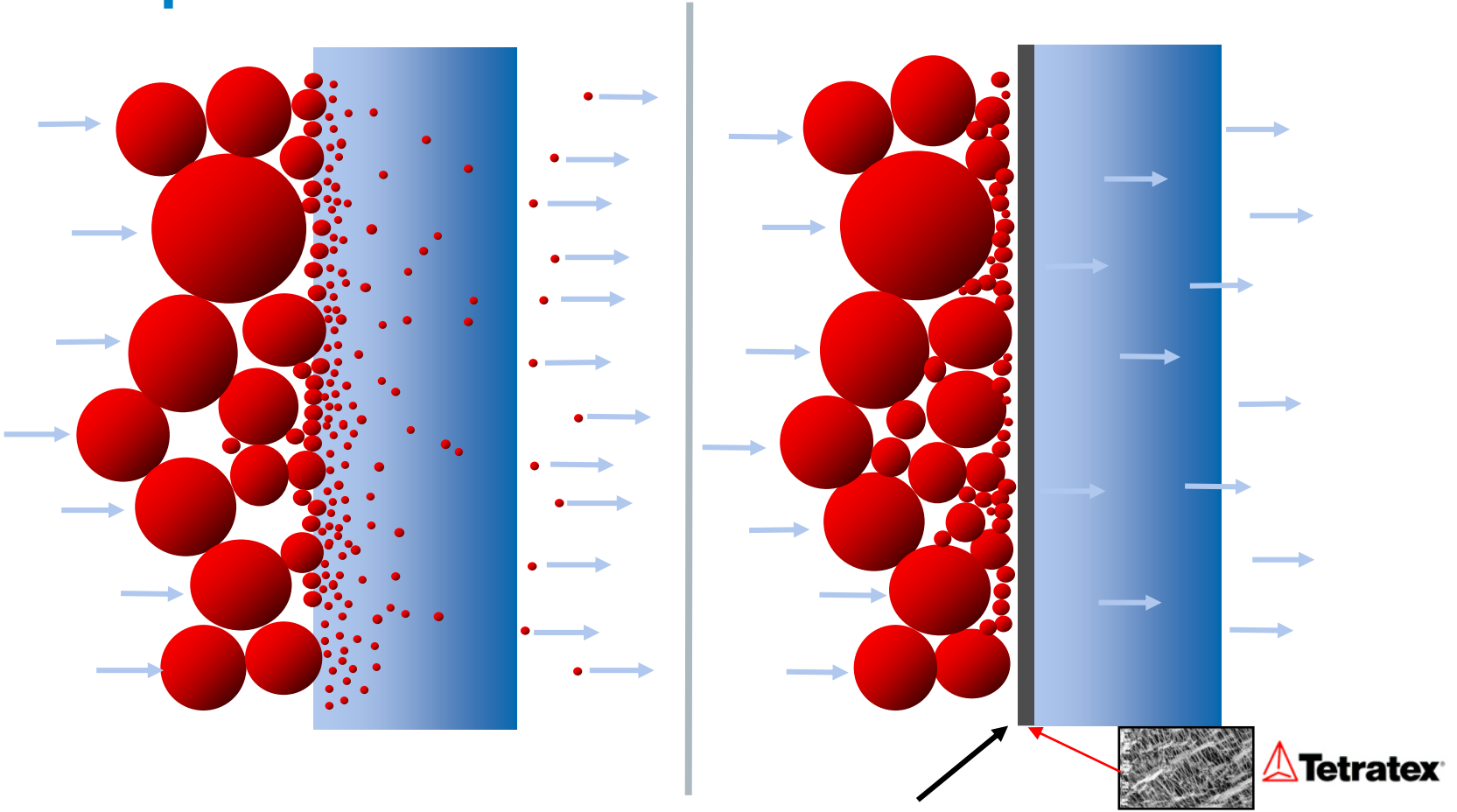
Membrane vs. Conventional Filter Media for Filter Fabric / Baghouses

Membrane = "Surface Filtration" Technology: A microporous ePTFE membrane is bonded to the surface of a supporting substrate – this membrane acts as the filter media.

