slender filter assembly that looks more like a cartridge filter than a bag filter. The media options range from spunbond polyester to PTFE membrane to a nanofiber layer on spunbond for optimum efficiency in addition to many other media depending on application needs. Pleated bag filters are also available with a stiffened aramid media for higher temperature applications.

Pleated bags have built-in cores so they replace both the filter bag and its supporting cage. Some pleated bag designs even have curved openings at their top to increase cleaning energy similar to the venturi used in some baghouse filters.

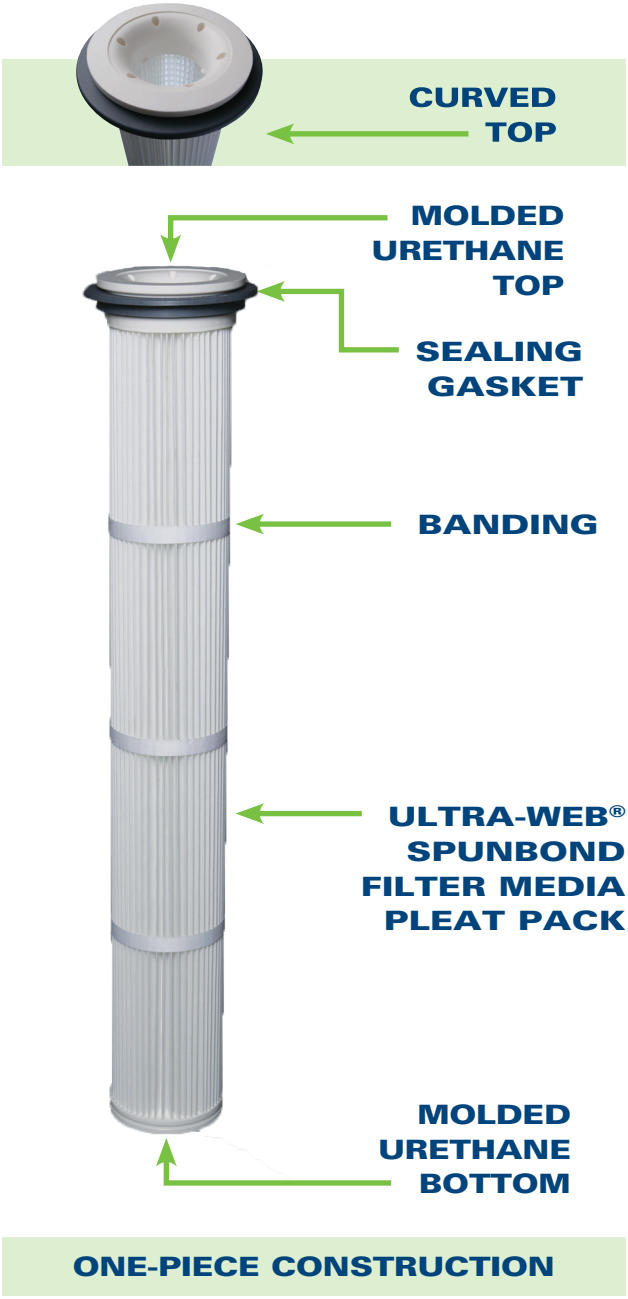
Pleated bags not only look like cartridge filters, but they perform more like cartridge filters than bag filters. Pleated bag media (polyester spunbond) offers better initial efficiency and is often more durable than the polyester felt used in conventional filter bags. Additionally, the average pleated bag filter can incorporate much more media than the corresponding length of felt bag it's replacing, typically allowing replacement of felt bags with much shorter pleated bags. There are pleated bag filter designs for top load applications, bottom load applications, and even oval applications.

BENEFITS OF PLEATED BAGS IN BAGHOUSE DUST COLLECTOR

Increased Filter Area - Baghouse dust collectors are generally sized on just a couple of key criteria: filtration velocity (air-to-cloth ratio) and for bottom entry baghouses the upward 'can' or 'interstitial' velocity. A typical filtration velocity in a grain, feed or seed facility would be between 8-12 feet per minute (cubic feet of air per square foot of cloth = feet per minute). Pleated bag filters can provide as much as twice the filtration area per foot of filter length, so in existing equipment the increased filter media in the pleat pack design can either reduce filtration velocities or allow more total volume at the same filtration velocity. This means you may be able to run more air through existing dust collectors without having to add another collector or over work current equipment. The caution here is bottom entry baghouse dust collectors where you may still find limits on total air volume based on the resulting upward velocity profile in the collector.

