



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.

Contact email

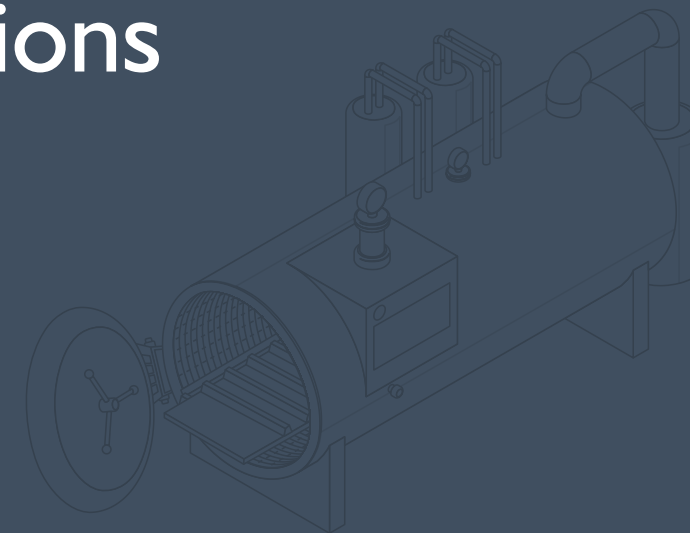
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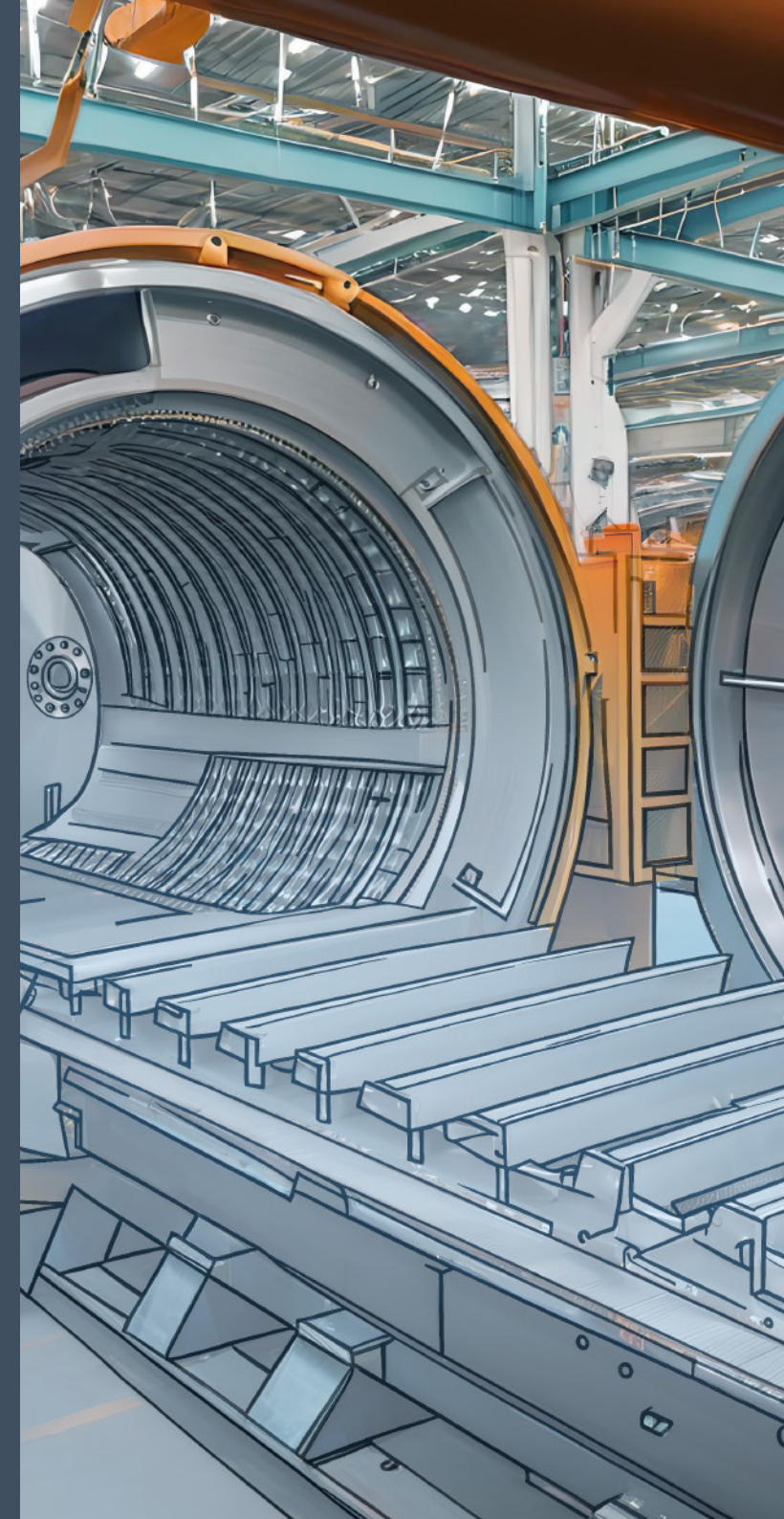
www.morganperformancecarbon.com
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Morgan Carbon and Graphite Solutions for High Temperature Applications