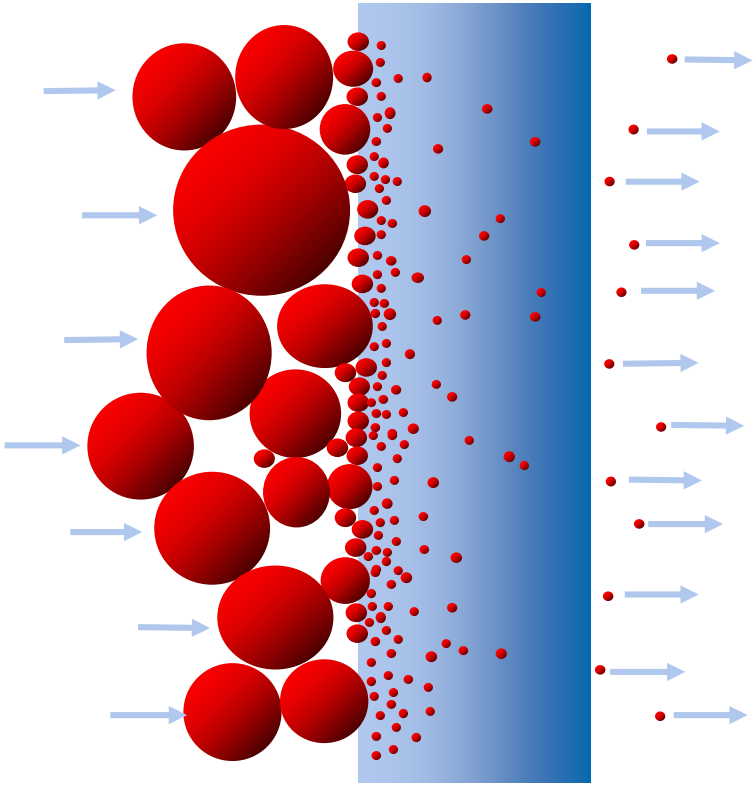
- All FPM *(filterable particulate matter)* is collected on membrane surface.
- No reliance on a filter cake – as the case with conventional filter products.
- No penetration of dust into or beyond the media – as with conventional media.

Depth Filtration versus Surface Filtration



Donaldson.
FILTRATION SOLUTIONS

Conventional Filter Media: Depth Filtration

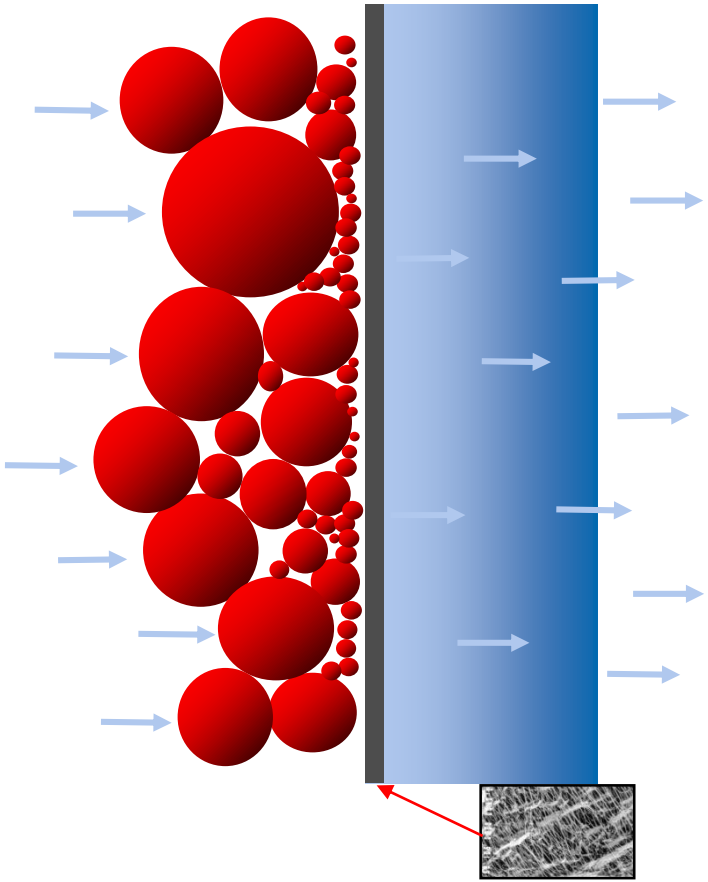


- Efficiency relies on primary cake formation
- Dust cake restricts airflow
- Requires high cleaning energy, which impacts mechanical stresses
- Fine particles migrate into media causing abrasion damage
- Leads to blinding - High pressure drop

