GE
Energy

ePTFE Membrane Filters

BHA-TEX®

imagination at work

High efficiency fine filtration

What is BHA-TEX®?

BHA-TEX® ePTFE (expanded polytetrafluoroethylene) membrane is an extraordinary filtration technology that provides the highest efficiency of any available filter bag media. Through GE Energy's sophisticated and controlled manufacturing process, PTFE resin is expanded into a membrane composed of millions of microscopic pores in a three-dimensional web-like structure. These micro pores are small enough to capture sub-micron particulate, yet large enough for the passage of airflow.

High Efficiency Filtration for Your Dust Collector

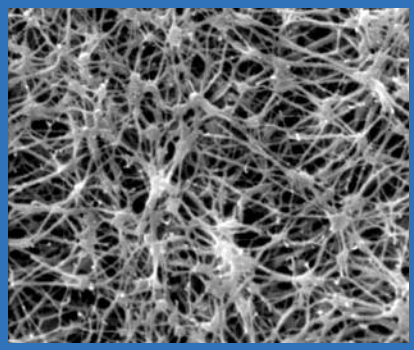
BHA-TEX membrane is made from PTFE resins, commonly known as Teflon®, the material that helps keep food from sticking to cookware. Interestingly, these same properties can help your dust collector operate at maximum efficiency. BHA-TEX membrane has a non-stick surface that operates without a dustcake to provide:

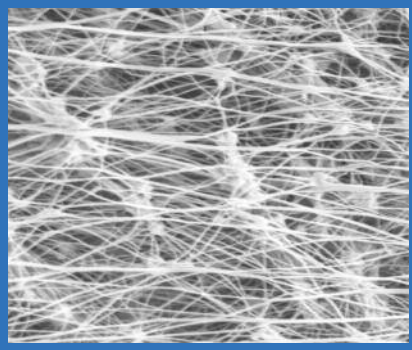
- 99.99% efficiency
- Higher airflow
- Better cleaning
- Optimum emissions control

PTFE Fluoropolymer Resin

1. Extrusion and bi-axial stretch

Family of Specialized ePTFE Membranes





2. Thermal lamination to base fabric

BHA-TEX Composite Fabric

Teflon® is a registered trademark of E.I. DuPont de Nemours & Company.

Cover Photo: PSP30585-35

Quality construction

Membrane, filter bags, and cages—only GE Energy makes them all!
Proper design and manufacturing of the filter bags and all related components are critical for optimal performance. The selection of raw materials and the design of filter bags, cages, tensioning assemblies, support rings, bag caps, and other essential hardware will impact the service life of the filter bags.

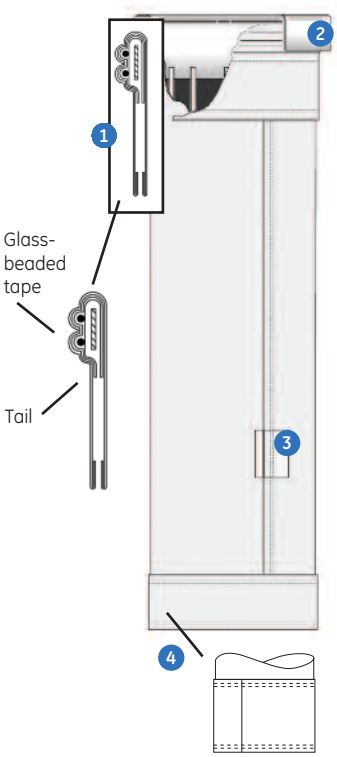
Manufacturing standards
Our ISO 9001 certified quality system includes testing and inspections at all stages of manufacturing, from incoming raw materials to packing and shipping the finished product. We also listen to feedback from customers and our field engineers to continually refine our product design and manufacturing techniques.

BHA-TEX filter media is tested and inspected to assure our filter bags are the highest quality. Using state-of-the-art automated equipment, GE Energy is able to apply process control technology to maintain consistent membrane properties for proper performance on a variety of base fabrics.

