Introducing the Ultimate Filtration Fiber for Cement Kiln Baghouses

PCA MTC Virtual Meeting
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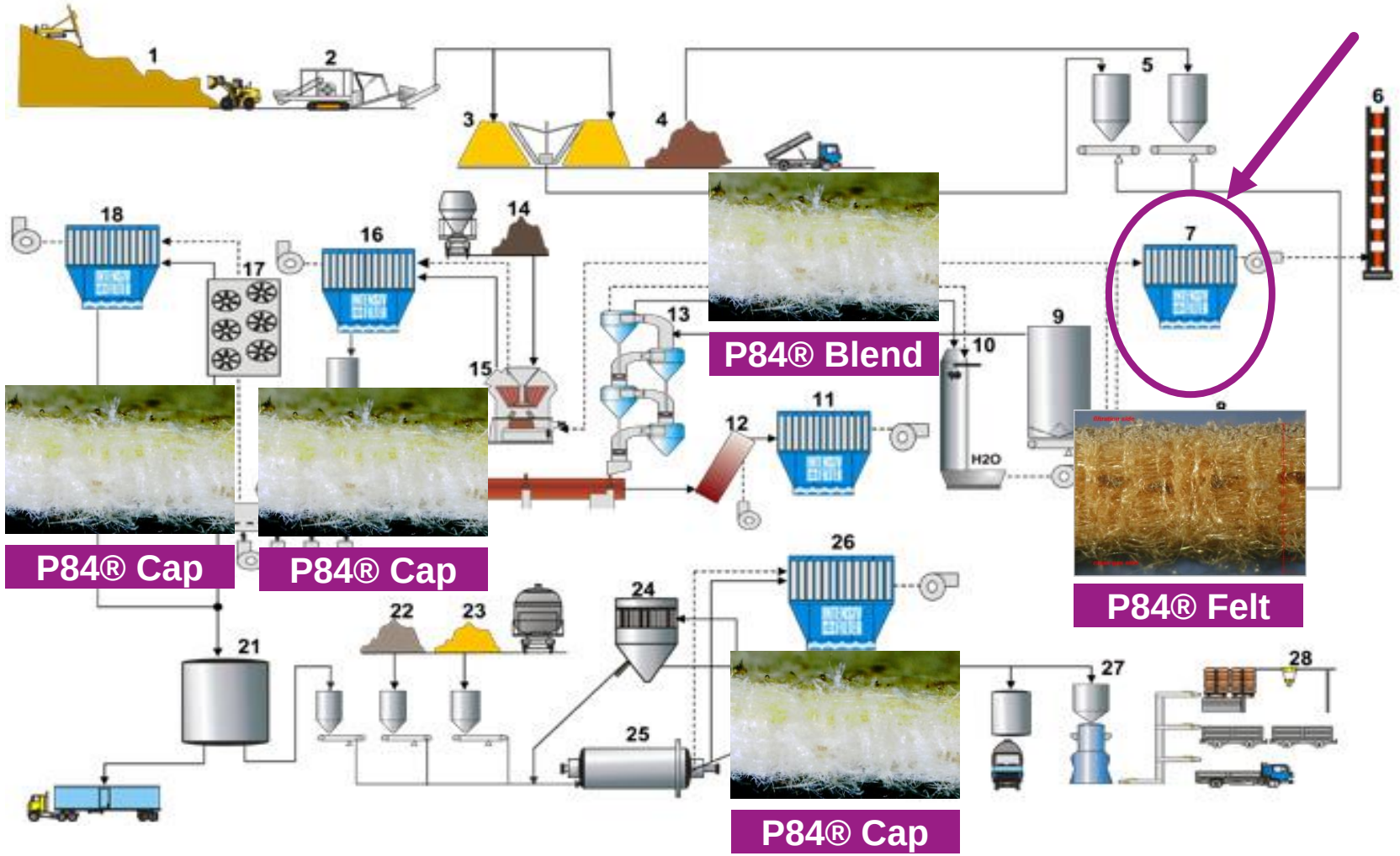
P84® Fiber Solutions
Proven in cement plant applications for 30 years



Typical Cement Plant Filters	
7	**Kiln-Raw Mill Filter**
11	Bypass Filter
16	Coal Mill Filter
18	Clinker Cooler Filter
26	Cement Mill Filter

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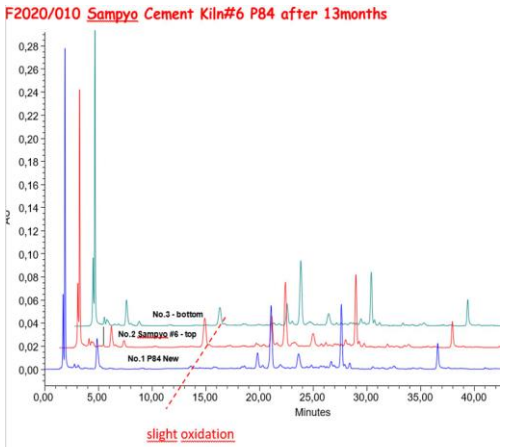
Evonik utilizes knowledge and tools to support optimization of cement filter media

- Bag filter material recommendation
- Bag filter condition monitoring
- Failure analysis
- Flue gas chemical analysis
- Bag filter plant assessment
- Bag filter training workshops



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Typical Bag Failures
Cement plant filters are a harsh environment for filter bags

