



Donaldson®  
FILTRATION SOLUTIONS

# Industrial Filtration



Tetratex® ePTFE Membrane Filter  
Media for Industrial Applications

 **Tetratex®**

# Donaldson Membranes

# Donaldson Membranes



Donaldson Membranes is a leading worldwide manufacturer of expanded microporous PTFE membranes, films and laminates. A technology-driven company committed to satisfying customer needs through innovative research and development, with production and sales offices located throughout Europe, America and Asia.

Donaldson places great emphasis on high quality manufacturing and customer service and has been accredited environmental certificate ISO14001, testament to our high standards.

Fabric filters are an intrinsic part of many industrial processes. Whether a filter collecting the actual product being manufactured or a pure environmental emission control measure, there is a clear need to maximise performance to ensure collection rates are high, particulate emissions are low and gas flows are maintained at optimum levels for the process concerned.

Each and every application is different and carries with it a specific set of challenges. A host of factors can influence the performance of any given fabric filter, but the selection of an appropriate filter media is critical. Getting it wrong can restrict production levels, raise filter element replacement and filter maintenance costs and cause all manner of environmental concerns for local authorities and neighbours alike.

- Increased productivity
- Near-zero particulate emission levels
- Improved capability for process upset recovery
- Greater ability to handle sticky/moist dusts
- Higher airflow
- Reduced constant baghouse pressure drop
- Fewer element changes
- Extended element life
- Reduced cleaning regime
- Reduced maintenance costs

# CLEAN AIR CLEAN AIR CLEAN AIR

Tetratex<sup>®</sup> 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 (for the product range see page 15).

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

As stated, all applications are different and should be considered case-by-case. This is where experience is vital. The selection of the most suitable filter media is not as straight forward as it would seem; moreover it is often based on experience and an understanding founded on know-how gained in the field over many years.

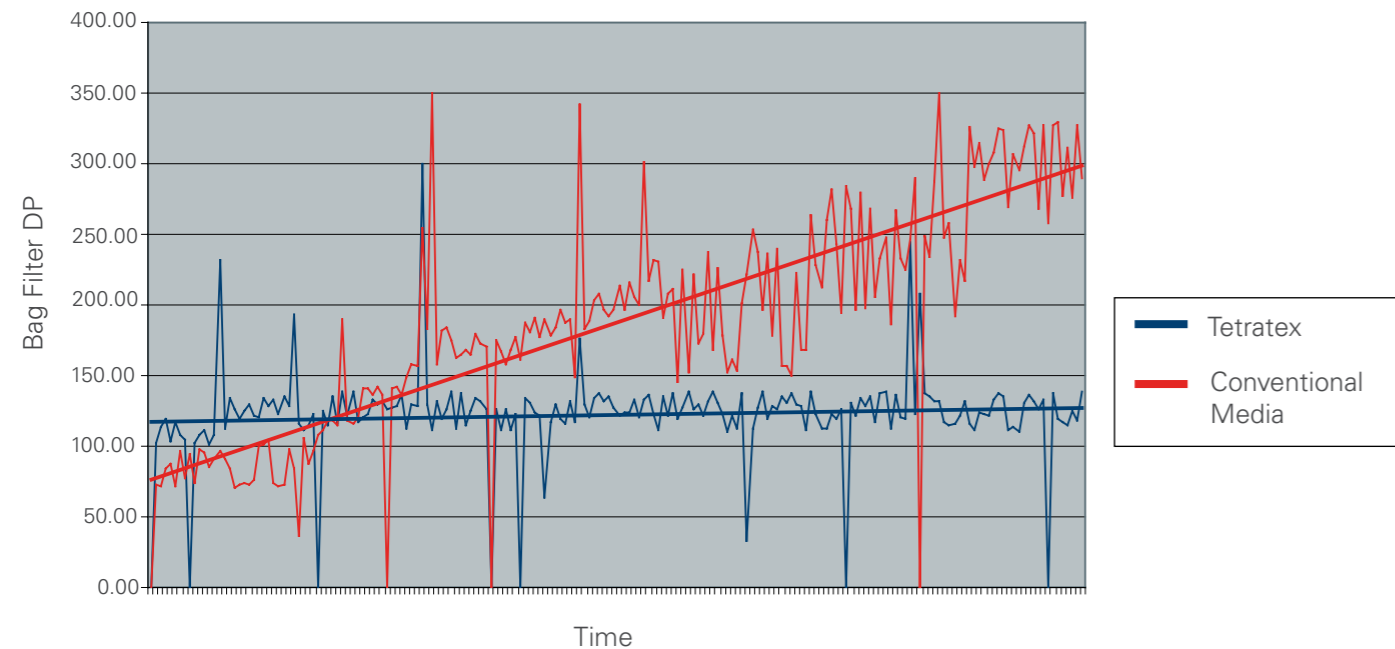
Since Tetratex filter media first entered the market over twenty-five years ago, it has been successfully employed in a vast array of dry filtration applications providing high-level performance and exceptional customer satisfaction.