Donaldson. FILTRATION SOLUTIONS

Tetratex

Membrane: Surface Filtration



- Acts as primary dust cake, no pre-coat required
- Inhibits particle migration
- Low cake formation allows for reduced cleaning – therefore, less mechanical stresses.
- Higher cleaning efficiency gives higher constant airflow
- Excellent cake release – Low pressure drop

Donaldson. FILTRATION SOLUTIONS

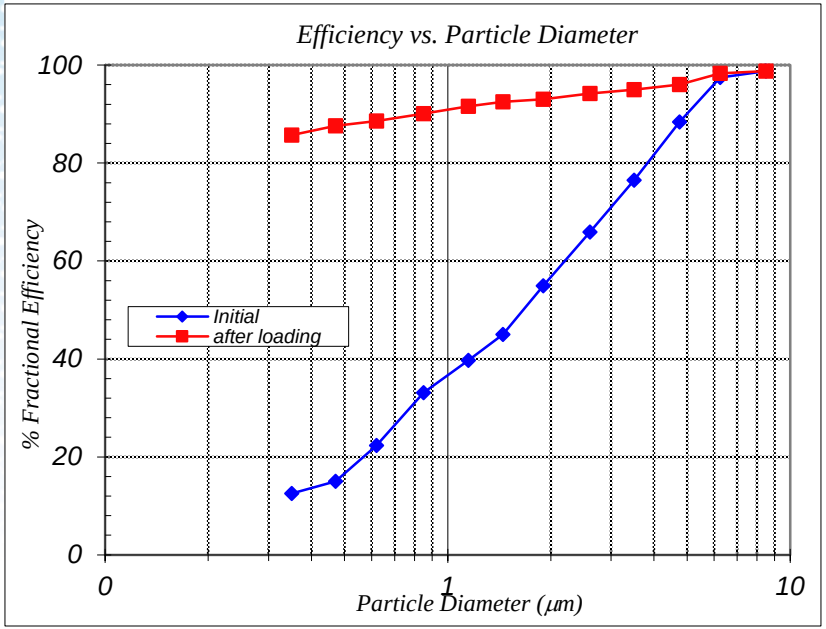
Tetratex

Membrane: Improves Filtration Efficiency

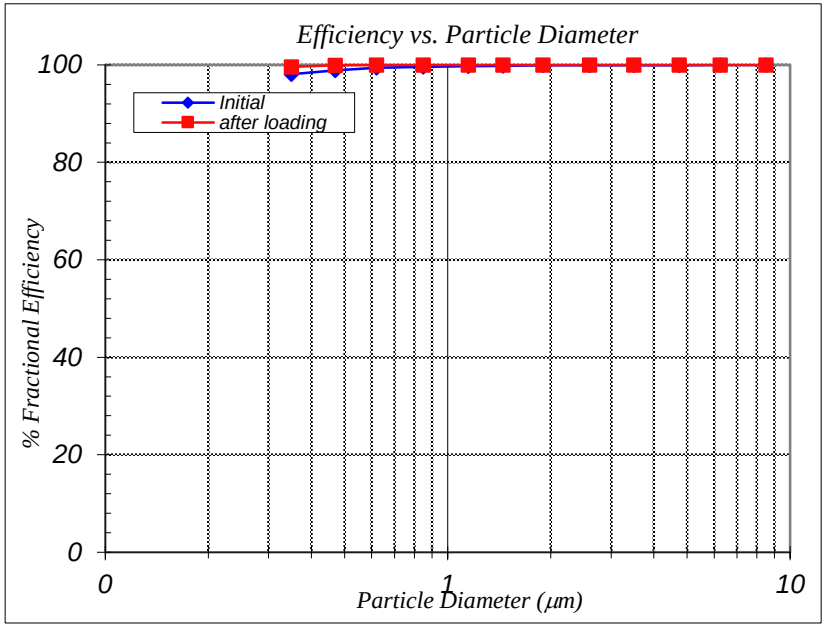
- Many utilities will be forced to add and/or increase their sorbent injection levels to comply with lower HG/HCL/acid gas emission limits.
- Several of these sorbents including Powder Activated Carbon (PAC), Trona, and lime products can have portions of their particle size distributions less than 2.5 microns.
- A higher efficiency membrane filter will allow these very fine/ submicron sorbent fractions to be filtered more reliably and efficiently.