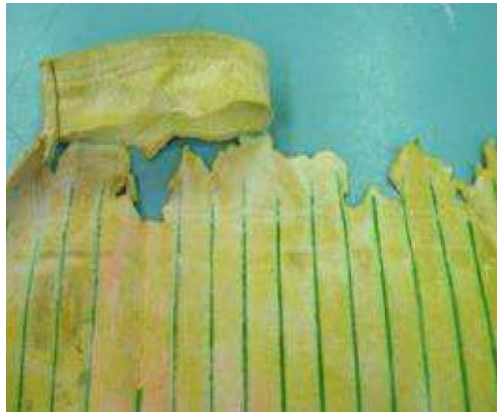
Heat damage – over-temperature

Acid damage

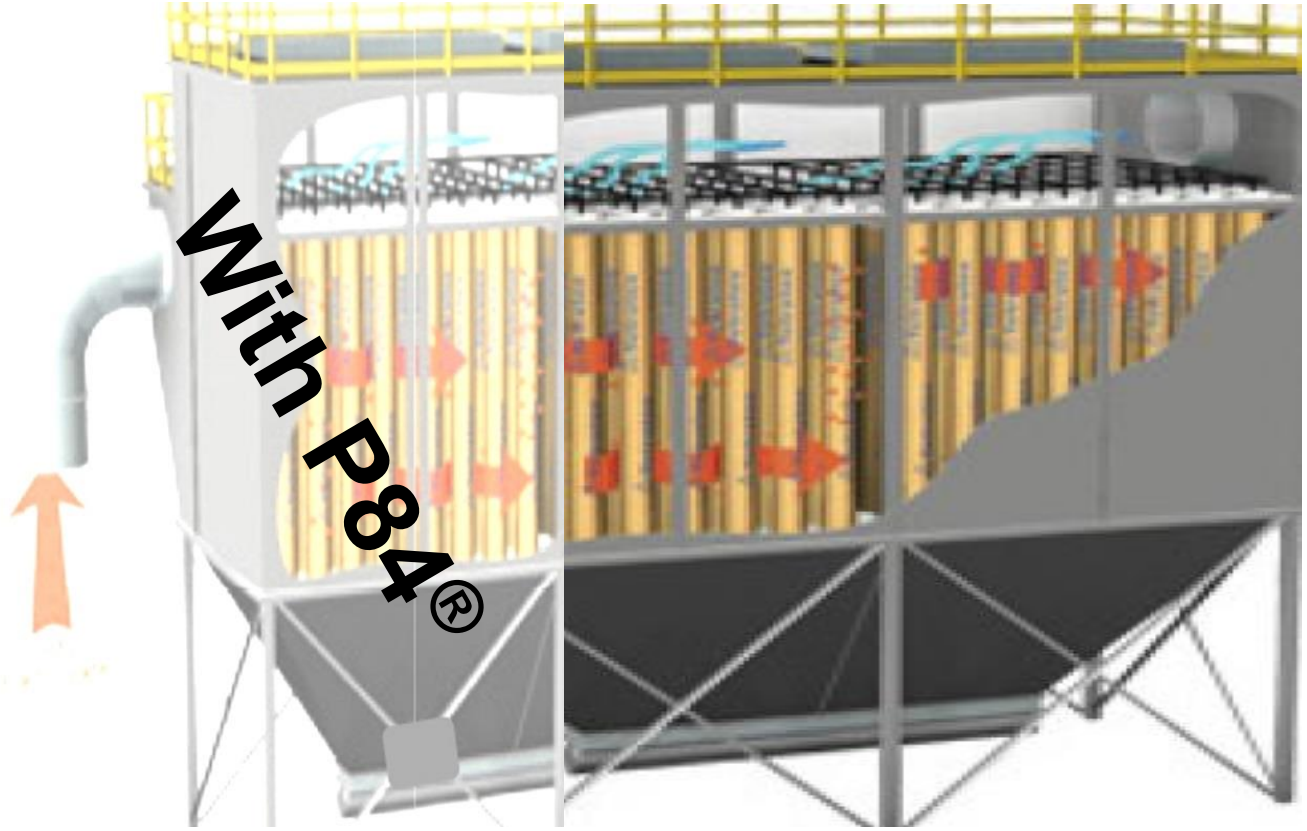
Moisture blinding

Cuff abrasion

Hydrolysis



Air to Cloth Ratio (ACR)
P84® filter media can handle the highest capacity requirements

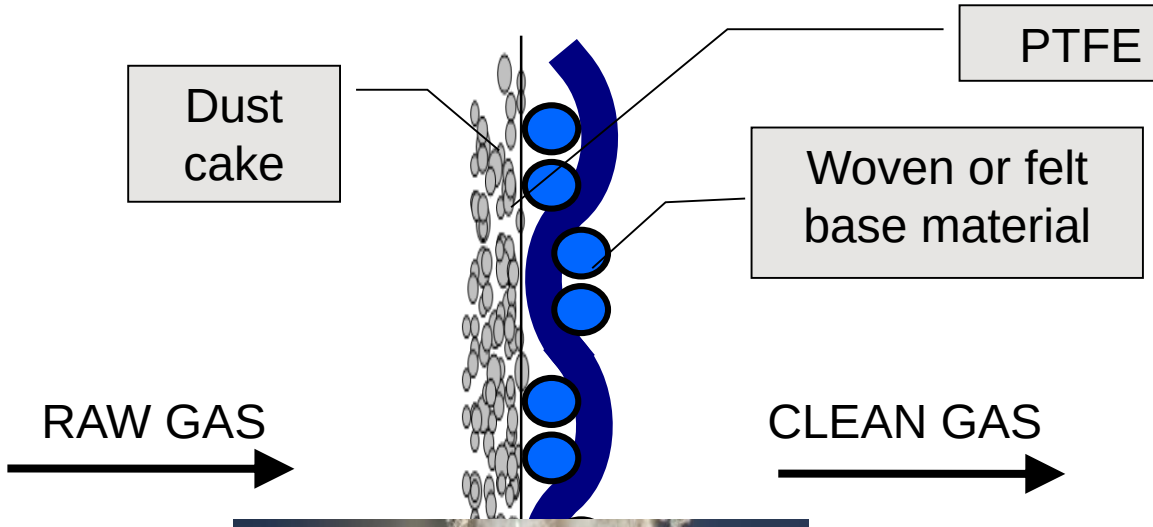


Filter Media	Max ACR (CFM/ft²)	Virtual Size (% Change)
Glass/Membrane	3.3	0
Round Fiber	3.9	20%
P84®	**4.6**	**40%**

