



Advanced Materials  
for automotive friction applications

## Brake Pad Fiber Solutions

# Manufacturing **engineered fibers** that significantly increase **brake friction pad** stability over a wide temperature range and improve fade and recovery characteristics - without increasing rotor wear or pad weight loss



BULK FIBERS ARE THE BASE OF OUR FIBER PRODUCT OFFERING AND WE TRANSFORM THEM INTO BLANKETS, PAPERS, BOARDS, SHAPES, TEXTILES, FELTS AND COATINGS

Thermal Ceramics, a business of Morgan Advanced Materials has extensive experience working with customers all over the world to engineer, design and manufacture high performance insulation in operating environments from 932°F to 2912°F (500°C to 1600°C). We have a proven track record for helping customers to improve operational efficiency and respond to changing environmental pressures.

We harness the ingenuity, passion and expertise of our applications engineers to pursue increasingly advanced ceramic insulation solutions which sets us apart.

- Supply intelligently engineered insulation solutions to a wide variety of industries and market sectors
- Integrated approach, incorporating design, manufacture and installation

## MATERIAL SOLUTIONS: FRICTION

Today's largest global brake pad manufacturers all utilize our Superwool Enfil fibers in OE and aftermarket formulations. Our tailored fiber offerings are based on formulators' requirements and meet global health and safety regulations such as REACH. Our Superwool Enfil fibers provide an alternative to semi-metallic pads and address formulator concerns for high temperature fade, rotor wear, wheel dust and NVH.

Bulk material	Superwool Max HM25	SM-90-SAZ-PI5	SM-95-SAZ-PI5	SM-90-SAB-T40	SM-70-SZB-T55
Color	off white	off white	off white	off white	off white
Continuous use temperature, °F (°C)	2200 (1204)	2200 (1204)	2200 (1204)	2200 (1204)	2200 (1204)
Melting temperature, °F (°C)	2730 (1499)	2730 (1499)	2730 (1499)	2730 (1499)	2730 (1499)
Fiber diameter, microns	2.5 - 4.5	2.5 - 4.5	2.5 - 4.5	2.5 - 4.5	2.5 - 4.5
Pad sheet density, pcg (kg/m <sup>3</sup> )	-	10 - 20 (160 - 320)	10 - 20 (160 - 320)	-	-
Bulk density, pcg (kg/m <sup>3</sup> )	12 - 16 (192 - 256)	-	-	-	-
Tap density, pcg (kg/m <sup>3</sup> )	-	-	-	30 - 50 (481 - 801)	40 - 70 (641 - 1121)
Specific gravity, g/cc	2.6 - 2.7	2.6 - 2.7	2.6 - 2.7	2.6 - 2.7	2.6 - 2.7
MOHS hardness	5.0 ± 0.25	5.0 ± 0.25	5.0 ± 0.25	5.0 ± 0.25	5.0 ± 0.25
Fiber index, %	>50	>90	>95	>90	>70
Chemical analysis, %					
Silica, SiO <sub>2</sub>	65 - 67	65 - 67	65 - 67	65 - 67	65 - 67
Calcium oxide, CaO	17 - 20	17 - 20	17 - 20	17 - 20	17 - 20
Magnesium oxide, MgO	13 - 16	13 - 16	13 - 16	13 - 16	13 - 16
REACH approved	Yes	Yes	Yes	Yes	Yes

## APPLICATION ENGINEERING EXPERIENCE

Thermal Ceramics product and system solutions provide automotive engineers and designers the tools to solve thermal management challenges that arise in OE and aftermarket applications:

- Friction modifiers
- Heat and NVH Shields
- Filtration
- Gaskets

Our comprehensive commitment to expansive research and development and strong partnerships with the automotive market ensures that our products remain at the technical edge and continue to push boundaries.

