TORAY High Performance Fibers for Low Sulfur Coal Applications

Chet Moon
TORAY FLUOROFIBERS (AMERICA), Inc.
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Toray offers a Broad Portfolio of Fibers

- TORCON® PPS
- TEFAIRE® A proprietary blend of TEFLON® and glass fibers
- TEFLON® PTFE Fibers
PPS fibers offer:
- Excellent Chemical Resistance for Acids, Alkalis and many Organic solvents
- Good Temperature Resistance; 175\(^0\) C continuous use
- Excellent Filtration Performance
- Demonstrated performance at numerous installations internationally
- Bag life of 2.5 to 4 years or more in most applications

Special items:
- High Tenacity Fibers
- Micro Fibers

However, they are subject to attack by Oxidizers like nitric acid, chromic acid.

Optimum temperature range is 145 – 160\(^0\) C. Use at temperatures above 175\(^0\) C will shorten bag life.

Short temperature excursions of up to 200\(^0\) C can occur without loss of properties or strength.

Very good acid resistance with 3 to 5% sulfur coal. However, 8 to 10% sulfur coal can result in loss of fiber properties.
TORCON® PPS Offers Exceptional Heat Resistance

[Graph showing the long heat resistance of TORCON® fiber at 180°C and 200°C over varying durations of treatment in days.]
Advantages of Torcon® S-371 PPS Fiber

- Staple fiber: tenacity 16% higher, 43% less elongation
- Spun yarn: tenacity 16% higher, 20% less elongation
- Scrim: warp strength 12% higher, weft 14% higher
- Can make higher strength scrim with same weight of fiber
- Yarn processing consistent to regular TORCON®S301
This proprietary blend of TEFLON® and glass fibers provides:

- 260°C Continuous use Temperature capability with surges up to 288°C
- The Blend Produces a Strong Triboelectric effect which enhances Surface Filtration; thus reducing dust penetration
- The Felt Offers Better Release
- High Air to Cloth Ratio versus 100% PTFE felts
- Excellent Chemical Resistance
- The only Chemical Concern is Fluorine Emissions of 100 ppm or more with Moisture in the Gas Stream Reacting to form HF

This Material is Used Extensively in Incineration Plants

Demonstrated bag life of 5 years – up to 10 years possible

Demonstrated performance in Coal Fired Boilers (fly ash)
Tefaire® Felt

- Consists of 70/30 blend of 3.5 dpf Teflon® and Micro denier glass
- 18 oz. basis weight
- Supported with PTFE scrim
- Continuous use temperature of 260°C
- Great Chemical Resistance
- 99.99% PM 2.5 efficiency
- Low Pressure drop (1.40 in. w.g.)
- Air permeability approx. 35 cfm
- Long Life in the most challenging processes
- No Hydrolysis Issues
- Great spark resistance

‘TORAY’
Innovation by Chemistry

Toray Fluorofibers (America) Inc.
2032 Highway 20 • Decatur, AL 35601
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TEFLON® Brand Fibers

TEFLON® Brand Fibers offer:

- 260°C Continuous use Temperature capability with surges up to 288°C
- Will work in the most chemically aggressive environments – no man made fiber is better
- New developments are improving filtration performance:
  - Micro Fibers
  - Modified Cross-sections
  - More Thermally Stable fibers for better dimensional stability in use
Low Shrink TEFLON® PTFE Fiber
100% Teflon® Felt

- Consists of 50/50 blend of
  6.7 and 3.5 dpf
- Available in 6.7, 3.5, or
  1.75 dpf
- 20 oz. basis weight
- Supported with PTFE scrim
- Continuous use temperature
  of 260°C
- Complete Chemical
  resistance
- 99.9% PM 2.5 efficiency
- Low Pressure drop
  (1.27 in. w.g.)
- Air permeability approx
  35 cfm
- Long life in the most
  challenging processes
- No Hydrolysis issues
- Great spark resistance

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VDI Testing for Various Felts

PM 2.5 Removal Efficiency

Torcon® PPS
Tefaire®
50/50 3.5/6.7 Teflon®
3.5 dpf LS Teflon®
VDI Testing Data for Various Felts

- Torcon® PPS
- Tefaire®
- 50/50 3.5/6.7 Teflon®
- 3.5 dpf LS Teflon®

Avg. Residual Pressure Drop (cm w.g)
Summary

- Currently, Toray PPS TORCON® is the most suitable fiber to meet most of the needs of Coal Fired Boiler Filtration Needs.
- However, new environmental requirements such as PM 2.5 and Mercury Removal may require new solutions.
- Toray is considering these problems and is offering possible solutions with TORCON®, TEFAIRE® and TEFLON® Brand Fibers.
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