$$ACR = \frac{volumetric\ gas\ flow\ (ACFM)}{filtration\ area\ (ft^2)}$$

Filter Media Construction -- e-PTFE Laminated Membrane

Stressed bags cause corrective actions and increased pressure drop



Surface Damage to Membrane

Dust Breakthrough

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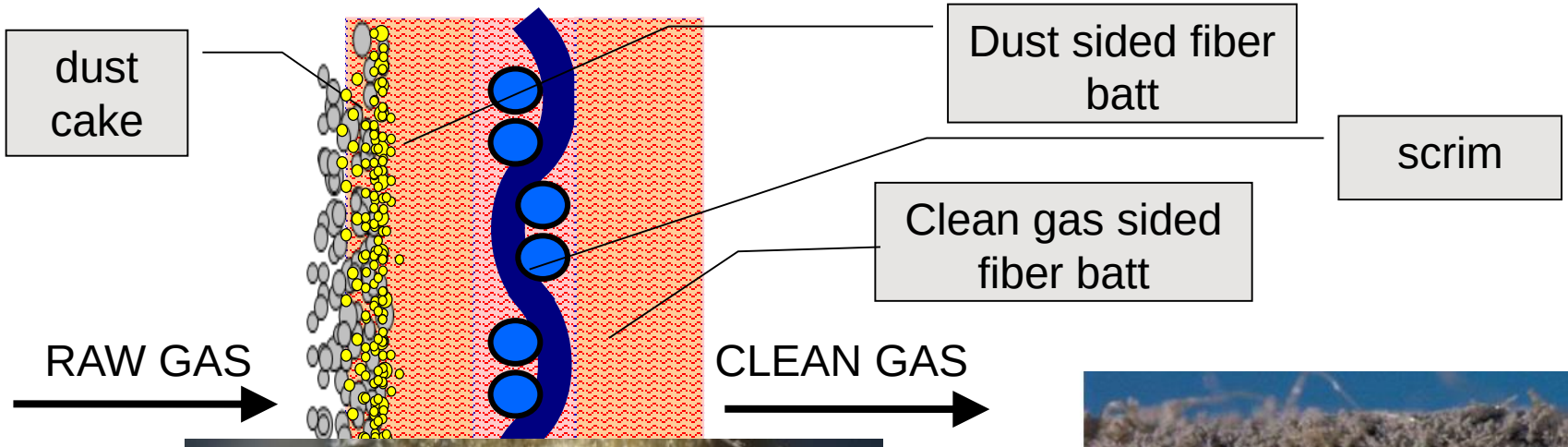
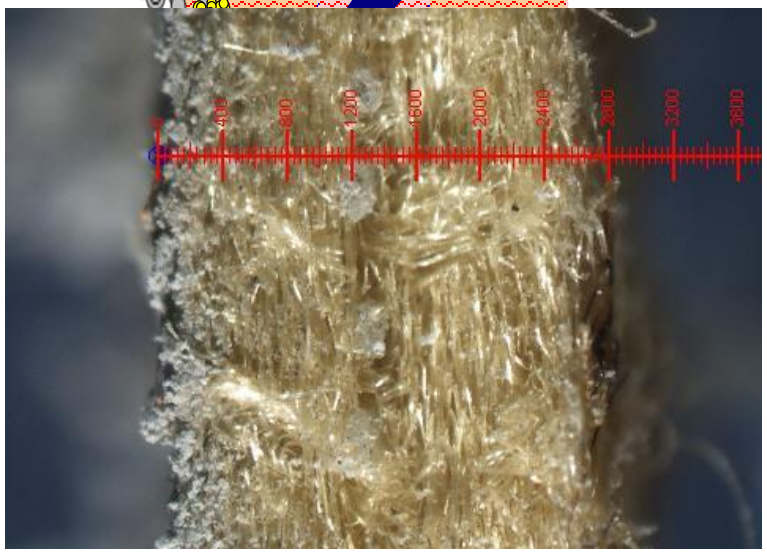
P84® Filter Media Construction
Stable operation over the life of the bag