- Brake pads
- Catalytic converter and DPF
- Exhaust system heat management
- EV battery heat management



### Heat Shields

Superwool products used in Heat Shields are ideally suited for thermal management and noise reduction

### Filtration

Our Papers are an excellent medium for filtration in airbag filter assemblies

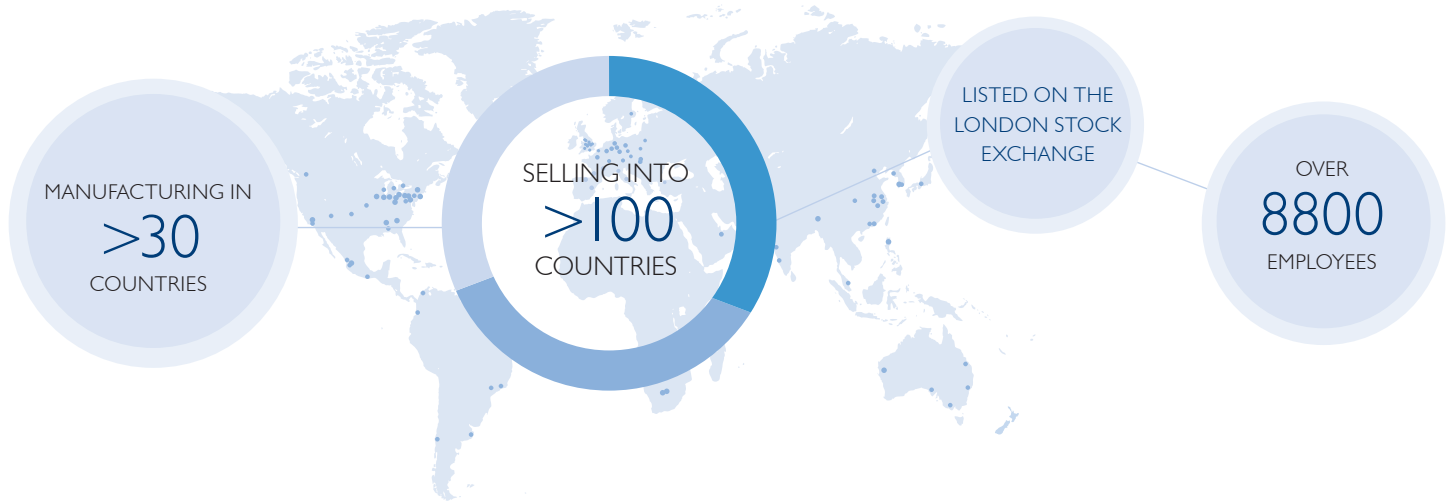


### Friction

Superwool Enfil fibers significantly increase brake friction pad stability and improve fade and recovery characteristics without sacrificing rotor wear or pad weight loss



## ABOUT MORGAN ADVANCED MATERIALS



Morgan Advanced Materials is a global engineering company offering world-leading competencies in materials science, specialist manufacturing and applications engineering.

We focus our resources on the delivery of products that help our customers to solve technically challenging Problems, enabling them to address global trends such as energy demand, advances in healthcare and environmental sustainability.

### What differentiates us?

Advanced material science and processing capabilities. Extensive applications engineering experience.  
A strong history of innovation and reinvention. Consistent and reliable performance.  
A truly global footprint. We find and invest in the best people.

For all enquiries, please contact our specialist offices:

#### Europe

Morgan Advanced Materials  
Morgan Drive  
Stourport-on-Severn  
Worcestershire DY13 8DW  
United Kingdom  
  
T +44 (0) 1299 872210  
F +44 (0) 1299 872218  
europesales@morganplc.com

#### North America

Morgan Advanced Materials  
4000 Westchase Boulevard  
Suite 170, Raleigh,  
NC 27607-3970  
USA  
  
T +1 (855) 809 9571  
F +1 (706) 622 4424  
nasales@morganplc.com

#### South America

Morgan Advanced Materials  
Avenida do Taboão 3265- São  
Bernardo do Campo – SP  
CEP 09656 000  
Brasil  
  
T +55 (21) 4075 0400  
F +55 (21) 4075 7547  
sasales@morganplc.com

#### Asia

Morgan Advanced Materials  
150 Kampong Ampat  
05-06A  
KA Centre  
Singapore 368324  
  
T +65 6595 0000  
F +65 6595 0005  
asiasales@morganplc.com

Morgan Advanced Materials plc  
Quadrant, 55-57 High Street,  
Windsor, Berkshire, SL4 1LP United Kingdom

[www.morganthermalceramics.com](http://www.morganthermalceramics.com)  
[www.morganadvancedmaterials.com](http://www.morganadvancedmaterials.com)