Lower Pressure Drop - Since pleated bag filters can double the amount of media in a baghouse dust collector, they can often lower the average differential pressure drop for the collector, assuming the same air flow volumes. Reductions in pressure drop often translate directly to energy savings over the life of the filter if the fan can be adjusted to take advantage of the reduced static pressure load on the filtration system. The reduction in differential pressure drop can also reduce the frequency of pulse cleaning required by the filters offering additional savings in reduced compressed air consumption.

Abrasion Resistant – Many grain dusts are particularly abrasive and quickly wear through even hardened carbon steel in a relatively short period of time despite the relatively small size of the dust particles. It is common for abrasion to cut short the life of bag filters in a collector with holes appearing in the bottom portions of the filter bags. This results in immediate filter bag emission failures because dust-laden air will begin passing through the holes unfiltered. Pleated bag filters can address this abrasion issue in a couple of ways. First, the spunbond polyester media in pleated bags is very durable. Second, pleated bag designs offer more media per foot of bag length, so pleated bags are often much shorter than the fabric bags they replace. This allows the creation of a *drop out zone* in the lower section of the collector. Dust entering the collector has an increased volume as it enters the collector that is more open, with lower-velocities. This zone allows the heavier, and therefore more abrasive, dusts to simply drop down into the hopper without swirling around and damaging the bottoms of the filter bags.



Improved Filter Efficiency - Another benefit of pleated bags is improved filter efficiency. Compared to conventional 16 ounce polyester bags, spunbond polyester pleated bags can reduce initial emissions by as much as 50%. Nanofiber-coated or PTFE coated pleated bags may further reduce emissions by as much as 75% relative to a conventional bag filter. In some instances the improved filter efficiency offered by pleated bags may make the difference between meeting or exceeding emission requirements. When the dust being collected is a product stream, as is the case in milling applications, the increased filter efficiency may also help improve overall productivity since less flour emitted out the stack translates to more flour that can be sold.

Longer Life - Having to change filters even quarterly can increase downtime at a grain handling or processing facility. If you push the capacity of a system beyond its original design flow, the frequency of filter bag replacement can jump by 400% if the system originally required a filter change once per year. All downtime is expensive, but for some facilities like large export grain terminals, downtime can exceed $100,000 in lost revenue per day when they are not moving grain. Even for more typical facilities an increase in downtime can create hidden costs for excessive filter replacement that can easily exceed $ 125,000/year. Pleated bags commonly offer longer filter life over polyester felt bags, and longer filter life leads directly to cost savings. When the filter bags last longer, filter change outs happen less often and fewer change outs means less downtime, fewer bags to purchase, less frequent disposal costs, and lower labor expenses.

Ease of Maintenance – And last but not least, when it comes to replacing filters, changing out fabric filter bags has always been an unpleasant, time consuming process. Dirty bags and cages are often a challenge to remove from the collector and the dirty old bags still need to be stripped from the cages before new bags can be installed into the collectors.

Because pleated bags replace both the bag and cage in the collector, they are often not only easier but also faster to change out. Additionally, because the pleated bags are typically much shorter than the corresponding bags and cages they replaced, they are often far easier to handle. Pleated bag users have often found they can cut their change out time by more than half, so the ease of change outs becomes yet another cost savings associated with pleated bags. Fewer hours of labor to change-out the bags and fewer hours lost to downtime.

Overall, pleated bag filters offer solutions to a wide variety of baghouse dust collector challenges including how to get more production from a dust collection system without the labor or financial cost of installing a new piece of capital equipment. Pleated bags can provide not only more efficient filtration, but they offer the potential for lower pressure drop, longer filter life, quicker and less painful maintenance, and they can even help address filter abrasion.

Pleated bag filters can result in problems solved!

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