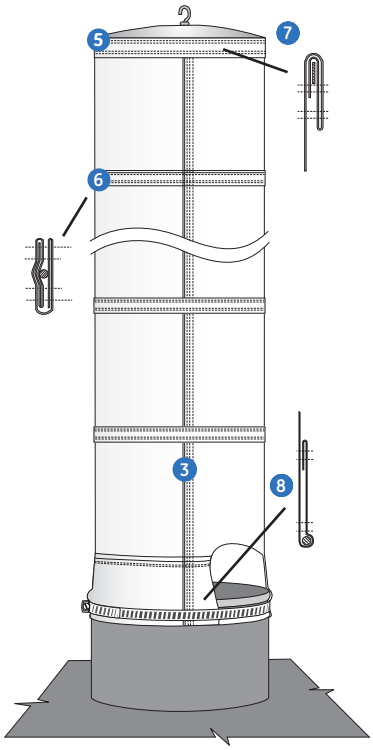
GE Energy's quality management system received the first ISO 9002 certificate in our industry in 1993, and we received ISO 9001 certification in 1996.

GE Energy is the only supplier that provides in-house ePTFE manufacturing and lamination combined with bag and cage design and fabrication. This total component approach is critical to maximizing the life and performance of a premium filter bag.

BHA-TEX Snapband Disc Bottom Filter



BHA-TEX Reverse Air Filter



1 Snapband constructed with glass-beaded tape and tail to ensure a consistent, leak-free fit.

2 As the manufacturer of both bags and support cages, we are capable of ensuring a critical fit.

3 GE Energy's felt and woven filter bags are constructed with a three-needle vertical seam, ensuring support in case one stitch should break or unravel.

4 Wearstrip (optional) designed to reduce possible inlet abrasion damage to membrane during service and installation.

5 Factory installed steel cap with open or closed eye allows for easy installation.

6 Anti-collapse ring (enclosed in a three-ply ring cover) is sewn into the bag to prevent collapse during cleaning.

7 Stainless compression band top is manufactured to tight tolerances for dust-tight seal.

8 Bottom cuff is sewn in place using two rows of two-needle lockstitch to secure the beaded glass cord. Bottom clamp holds bag cuff tightly to the thimble.

Fabric solutions

We have the right fabric for any application.

Filter bags manufactured with BHA-TEX® membrane are available in a variety of base fabrics to meet your system's specific requirements. Contact a GE Energy technical representative for help in selecting the base fabric best suited for your process environment.

Fabrics	Polypropylene	Acrylic	Polyester	PPS (Torcon®/Procon®)	Aramid (Nomex®)	P84***	Fiberglass*	PTFE*** (Teflon®)
Max. Continuous Operating Temperature	170°F (77°C)	265°F (130°C)	275°F (135°C)	375°F (190°C)	400°F (204°C)	356–500°F (180–260°C)	500°F (260°C)	500°F (260°C)
Abrasion	Excellent	Good	Excellent	Good	Excellent	Fair	Fair	Good
Energy Absorption	Good	Good	Excellent	Good	Good	Good*	Fair*	Good
Moist Heat	Excellent	Excellent	Poor	Good	Good	Good	Excellent	Excellent
Alkalines	Excellent	Fair	Fair	Excellent	Good	Fair	Fair	Excellent
Mineral Acids	Excellent	Good	Fair	Excellent	Fair	Good	Poor**	Excellent
Oxygen (15%+)	Excellent	Excellent	Excellent	Poor	Excellent	Excellent	Excellent	Excellent

*Sensitive bag-to-cage fit, ** Fair with chemical or acid resistant finishes, *** Must oversize bag for shrinkage for temperatures above 450°F (232°C).

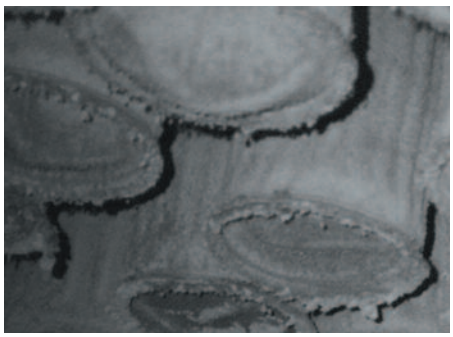
Chemicals? High temperatures? We've got you covered.

While BHA-TEX membrane is unaffected by aggressive chemicals and harsh environments, the base fabric must also be durable enough to endure the rigors of start-up, shutdown, dewpoint excursion, and other process variations. For aggressive hot gas applications, BHA-TEX can be laminated to felt and woven PPS (Torcon®/Procon®), standard and acid resistant aramid (Nomex®), P-84, fiberglass, and PTFE. BHA-TEX ePTFE membrane can withstand temperatures up to 500°F (260°C).

Moisture? Agglomeration? BHA-TEX membrane can beat it.