PERFORMANCE CARBON



Rigid Board Insulation

Morgan Rigid Boards, crafted from 100% rayon-based short fiber precursors, combine exceptional performance with versatility, providing a reliable solution for critical thermal management and insulation needs in extreme environments of demanding applications with vacuum or inert atmosphere up to 3,000°C.

High quality raw materials and well controlled, highly capable, proprietary manufacturing processes ensure a consistent high purity product with uniform insulation properties. This will help minimize energy consumption, maximize furnace performance, and minimize total cost of ownership.

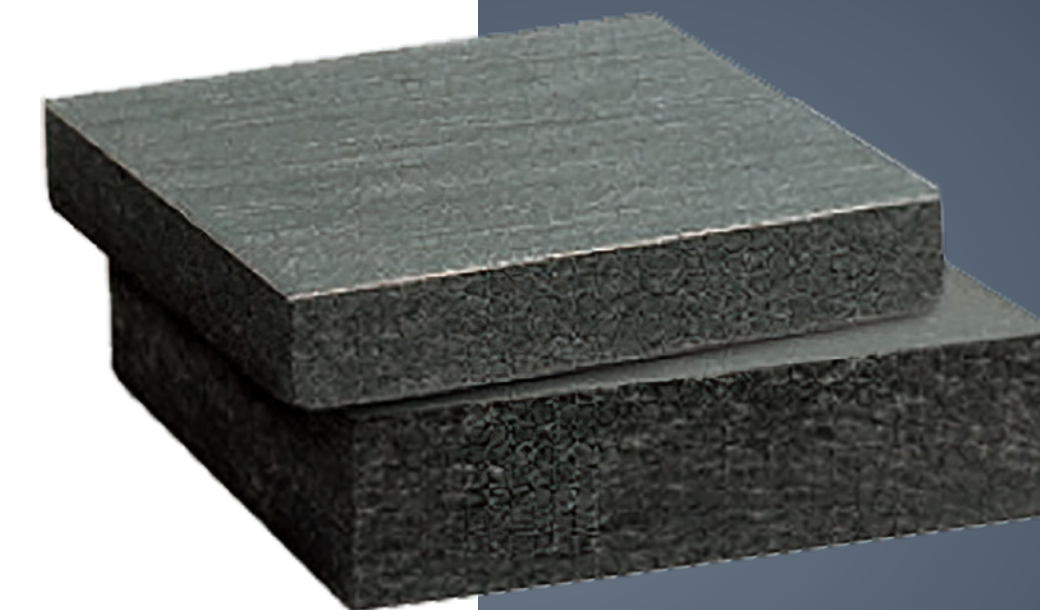


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General material characteristics include

- Outstanding oxidation resistance
- Lightweight with low shrinkage and volatile release
- High mechanical strength
- Low thermal conductivity
- Chemical resistance
- Uniformity and consistency for reliable performance

Four exceptional grades are available to meet the demanding requirements of variety of high temperature applications.