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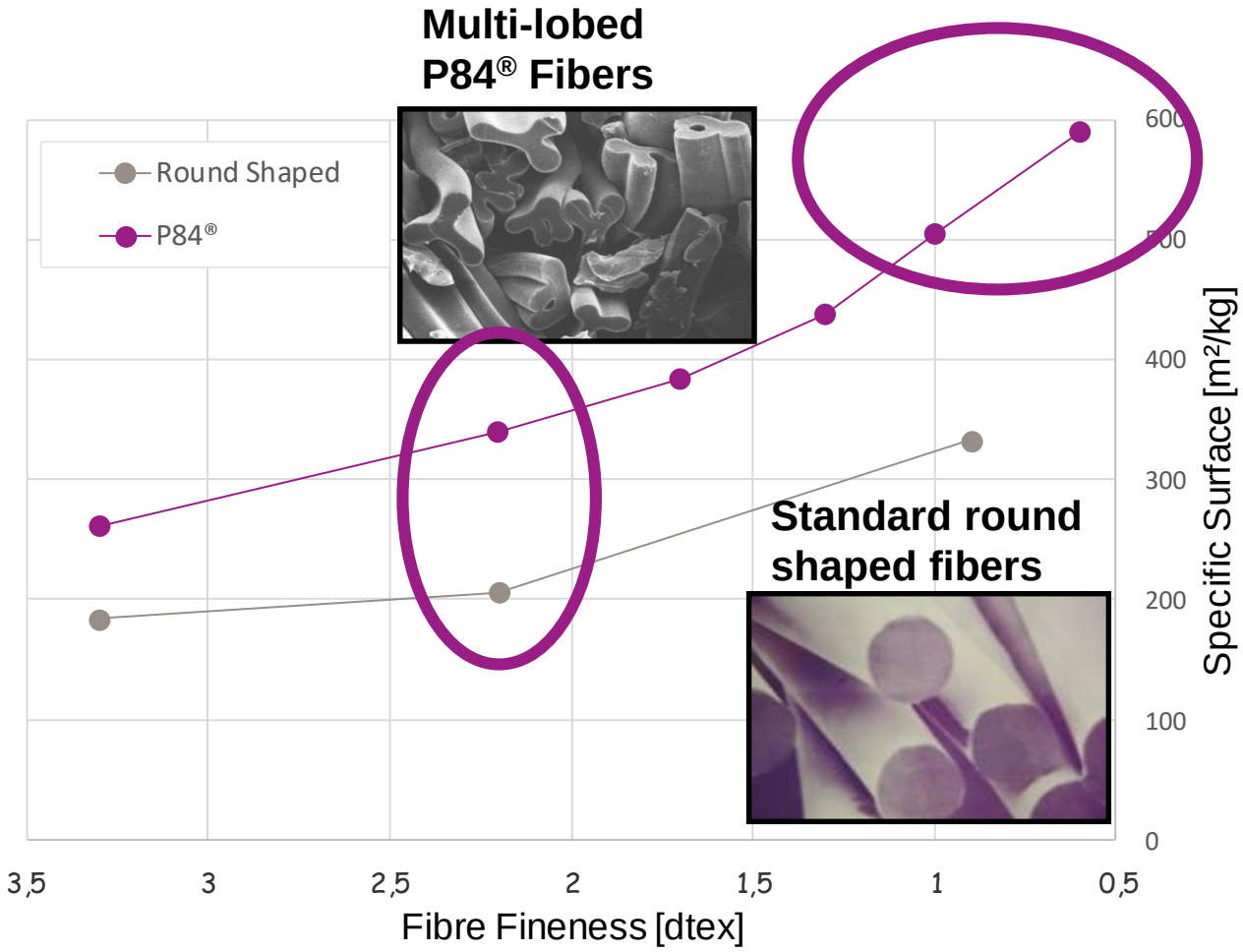
P84® Fibers - High Specific Surface Area
Proven capability to meet the most stringent emission limits



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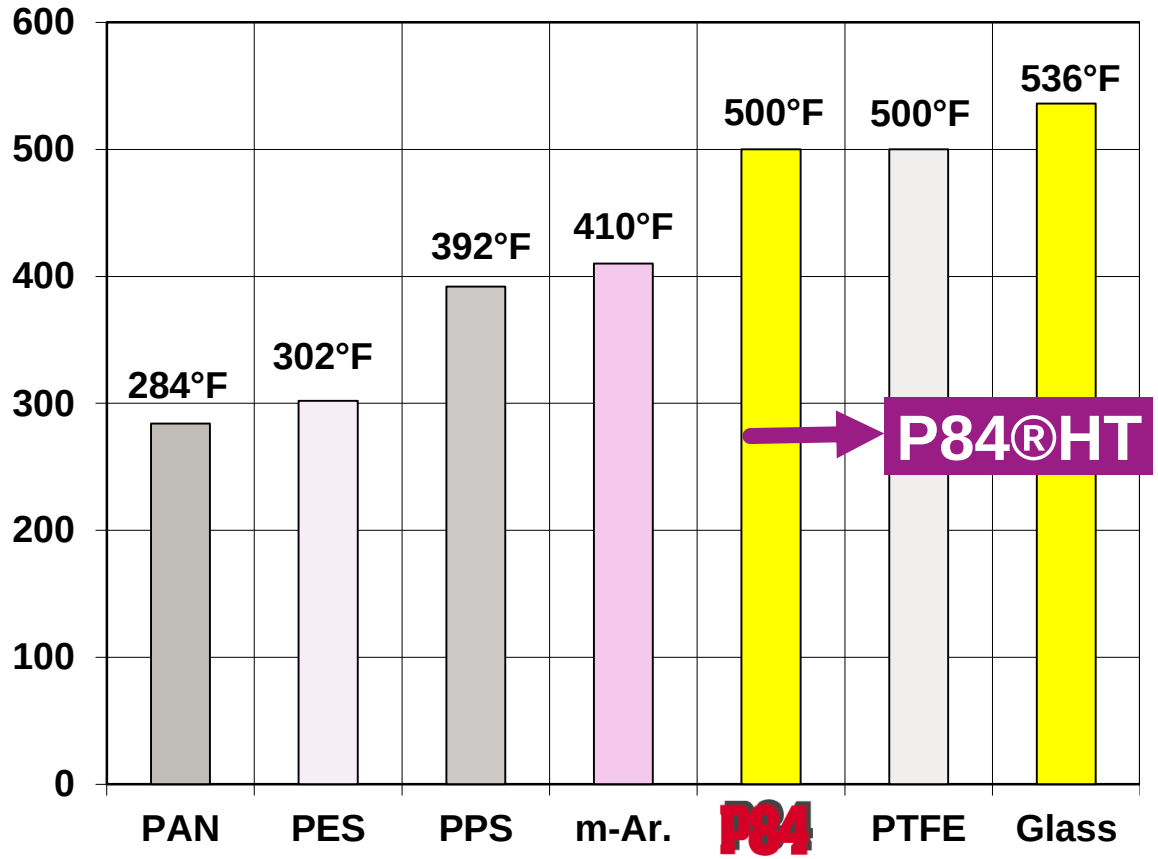
Upset Temperatures in Cement Kiln Baghouses
Exceed the limits of most filter media



P84®HT can handle temperatures above 500°F providing a high performance alternative to glass/membrane for cement kiln baghouses.