Efficiency Comparison: 16oz PPS

Conventional Media



Tetratex Laminate (8162)



**** Independent test results conducted by LMS Technologies Inc. May 2012***

Donaldson. FILTRATION SOLUTIONS

Committed To Solving Your Filtration Challenges

Tetratex

Efficiency Comparison: 16oz PPS High-Temperature Needlefelt

Conventional Media

Status	Initial	after loading
Size Range (mm)	% Efficiency	
DP ("H_2O)	0.185	0.385
0.3-0.4	12.5	85.7
0.4-0.55	15.0	87.6
0.55-0.7	22.3	88.6
0.7-1.0	**33.1**	**90.1**
1.0-1.3	39.7	91.6
1.3-1.6	45.0	92.5
1.6-2.2	54.9	93.0
2.2-3.0	**65.9**	**94.2**
3.0-4.0	76.5	95.0
4.0-5.5	88.4	96.0
5.5-7.0	97.5	98.3
7.0-10.0	98.8	98.8

Tetratex Laminate (8162)

Status	Initial	after loading
Size Range (mm)	% Efficiency	
DP ("H_2O)	0.756	0.956
0.3-0.4	98.1	99.6
0.4-0.55	98.9	99.9
0.55-0.7	99.4	100.0
0.7-1.0	**99.6**	**100.0**
1.0-1.3	99.7	100.0
1.3-1.6	99.8	100.0
1.6-2.2	99.9	100.0
2.2-3.0	**99.9**	**100.0**
3.0-4.0	99.9	100.0
4.0-5.5	99.9	100.0
5.5-7.0	100.0	100.0
7.0-10.0	100.0	100.0

**** Independent test results conducted by LMS Technologies Inc. May 2012***

Donaldson. FILTRATION SOLUTIONS

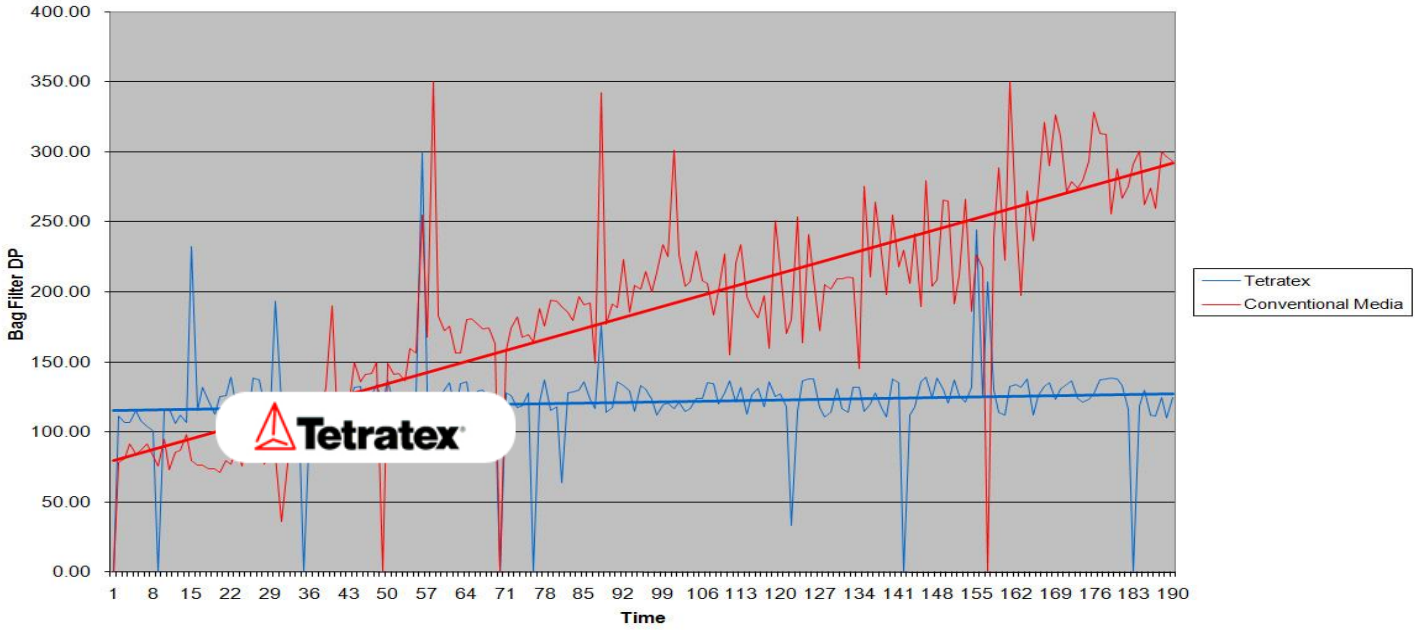
Committed To Solving Your Filtration Challenges