# Reducing Pressure Drop - Increasing Airflow - Reducing Emissions

All too often, baghouse pressure drop is the primary cause of frustration for operators seeking to improve extraction or airflow through their filtration system. Whether to increase throughput and increase production rates or to improve extraction from a dust source, baghouse pressure drop will ultimately dictate matters.

Ordinarily, increasing airflow results in a similar increase in filter differential pressure (DP), with conventional filter media being unable to clean effectively at the higher resultant filter velocity (air-to-cloth ratio). Additionally, the higher DP only serves to exacerbate the problem with fine dust particles being drawn deeper into the structure of the media, restricting permeability and reducing element life expectancy.

Tetratex filter media operates by utilising surface filtration principles. The membrane on the filtering surface of the media prevents penetration of fine particles into the substrate. When cleaned, there is a near total removal of dust from its surface. It is this twin-action characteristic that enables Tetratex to increase airflow without compromising baghouse DP. The permeability of Tetratex media is maintained at all times and so DP is not only lower, but is kept constant throughout the life of the filter elements.



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

Whilst inhibiting penetration of fine dust particles into the structure of the media assists airflow, it also allows exceptionally low particulate emission levels to be achieved. Where appropriate membrane selection, application understanding and element manufacturing expertise are brought together, near-zero emission levels are commonplace. Not only does this reduce operators' impact on their environs, but also increases product collection; why send your product out to atmosphere?!

It should be noted that no two baghouses are ever alike. The demands placed on filter media installed are constantly changing. The selection of an appropriate substrate to handle the gas conditions being experienced is vitally important as is the selection of the appropriate membrane. Donaldson manufacture a number of differing ePTFE membranes, each providing its own unique filtration characteristics. Donaldson can advise on the membrane requirements for any given set of process parameters to ensure optimum performance.



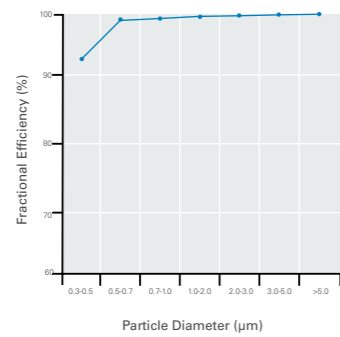
The charts on the following two pages detail laboratory collection efficiency test results for each membrane in our current range. Specific application parameters impact greatly on media performance and Donaldson should be consulted on a case-by-case basis where clarification of expected performance is required.