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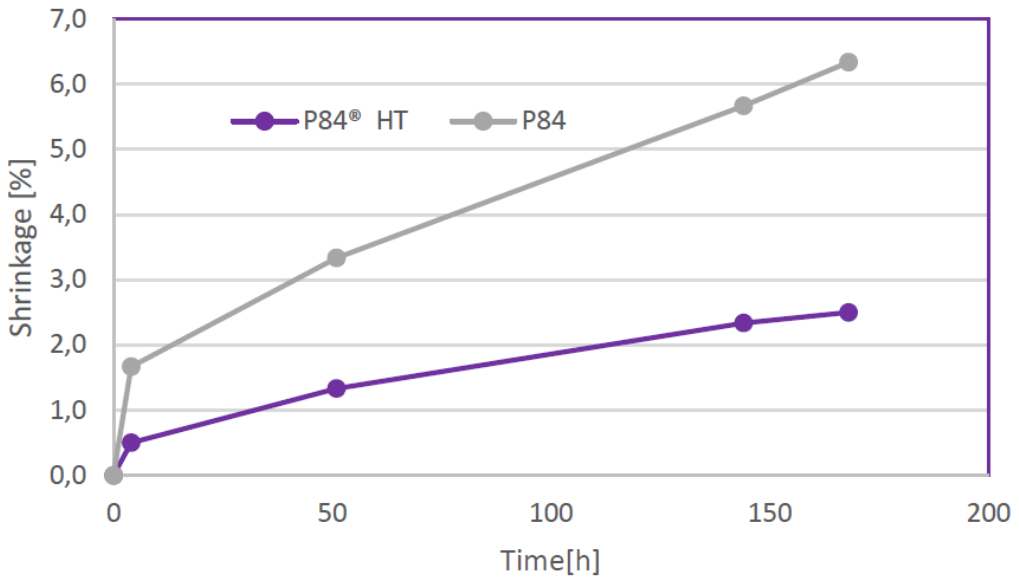
Introducing P84®HT Fiber

All the benefits of P84® with even higher temperature resistance



Multi-lobal

Increased peak temperature

Extended time for temperature upsets

	P84®	P84®HT
Min. Tenacity [cN/tex]	35	35
Elongation [%] min./max.	25/35	25/35
Shrinkage at 464°F (240°C) / 15 Minutes [%]/max.	<3	1
Shrinkage at 518°F (270°C) / 15 Minutes [%]/max.	Not Measured	**<3**
Glass Transition Temperature – T_g [°F/°C]	631/333	**718/381**

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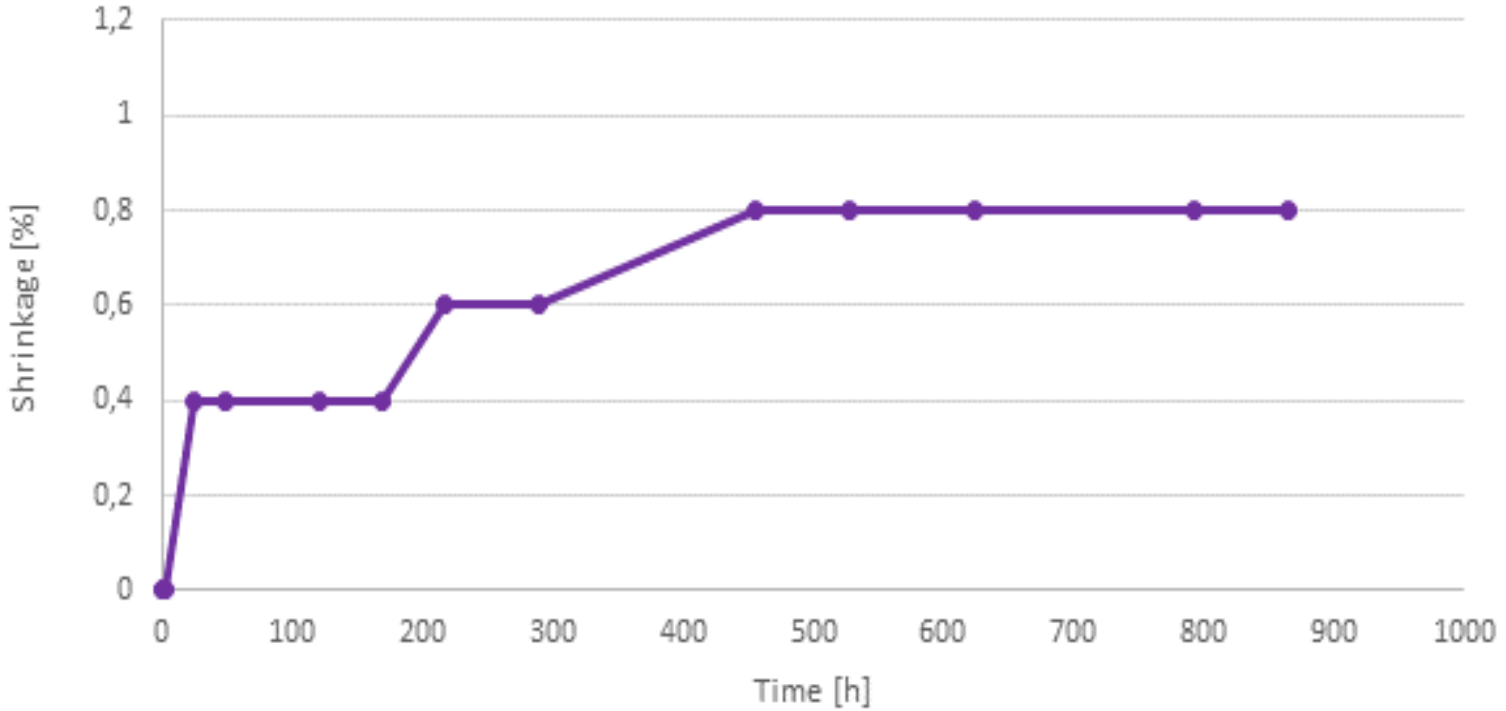
P84®HT Shrinkage Characteristics
Suitable for continuous operation in a kiln baghouse

