Technical Assistance

Donaldson Membranes is committed to working closely with partners to provide comprehensive technical and sales support.

Our experience in innovative design, manufacturing, filtration knowledge and technical support will help you and your organisation to succeed.

Having an enviable resource of more than twenty-five years of dry filtration experience, Donaldson Membranes is able to provide a thorough and educated evaluation of your system process to best determine the most suitable Tetratex filter media solution.

The Donaldson Membranes technical team can provide assistance with manufacturing requirements, installation support, commissioning, recommended routine maintenance advice and troubleshooting, providing you with everything you require to ensure full satisfaction and a successful filtration solution.

In order to ensure your application continues to run at optimum levels, regular routine condition testing of filter media is recommended. The laboratory facility of Donaldson Membranes is able to provide detailed analytical feedback, providing a full breakdown of the testing carried out (typically retained permeability, residual tensile strength and supporting microscopic photography). If carried out on a regular basis, this information can be catalogued, trended and used to highlight potential process issues which may adversely affect media performance ahead of filter problems being experienced and/or to provide an invaluable indication of expected filter element life.

Donaldson Membranes can also provide SEM (Scanning Electron Microscope) and particle size analysis capability where more detailed examination is required.

Donaldson Membranes is committed to ensuring excellent service and life-long product performance.

The examples cited herein are indicative of expected results in field applications.
Please contact us if you would like advice on maximising filter efficiencies.
We offer a range of support services including troubleshooting and filter media analysis.

Tetratex®

Donaldson® FILTRATION SOLUTIONS

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Donaldson® FILTRATION SOLUTIONS

Depth Filtration vs Surface Filtration

Tetratex® filter media can enhance the performance of your fabric filter by utilising surface filtration technology as opposed to traditional depth filtration methods. Tetratex is a proprietary expanded microporous PTFE (Polytetrafluoroethylene) membrane, manufactured solely by Donaldson Membranes. It is laminated to a variety of base substrates to provide a complete range of media including woven and felted textile media for conversion into all types of filter bag as well as pleatable media for cartridges style elements.

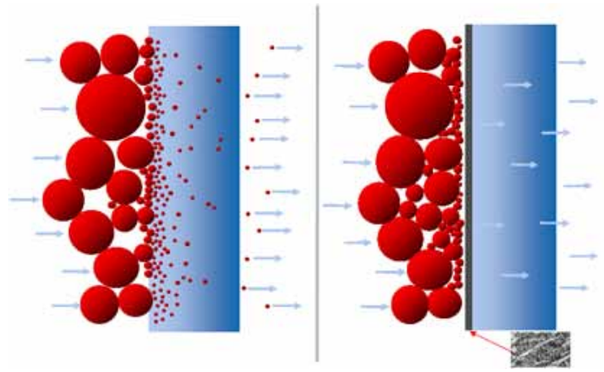
Depth vs Surface

There are two key functions of a solid/gas filter – firstly, the capture of dust particles in the gas stream and secondly the maintenance of gas flow through the media employed. For any filter media to operate effectively, it must satisfy on both these counts.

For collection to be effected, any individual particle in the gas stream must be slowed, intercepted and collected on or within the filter media. However, in the case of conventional filter fabrics, the interstices between the fibres within the structure of the media are often considerably larger than the particles to be collected. So, how are conventional media able to collect fine particles? They do so by the penetration of dust particles into the surface to 'close off' these open pores and by the formation of a filter cake on the surface of the media. This is termed *'depth filtration'*. Without a filter cake on their surface, conventional filter media are rarely able to collect fine particulate efficiently; media blinding and atmospheric emissions occur over time as individual dust particles penetrate into and beyond the filter media.

Tetratex filter media utilises true *'surface filtration'* technology. A microporous ePTFE membrane, it is laminated to the surface of a supporting substrate and it is this membrane which acts as the filter media. The construction of the membrane, with millions of pores per cm^2, is such that sub-micron particles are captured on its surface. The backing substrate is merely a support and plays no part in the filtration process. All particulate is collected on the surface of the membrane. No reliance on a filter cake. No penetration of dust into or beyond the media.

Depth Filtration
Particles penetrate the structure of the media and form a filter cake on the surface



