



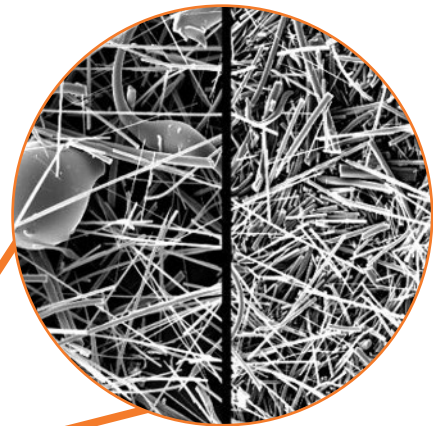
## Friction

Our fibres are blended into friction formulations which produce stable friction without noise, no wheel dust, and improved pad and rotor life over a wide range of temperature, pressure, and speed.

The Thermal Ceramics business of Morgan Advanced Materials has extensive experience working with customers all over the world to engineer, design and manufacture high performance fibres in operating environments from 500°C to 1600°C. We have a proven track record for helping customers to improve products and respond to changing environmental concerns.

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

- Supply intelligently engineered solutions to a wide variety of industries and market segments
- Integrated approach working with our customers incorporating Morgan's research, design, and global manufacturing expertise



Fibre options for friction applications

- Range of fibre index (reduce un-fibred grains or shot)
- Fibre chemistry options for a wide temperature range

Driving development and  
innovation in the global automotive market

# Friction

Today's global friction material manufacturers utilise our Superwool® Enfil™ family of fibres in OE and after-market formulations. Our customised fibre offerings are based on customer requirements and meet global health and safety regulations such as REACH.

Morgan's Superwool family of fibres yields the highest temperature stable structural matrix in friction formulations. Customised variations of Morgan's fibres provide outstanding value for all OE and after-market friction applications. Our Superwool Enfil fibres provide performance enhancements to semi-metallic, copper free, low steel pads, truck blocks, and lining materials. Morgan can assist in choosing the best material for your given application.

Material types	XT-75	SM-HM25	SM-90	SWP-90	SWP-60
Manufacturing Region	Asia	Americas	Americas	Americas, Asia	Asia
Continuous use temperature, °C	1300	1204	1204	1000	1000
Fibre diameter, µm (average)	6.4	4.2	4.2	4.9	3 - 4
Fibre index, %	>75	>65	>90	>90	>60
<b>Chemical analysis, %</b>					
Silica, SiO <sub>2</sub>	27 - 33	65 - 67	65 - 67	62 - 68	62 - 68
Calcium oxide, CaO	-	17 - 20	17 - 20	28 - 32	28 - 32
Magnesium oxide, MgO	0.5 - 1.5	13 - 16	13 - 16	3 - 7	3 - 7
Aluminium oxide, Al <sub>2</sub> O <sub>3</sub>	32 - 38	-	-	-	-
Potassium oxide, K <sub>2</sub> O	23 - 28	-	-	-	-
Zirconium oxide, ZrO <sub>2</sub>	5 - 9	-	-	-	-
Others	<0.5	-	-	<1	<1

Notes: Density range typical 2.53 - 2.64 g/cm<sup>3</sup>

Hardness range typical 4.3 - 4.9 GPa