Shrinkage of a P84®HT felt exposed to typical operating temperatures



P84®HT felt construction

- **Temperature of 464°F (240°C)**
- >800 hours of exposure
- <2% shrinkage rate
- 21% O_2 air stream

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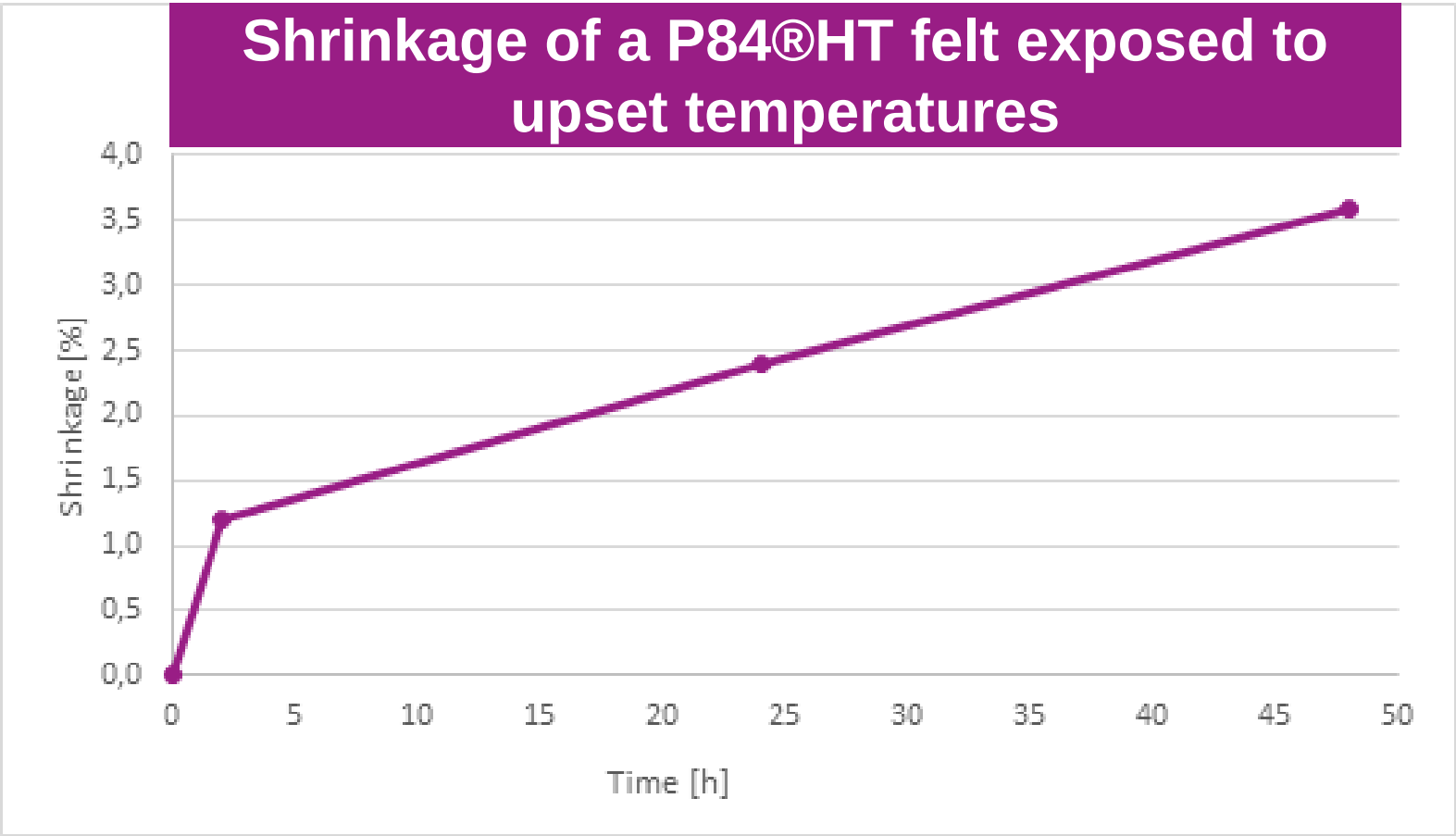
P84®HT Shrinkage Characteristics
Capable of withstanding extreme surge temperatures



P84®HT felt construction

- **Temperature of 554°F (290°C)**
- 50 hours of exposure
- <4% shrinkage rate
- 21% O_2 air stream