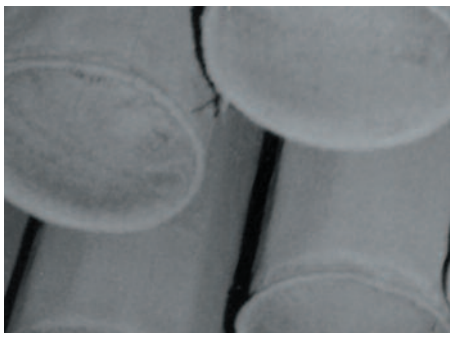
Particulate, when exposed to moisture, can adhere to the fibers of the fabric causing agglomeration—a major problem in some collector applications. This agglomeration restricts airflow and causes differential pressure to increase. Not so with BHA-TEX filter bags. Since the particulate sheds easily from the membrane, it is less likely to absorb enough moisture to solidify on the surface.

Traditional Filter Bags



Do your filters look like this? Moisture in the gas stream mixes with dust and sticks. This forms a dense, non-permeable dustcake which increases differential pressure (ΔP) and reduces airflow, resulting in decreased production.

BHA-TEX Filter Bags



Filters laminated with BHA-TEX resist sticky dust. This 100% ePTFE based material ensures increased airflow so you can spend more time producing, and less time and money cleaning and replacing filters.

Fabric and membrane innovation

GE continues to develop innovative fabrics designed for high efficiency membrane lamination. These proprietary fabrics, combined with a family of next generation, high durability membranes, have made BHA-TEX the best performing membrane product available for industrial particulate matter emissions control. GE's bi-component lamination is one of the many innovations GE has brought to the industry over the last two decades. GE Energy's bonding process is more scientifically controlled than conventional bonding methods. Lamination occurs across a large number of tiny fibers rather than large singed areas. This creates a more durable laminate and allows more filtration area on the filter.

Benefits of BHA-TEX bicomponent polyester, acrylic, PPS, and aramid filters:

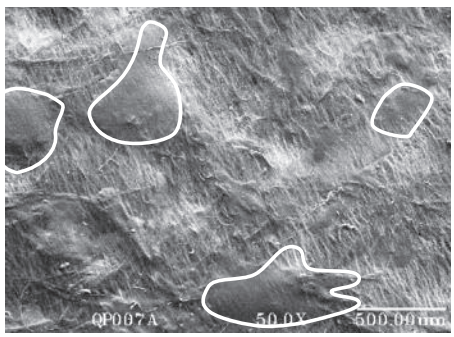
- Thicker and more durable membrane
- More surface area for filtration
- Extremely high filtration efficiencies—near zero emissions

BHA-TEX QP131 – Fractional Efficiency

Size Range (µM)	Fractional Efficiency (%)
0.3–0.5	99.998
0.5–0.7	100.000
0.7–1.0	100.000
1.0–2.0	100.000
2.0–3.0	100.000
3.0–5.0	100.000
>5.0	100.000

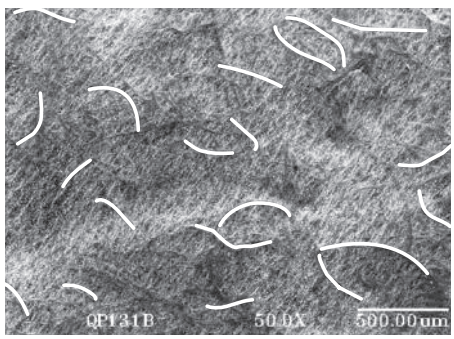
Test conditions:
Air-to-cloth ratio = 10.5:1 ACFM/FT^2
ΔP (in. H_20) = 1.10"

Conventional ePTFE Lamination
50X Magnification



Conventional membrane lamination to a singed polyester uses large bond points that can restrict airflow and cause membrane cracking.

Bicompontent Lamination
50X Magnification



GE Energy's bicomponent lamination technique allows for more numerous, yet much smaller bond points. Better bond, more airflow.

Surface vs. depth filtration

Depth filtration—the conventional way

Using standard fabric filter media, filtration occurs as a result of the formation of a primary dustcake (initial layer of dust) on the surface of the filter bag and an accumulation of dust particles within the depth of the filter media. Over time the dust becomes permanently trapped in the depth of the fabric, resulting in higher differential pressure and reduction in process ventilation. It also causes the filter bag to "blind" which reduces filter life.