# General Characteristics of Tetratex ePTFE Membranes

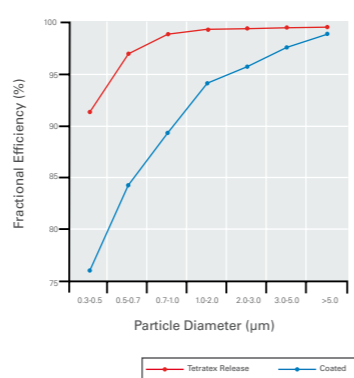
## Tetratex® Release

- Superior collection efficiency, compared to PTFE coated products and microfibre needlefelts
- Tetratex Release results in near-zero emissions for particles larger than 5 microns
- Due to the extreme anti-adhesive properties of membranes, Tetratex Release typically requires fewer cleaning cycles to maintain acceptable pressure drop than PTFE coated filter media.
- A low cost, high value alternative to coated filter media
- Delivers added value performance and excellent dust cake release compared to coated filter media and microfibre needlefelts
- Tetratex Release can reduce constant operating pressure drop by 20% compared to PTFE coated filter media

Fractional Efficiency Chart



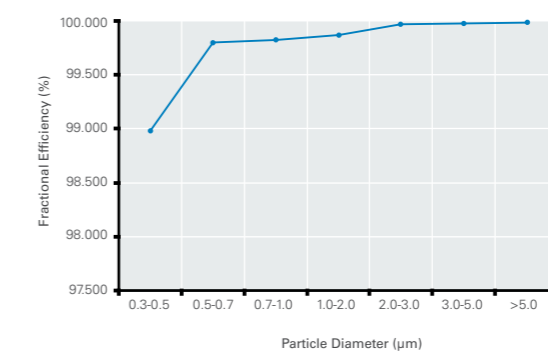
Tetratex Release v. Coated



## Tetratex EXTREME®

- The latest generation of ePTFE membrane for optimised baghouse performance is here!
- Reduced pressure drop
- Increased airflow
- Tetratex EXTREME displays a significantly higher permeability
- The complex structure of the membrane ensures particulate emissions can be maintained at near-zero levels for the operational life of the media
- Highly durable construction; able to handle the adverse conditions often seen in baghouses
- No compromise on collection efficiency
- No compromise on durability

Fractional Efficiency Chart



- Unique microporous structure
- High porosity
- Bi-axial structure
- Hydrophobic
- Chemically inert

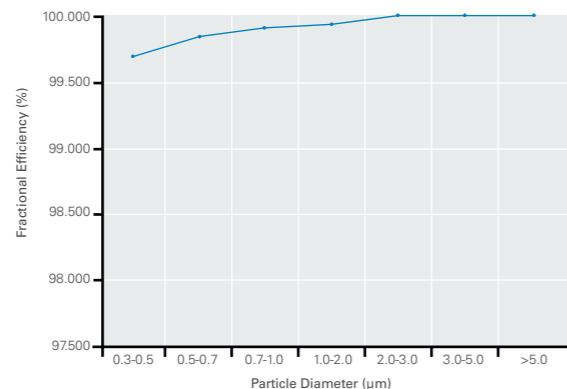


- Inhibits particulate penetration which helps to preserve integrity of the substrate
- Operating temperature -250 to +280°C
- Low coefficient of friction

## Tetratex® High Efficiency

- Tetratex High Efficiency membrane is a high performance ePTFE membrane, delivering excellent particulate capture rates and superior dust cake release
- Near-zero emissions meet required regulatory standards with sub micron capture capabilities.
- Lower constant operating pressure results in energy savings
- Increased filter element life and less frequent cleaning can be achieved due to the extreme anti-adhesive properties of the membrane, delivering lower maintenance and operational costs
- Tetratex High Efficiency membrane provides increased efficiency, reduced operational costs resulting in increased profitability