Surface Filtration
Particles are collected on the surface of the membrane

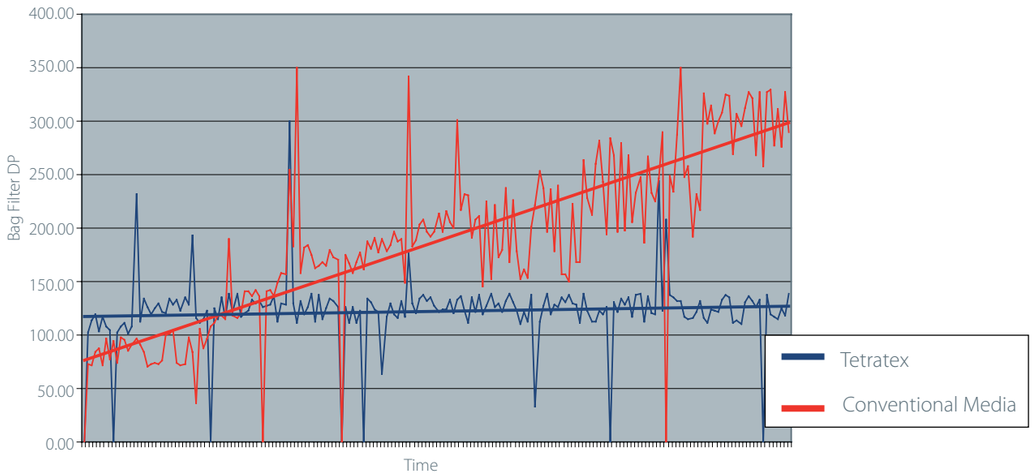
Tetratex®

Benefits of Tetratex®

Tetratex ePTFE membrane filter media can bring about a wide range of benefits for your fabric filter baghouse; the unique structure of the membrane prevents the penetration of fine dusts into the supporting substrate and facilitates excellent cleanability due to its non-stick characteristics.

Increased...
- airflow
- filter element life
- dimensional stability
- product collection
- ability to handle sticky/moist dust
- capability for process upset recovery

Reduced...
- particulate emissions
- constant baghouse pressure drop
- cleaning regime
- maintenance costs
- element changes



The above chart details indicative results of comparative bag filter pressure drop of Tetratex vs. conventional media in a Cement Finish Mill.

Potential Savings - Production

By employing Tetratex ePTFE membrane filter media, increased system airflow can be achieved through reduced filter pressure drop (see above DP comparison). This can bring about significant production benefits.

The following example considers a cement finish mill process utilising an estimated 10% increase in airflow. Where other system parameters are acceptable, the use of Tetratex media could significantly reduce the cost/tonne of product and increase mill capacity.

EXAMPLE

	Conventional Filter Media - Power Consumption	Tetratex® - Power Saving
Production:	24/7 x 8000 hours	24/7 x 8000 hours
Drive:	2.4MW	2.4MW
Air Volume:	***150,000 AM³/Hr***	***165,000 AM³/Hr***
Dust Loading:	750gr/Nm³ (78.1 T/Hr)	750gr/Nm³ (85.9 T/Hr)
Current Media:	Conventional Felt	Tetratex Felt
Filter DP:	***200mmWG***	***150mmWG***
Result:	***Above equates to 30.73 Kw Hr/Tonne of Cement @ €0.10/Kw Hr = €3.073/Tonne of Cement producing 624,800 T/annum***	***Above equates to 27.94 Kw Hr/Tonne of Cement @ €0.10/Kw Hr = €2.794/Tonne of Cement producing 687,200 T/annum***

Potential Savings - Fan Power

In cases where end-users are seeking to reduce their energy consumption, Tetratex ePTFE membrane filter media is a proven technology. By considering standard fan laws governing air movement systems (eg. backward inclined fansets), we can calculate the potential cash savings by operating a typical system at a reduced filter pressure drop.

$Q = (V \times \Delta P) / Eff.$

Where:
Q = Absorbed power of fan (Watts)
V = Total gas flow (Am³/sec)
ΔP = Total system resistance (Pascals)
Eff. = Efficiency of fan % - for a backward-inclined fan, this is typically around 70%

By maintaining required airflow at a reduced filter DP at a lower fan speed, energy absorbed by the fan is reduced and significant savings in power consumption can be achieved. The following example is based on a system with an estimated 25mmWG reduction in filter pressure drop using Tetratex, a total flow of 175,000Am³/Hr running for 8000 hours per annum with a power cost of €0.10/KwHr.

EXAMPLE

Volume (Am³/hr)	175,000
Hours	8,000
Cost of Power (€/Kw Hr)	0.10
DP Reduction (mmWG)	25
Fan Power Saving	***€13,625***

Note: In most cases, the fan speed will need to be adjusted down to facilitate such savings. This can be achieved through vee-belt adjustments or via a frequency inverter drive.

Potential Savings - Compressed Air

It is often possible to reduce filter bag cleaning regimes by the use of Tetratex ePTFE membrane filter media with a reduction in pulse pressure being one option. The cost to generate 1m³ of air at a reduced 4 bar pressure with Tetratex bags compared to 6 bar with conventional media is considered in the following example for a filter consuming 100m³/hr of compressed air over an operating period of 8,000 hours at a power cost of €0.10/KwHr.

EXAMPLE

Assumes a reduction in compressed air pressure from 6.0 bar to 4.0 bar Estimated power for delivery of 1m³/hr air @ 6.0 bar - 0.11 Kw Estimated power for delivery of 1m³/hr air @ 4.0 bar - 0.08 Kw	
Total Compressed Air Usage (Am³/hr)	100
Total Hours	8000
Cost of Power (€/Kw Hr)	0.1
Expected Power Saving (€)	***€2,400***

Estimated requirement for effective cleaning: 4 litres (0.004m3) of compressed air for every m² of cloth.

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