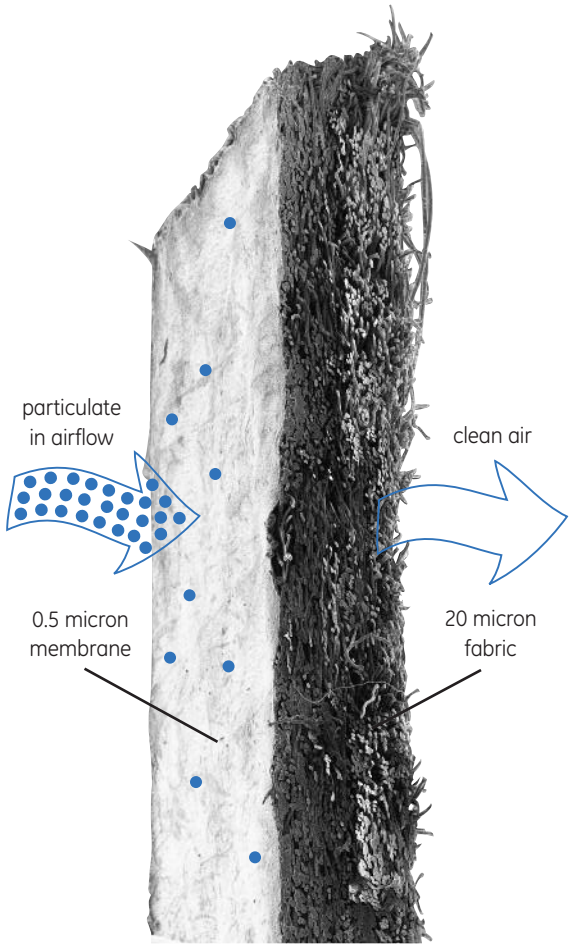
In certain applications, with proper operation of the collector, this primary dustcake can filter moderately sized particulate matter for a period of time. However, depth filtration does not effectively capture sub-micron particulate.

Surface filtration—the better way

Surface filtration occurs with all particulate collected on the surface of the filter media. This filtering method eliminates the need for a primary dustcake. BHA-TEX® ePTFE membrane acts as the primary dustcake, collecting all particulate on the surface rather than trapping it inside the depth of the filter media where it would restrict airflow.

Fine filtration from the start

With conventional filter media, emissions can take place at start-up and immediately following the cleaning cycle. These emissions are virtually eliminated with BHA-TEX. The filtration properties of BHA-TEX have been laboratory tested with sub-micron particulate. The resulting emissions with BHA-TEX laminated fabrics were 40 times less than emissions with standard filtration media over the life of the filter.

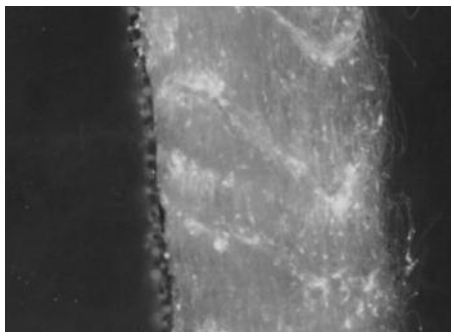


The microporous structure of the membrane keeps particulate out of the fabric, which reduces internal abrasion and helps extend filter life.

Depth Filtration
(Cross-section of standard media)

Depth filtration relies on dust build-up within the fabric to filter particulate. Over time, dust particles become embedded within the fibers, block airflow, and increase differential pressure.

Surface Filtration
(Cross-section of standard media with BHA-TEX)



With BHA-TEX, filtration takes place on the membrane surface. As a result, the media does not require the formation of a primary dustcake to effectively filter particulate.

Differential pressure

How does BHA-TEX® operate with a lower ΔP?

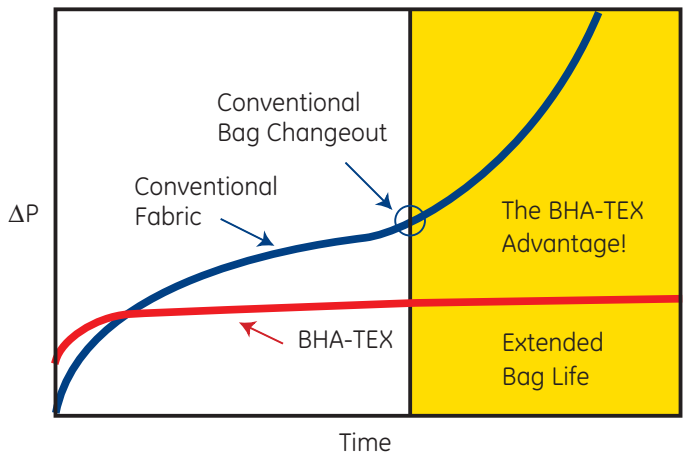
The operating pressure drop of a filter bag (or baghouse) is determined by two factors, both of which may reduce air permeability:

- The nature of the dustcake (thickness, density, moisture, etc.)
- The amount of particulate that is trapped within the depth of the fabric

The initial permeability of a fabric generally does not predict the operating pressure drop of a baghouse. For example, the addition of BHA-TEX membrane to a conventional filtration fabric will lower the new permeability from 30-60 cfm to 5-15 cfm (depending on the base fabrics and type of ePTFE membrane). While the new permeability has been reduced four times, BHA-TEX will normally operate at 0.5" pressure drop under full load at a 6:1 air-to-cloth ratio. Only after dust loading has begun will the pressure drop begin to increase.

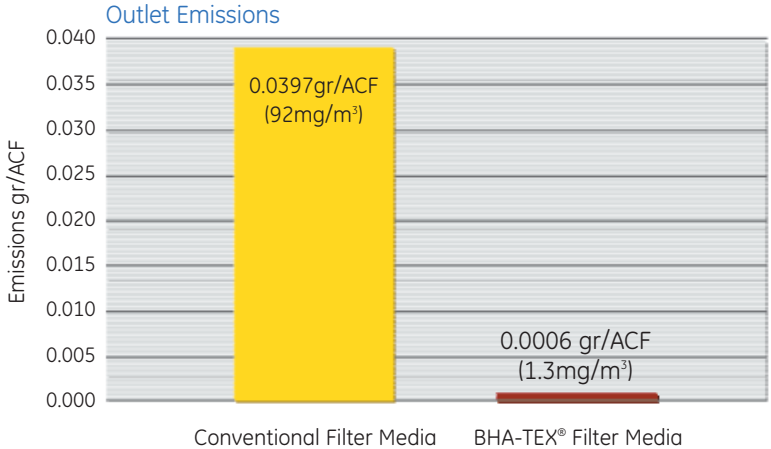
Due to the non-stick properties of BHA-TEX, most particulate is easily cleaned from the surface, allowing a low pressure drop to be consistently maintained. This can result in reduced fan energy consumption, higher process throughput, and reduced compressed air costs.

Differential Pressure (ΔP) Performance



Extend baglife at consistently lower differential pressure with BHA-TEX.

Outlet Emissions



Test Conditions:

- New fabric
- 0.6 micron (average)
- 5:1 air-to-cloth ratio
- 1.52 m/min filter rate
- 10 grains/ACFM grain loading

Applications

The following are just a few of the many different applications where BHA-TEX membrane filters have improved system performance. Contact your GE Energy sales representative to discuss your particular application. We custom manufacture BHA-TEX filters to fit nearly any OEM style of baghouse. GE Energy engineers can help you select the right media, size, and construction to fit your collector.

Cement and Rock Dust
Kiln
Clinker Cooler
Crushing/Grinding
Raw Mill/Finish Mill
Packing Machines
Kaolin Processing
Material Loading
Material Handling/Transport
Coal Mill
Clay Grinding
Bentonite Crushing
Silo Bin Vents
Calciners

Food/Pharmaceutical
Food Additive Processing
Spray Drying
Pharmaceutical Pill Coating
Cereal Processing
Animal Vitamins
Pneumatic Conveying/Material Handling

Combustion
Boiler
Coal Handling
Fly Ash Handling
Hazardous Waste Incinerators
Soil Remediation
Waste to Energy
Corbon Black
Fume Metal Oxide

Chemical
Fertilizer Spray Dryers
Calcium Hypochlorite
Polyethylene Resins
Coke-Briquetting Process
Tire/Specialty Rubbers
Catalyst Manufacturing
Plastic Fibers
Cellulose Fibers
Polystyrene Fluff
Packaging
PVC
Detergents

Paint/Pigments
Toner Mixing/Blending
Pneumatic Conveying
Pigment Blending
Micronizers
Packaging
Paint Mixing
Spray Dryers

Metals
Electric Arc Furnace
Desulphurization Furnace
Induction Furnaces
Mold Cooling Lines
Shot Blast/Grinding
Ladle Melt Furnace
Sand Shakeout/Sand Reclaim
BOF Furnace
Caster
Reverb Furnace
Sintering

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