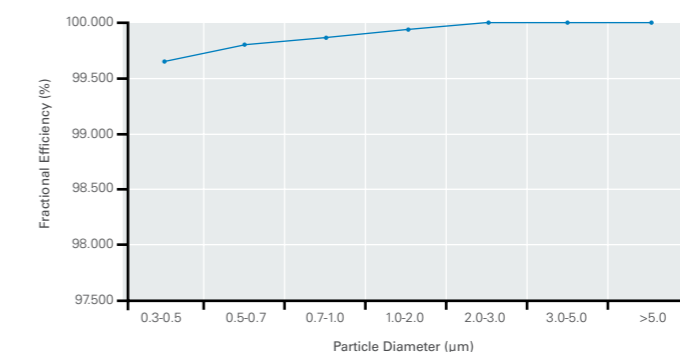
Fractional Efficiency Chart



## Tetratex® Ultra High Efficiency

- Tetratex Ultra High Efficiency ePTFE membrane delivers exceptional particulate capture rates and excellent dust cake release providing outstanding durability
- Near-zero emissions meet required regulatory standards with sub micron capture capabilities
- Lower constant pressure drop resulting in energy savings
- Increased filter element life and less frequent cleaning can be achieved due to the extreme anti-adhesive properties of the membrane, delivering reduced costs
- Tetratex Ultra High Efficiency provides increased efficiency, reduced operational costs resulting in increased profitability

Fractional Efficiency Chart





# Chemicals

Increasing collection efficiencies, reducing energy consumption and environmental emissions are three of the greatest challenges facing the chemical industry today. Donaldson Membranes can help overcome these challenges by providing Tetratex® ePTFE membrane filter media at a low-cost to meet the increasingly demanding nature of the Chemicals process dedusting applications.

Benefits include...

- Improved particulate collection efficiencies
- Reduced energy consumption & emissions
- Increased productivity
- Increased filter element life

**Process:** Chromium Oxide Plant

**Media:** #6255 Tetratex Ultra High Efficiency Woven Fibre Glass

BEFORE:	AFTER:
Flow rate: 145,500 Am <sup>3</sup> /h	Increased the flow rate to 179,500 Am <sup>3</sup> /h
Differential pressure: 180mmWG	Differential pressure reduced to: 131mmWG
Cleaning pressure 6.5 bar	Cleaning pressure reduced to 4 bar

• Calcining • Milling • Kilns • Dryers • Micronising • Classifying • Venting



# Metals

Whether it be primary manufacture or secondary recycling, the production and processing of metals, brings with it a wide variety of filtration challenges. Hot gases, fine dust and aggressive process conditions are all problems that can be solved by employing Tetratex ePTFE membrane filter media. Industry leaders are benefiting from the use of Tetratex in their baghouses.

Benefits include...

- Optimisation of extraction
- Reduced emission
- Increasing production rates
- Increased filter element life

**Process:** Electric Arc Furnace

**Media:** #8025 Tetratex Ultra High Efficiency Polyester Felt

BEFORE:	AFTER:
Particulate emissions: >60mg/Nm <sup>3</sup>	Particulate emissions reduced to: <10mg/Nm <sup>3</sup>
Differential Pressure: 200mmWG	Differential pressure reduced to: 135mmWG
Summary: Lifetime of media was increased from 6 months to 24 months	

• Aluminium • Copper • Ferro Alloys • Lead • Nickel • Steel • Smelting • Grinding • Furnace Extraction



# Energy

The burning of both traditional and alternative fuels to generate heat and power is a growing industry, but one which must comply with stringent process control and environmental legislation. Tetratex ePTFE membrane filter media can provide significant benefits for boiler process.

Benefits include...

- Exceptionally low particulate emissions
- Stable gas flow through the system
- Greater ability to recover from process upsets

**Process:** Coal Fired Boiler

**Media:** #6262 Tetratex PPS Felt

BEFORE:	AFTER:
Particulate emissions: >50mg/Nm <sup>3</sup>	Particulate emissions reduced to: <5mg/Nm <sup>3</sup>
Differential pressure: 250mmWG	Differential pressure reduced to: 175mmWG
Media life: 12 months	Media life increased to: 36 months

• Coal • Biomass • Municipal • Paper • Sludge • Flue Gas Cleaning



# Minerals

Incorporating a plethora of sub-segments, the minerals industry has taken big steps in recent years to implement technological improvements to enhance production levels and to minimize the impact of their operations on the environment. The cement industry alone has made hitherto unseen investments in environmental and process optimisation, with many operators now utilizing advanced baghouse technology to dedust their kilns. Tetratex ePTFE filter media membrane filter media is the media of choice for many operators providing high-level filtration performance over an extended media life. Benefits include...