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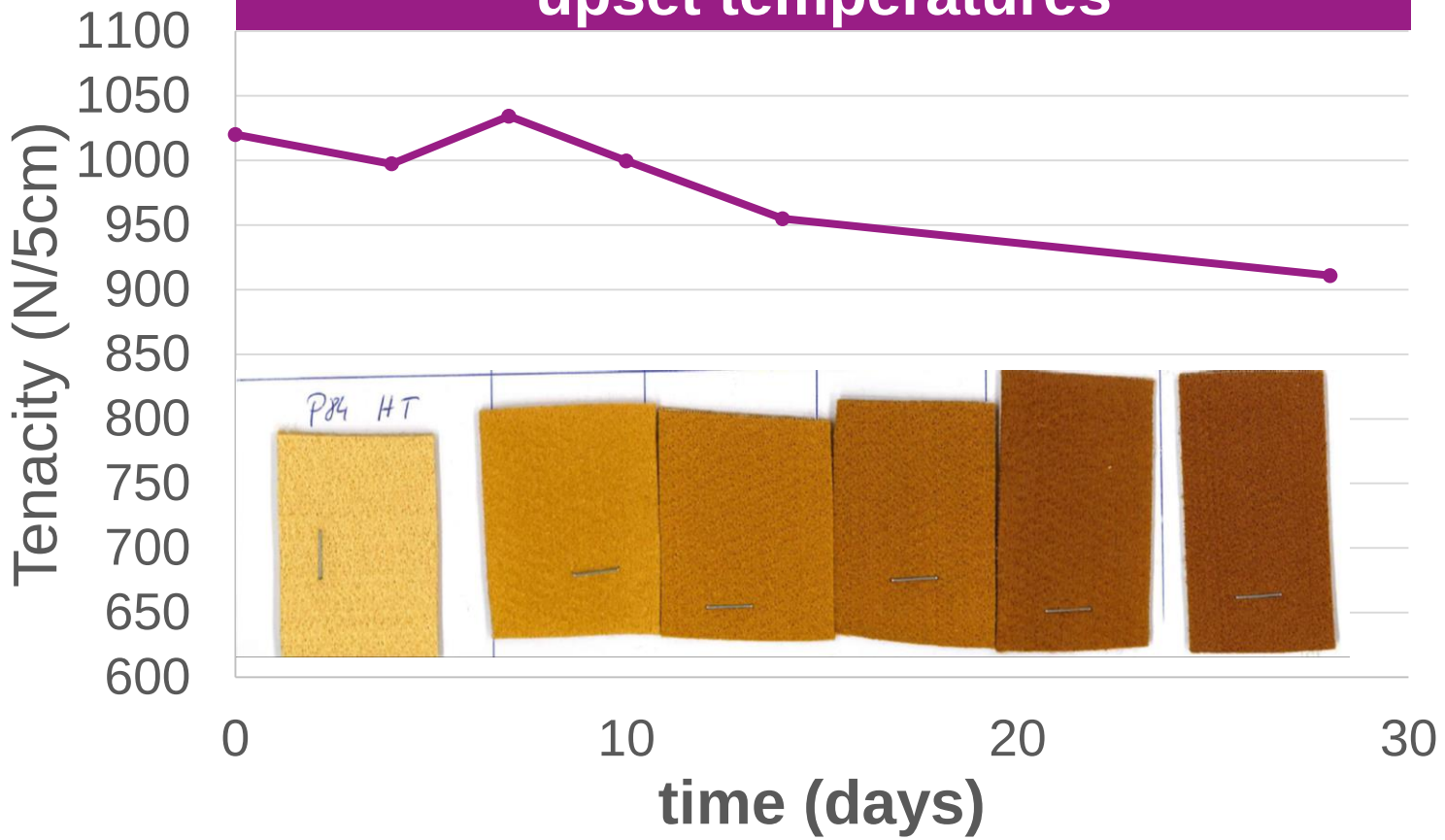
P84®HT Strength and Flexibility

Even under extreme temperature stress, P84®HT is flexible and strong

Strength of a P84®HT felt exposed to upset temperatures



P84®HT felt construction

- **Temperature > 530°F (290°C)**
- 600 hours of exposure
- Retains flexibility
- Retains strength
- 21% O_2 air stream

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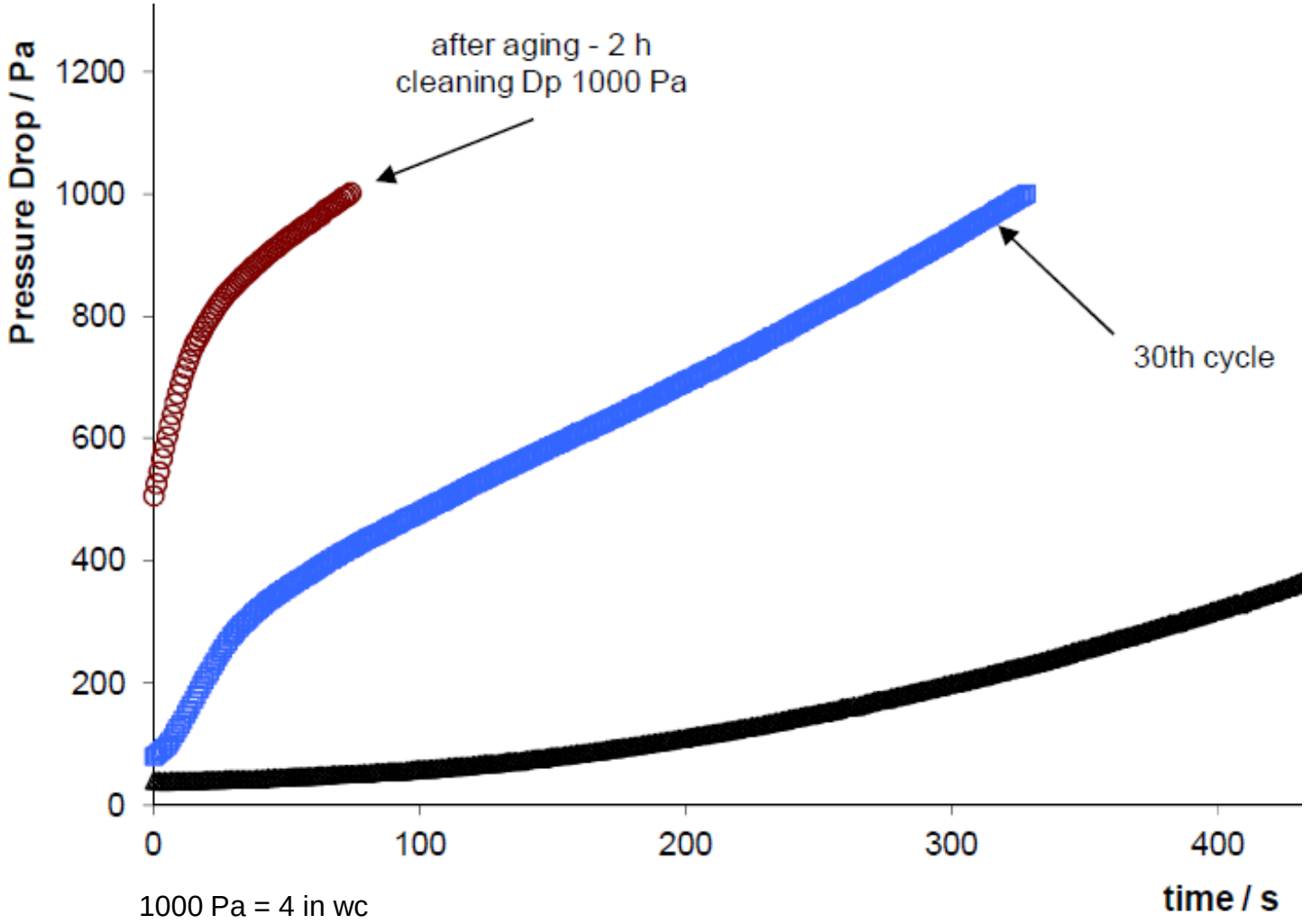
Filtration Properties of P84®HT Fibers
Continues to perform even after exposure to high temperatures