RGB: A high purity carbon-bonded carbon fiber rigid board

RGB-P: An ultra-high purity RGB

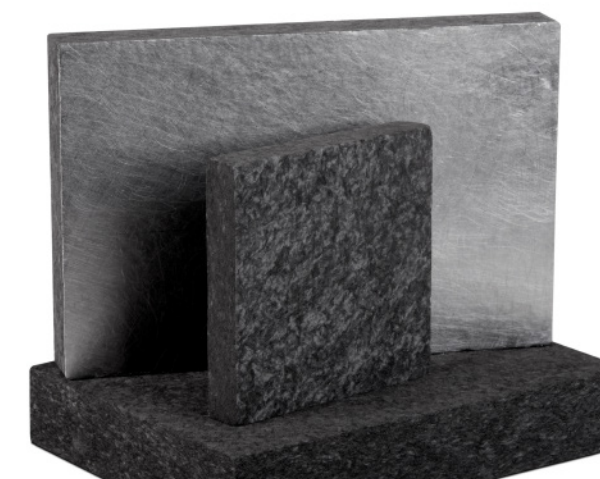
RGB-LTC: A high purity carbon-bonded carbon fiber rigid board with improved insulation properties

RGB-LTC-P: An ultra- high-purity RGB-LTC

Offered in various dimensions, with maximum size of 8"x40"x60", suitable for a wide range of applications.

Rigid Board Insulation Typical Properties

	Units/Direction	RGB	RGB-LTC
Density	g/cc	0.16	0.10
Flexural Strength	MPA w/g	1.0	0.3
	MPA a/g	1.0	0.28
Compressive Strength	MPA w/g	0.62	0.13
	MPA a/g	0.36	0.12
Carbon Content	%	> 99	> 99
Ash	%	< 0.1	0.04
CTE (@1000°C)	(x10 ⁻⁶)/°C	2.6	2.7
Min Process Temp	°C	1,900	1,900



Value-added Services

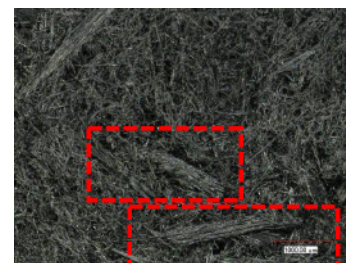
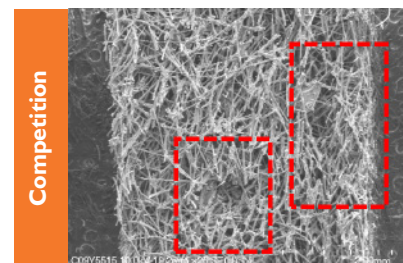
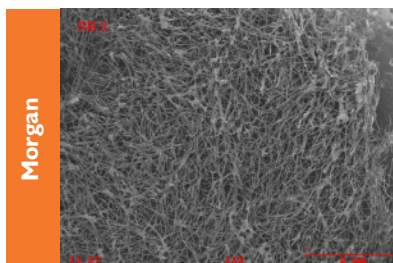
Surface Foiling and Coating: Extend insulation lifespan, ensure uniform heat distribution and prevent particle generation, erosion and oxidation during exposure to vacuum and high temperatures.

Ultra-high Purification: Enhance purity levels to meet stringent application requirements.