Tetratex

Higher Airflows
= Optimal Fabric Filter Performance

- Membrane Filter = Lower DP = High Airflows = Peak Capacity = Decreased Operating Cost = Efficient Operations
- Conventional Filter = Higher DP = Lower Airflows = Derated boiler = Increased Operating Cost = Inefficient Operations
- Membrane surface filtration technology allows filter fabric's to clean better (lower dp's), which leads to longer cleaning cycle times, more "gross" filter cloth area on line, less compressed air usage (savings), and less cleaning stress on the filters (longer life).

Tetratex® Membrane Filter Media



Benefits:

Increased…

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

Reduced…

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

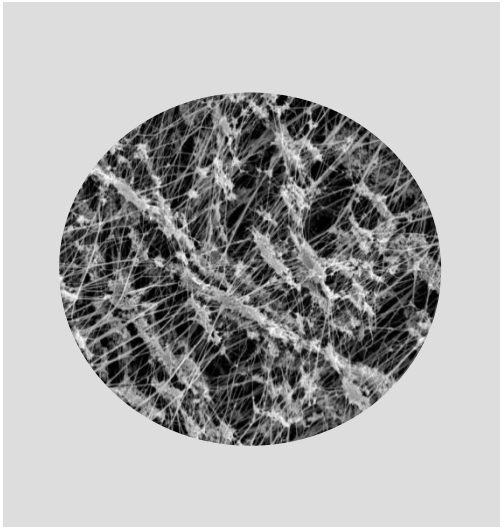
Donaldson. FILTRATION SOLUTIONS

Tetratex

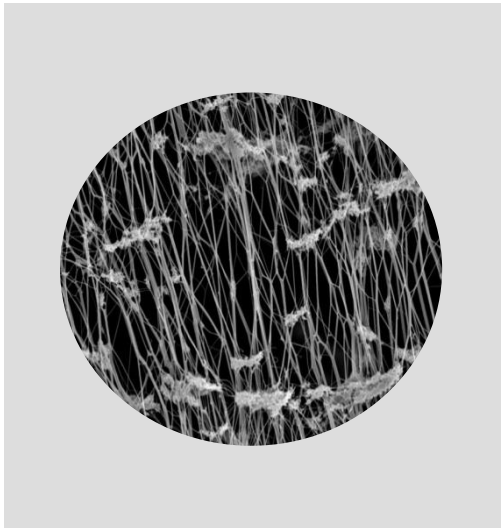
Recoverability from Moisture Excursions

- **“Wet Cake”:** High moisture levels can cause PM to be extremely sticky and challenging to remove from conventional filter bags. Can occur periodically via tube leaks, dew point excursions, high humidity, start up/shut down conditions.
- **Results:** Primary cake in conventional filters can “cement” within the media. This condition will increase DP which will trigger the boiler to be derated.
- **Recoverability:** Tetratex Membranes via surface filtration eliminate this risk and allows for improved recovery from moisture excursions.

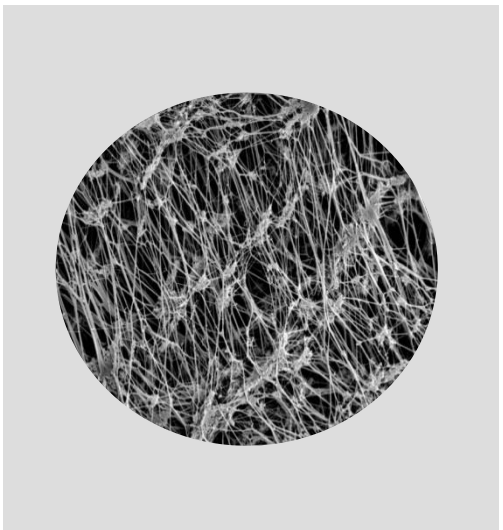
Tetratex® Membrane Products
Particular to the Challenge



Tetratex



Tetratex *EXTREME*®



Tetratex High Efficiency

Donaldson. FILTRATION SOLUTIONS

Committed To Solving Your Filtration Challenges

Tetratex

Questions

www.donaldsonmembranes.com

Email: Edward.Ricketts@donaldson.com

Call: 267-443-8581