1000 Pa = 4 in wc

P84®HT felt construction

- **Temperature of 536°F**
- VDI filtration performance test
- Retains filtration capabilities
- Stable pressure drop
- Long pulse cycle time

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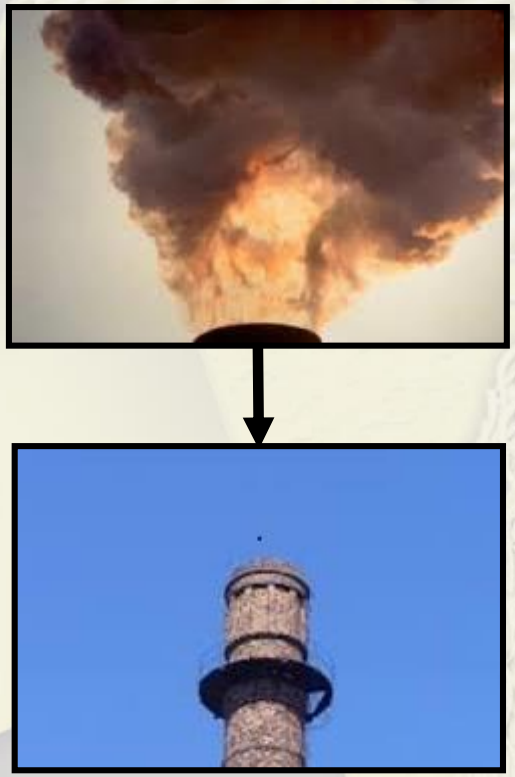
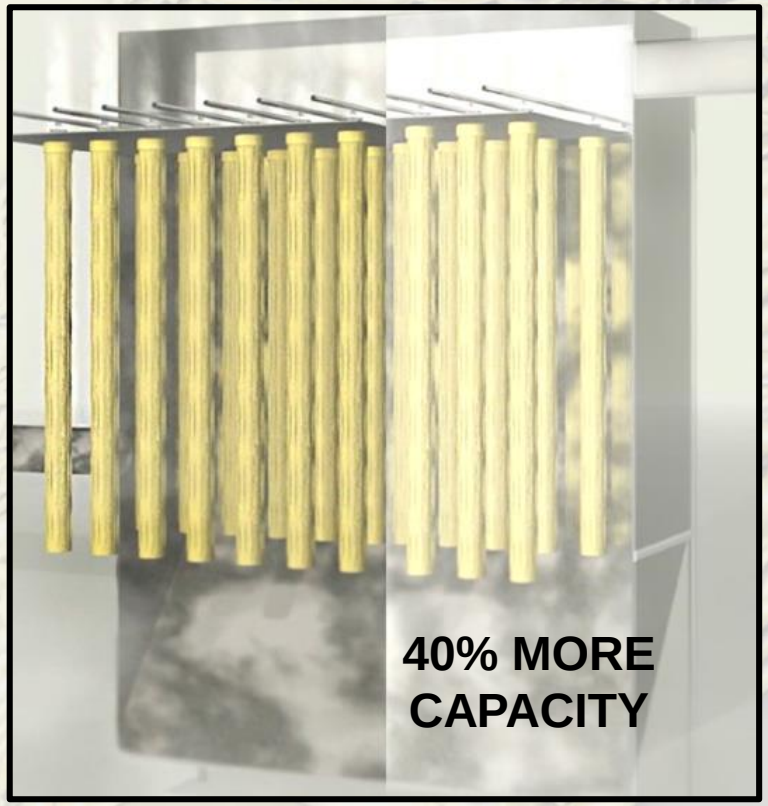
The Benefits of P84®HT Based Needle Felts for Cement Plants
Ideal for kiln/raw mill, clinker cooler and alkali bypass filters

Lower Emissions



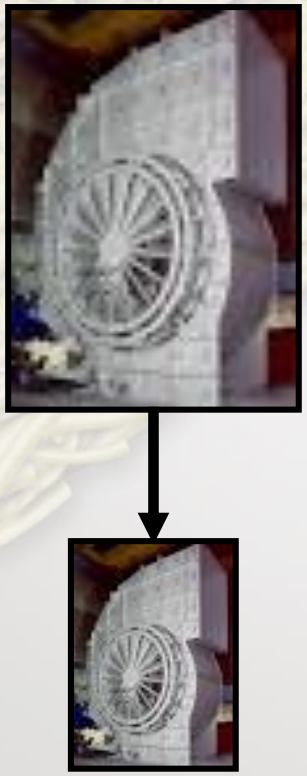
P84®HT bags reduce Cement MACT compliance costs

Reduced Capital Cost



P84®HT bags last in extreme applications

Reduced Operating Cost



P84®HT bags reduce energy costs

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Questions?

Need help with your filter unit

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