- Improved airflow & throughput
- Increased production rates
- Optimisation of mill efficiencies
- Elimination of production bottlenecks
- Increased factory output

**Process:** Cement Finish Mill - Production bottleneck at Turkish cement plant

**Media:** #5102 Tetratex Release Polyester Felt

BEFORE:	AFTER:
The flow rate 176,500 m <sup>3</sup> /h	Increased the flow rate to 179,500 m <sup>3</sup> /h
Differential pressure 197mmWG	Differential pressure reduced to 131mmWG
Cleaning pressure 6 bar	Cleaning pressure reduced to 5 bar
Summary: The plant manager was delighted with the improved performance levels of the mill and associated filter.	

• Raw Mills • Kilns • Coal Prep Plants • Alkali Bypass • Clinker Cooler • Finish Mills • Venting/Conveying

# 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 Benefits of Tetratex®

- Increased particulate collection efficiency
- Increased filter element life
- Reduced emissions
- Reduced baghouse pressure drop
- Reduced baghouse downtime
- Increased productivity
- Reduced energy consumption

Substrates	Tetratex Release	Tetratex EXTREME	Tetratex High Efficiency	Tetratex Ultra High Efficiency
Acrylic	•	•		
Acrylic Antistatic		•		
Aramid	•	•		
Aramid Antistatic		•		
Pleatable Aramid		•		
Pleatable Polyester		•	•	
Pleatable Polyester Antistatic		•	•	
Pleatable PPS		•		
Polyester Antistatic	•	•		•
Polyester	•	•	•	•
Polyimide		•		
Polypropylene		•		
Polypropylene Antistatic		•		
PPS	•	•		
PPS Antistatic		•		
PTFE Felt			•	
Woven Glass			•	•
Woven Polyester			•	
Woven Polyester Antistatic			•	
Woven PTFE			•	•

\*Product matrix correct as of May 2011; this chart is subject to change at any time without prior notice.



[www.donaldson.com](http://www.donaldson.com)

Please contact us if you would like advice on maximising filter efficiencies. We offer a range of support services including process evaluation, troubleshooting and filter media analysis.

**Donaldson Membranes UK, Ireland, Scandinavia, Nordic Regions, Benelux,  
The Middle East, CIS Countries & Baltic States**

T +44 (0)1942 711 711 | E [membranes-europe@donaldson.com](mailto:membranes-europe@donaldson.com) | F +44 (0)1942 711 571

**Donaldson Membranes Iberia, France, Italy and North Africa**

T +34 933 394 266 | E [membranes-es@donaldson.com](mailto:membranes-es@donaldson.com) | F +34 933 395 340

**Donaldson Membranes Germany and Eastern Europe**

T +49 259 478 1692 | E [membranes-de@donaldson.com](mailto:membranes-de@donaldson.com) | F +49 259 478 1693

Donaldson Filter Components Limited 2011. All rights reserved.

This publication is issued to provide outline information only which (unless agreed in writing by Donaldson Filter Components Ltd) may not be used, applied or reproduced for any purpose, or form part of any order or contract or be regarded as a representation relating to the product or service concerned. Donaldson Filter Components Ltd, reserves the right to alter without notice the specification, design or conditions of supply of any product or service.

Donaldson logo, the Tetratex logo and Tetratex *EXTREME* are trademarks of Donaldson Company Inc.

Publication Code: IFB015/EN/05/11 Printed in the UK