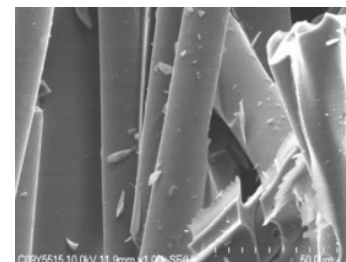
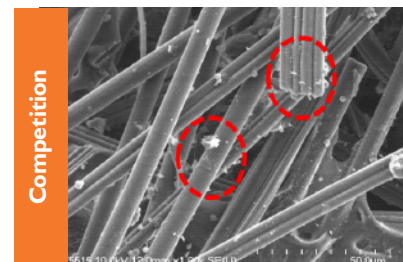
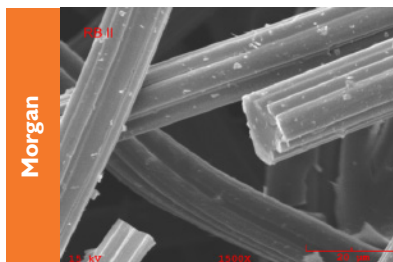
Engineered Solutions: Utilize world-class 5-axis machining capabilities for highly customized, complex engineering solutions tailored to specific application needs.

Morgan Rigid Boards offer Excellent Structure

Well dispersed fibers
No voids
No large domains of fiber alignment



Single fiber type
Very few loose particles



The data in this product bulletin relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process. We believe that the information contained herein is current as of the date of the product bulletin. Since the use of this information and these opinions and the conditions of use of the product are not within the control of Morgan Advanced Materials., it is the user's obligation to determine the conditions of safe use of the product. This information is not to be taken as a warranty or representation for which we assume legal responsibility nor as permission or recommendation to practice any patented invention without a license. It is offered solely for your consideration, investigation and verification.

For more technical information,
please contact semiconductor@morganplc.com



Morgan Soft Felt for Industrial Applications

Morgan Soft Felts, crafted from 100% rayon-based fiber precursors and processed at temperatures exceeding 1,900°C for Carbon and 2,500°C for Graphite, combine exceptional performance with versatility, providing a reliable solution for critical thermal management and insulation needs in extreme environments of demanding applications with vacuum or inert atmosphere.

High quality raw materials and well controlled, highly capable, proprietary manufacturing processes ensure a consistent high purity product with uniform insulation properties. This will help minimize energy consumption, maximize furnace performance, and minimize total cost of ownership.



General material characteristics include

- Structural integrity in aggressive vacuum or inert environments, exhibiting minimal outgassing, extremely low shrinkage, and volatile release and ensuring stable performance.
- Features a consistent fiber structure and homogenous composition, contributing to precise and uniform production.
- High purity and effective thermal insulation and heat management.
- Low oxidation and friability for challenging conditions.
- Carbon content >99%

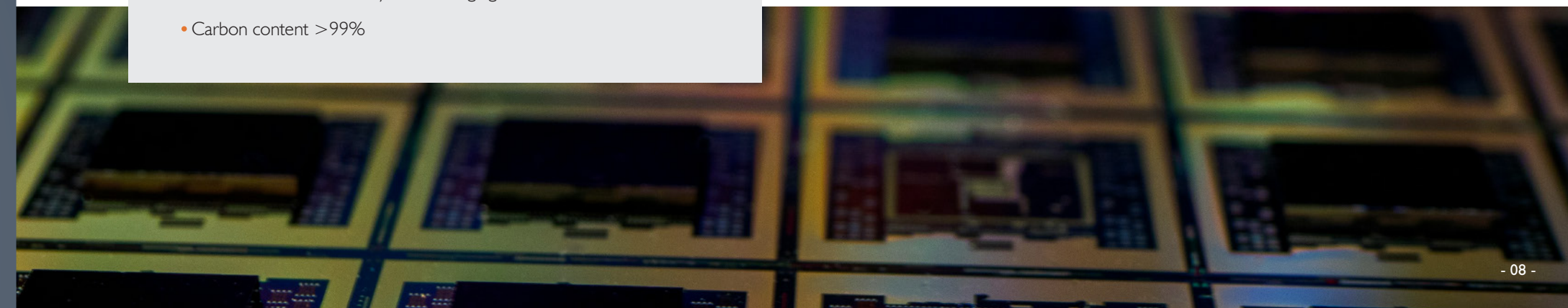
Four grades are available, which can be supplied in bulk rolls, precision-cut parts, or pre-rolled cylinders:

VDG: Carbon felt that is heat treated to a minimum of 1,900°C and exhibits very low thermal conductivity

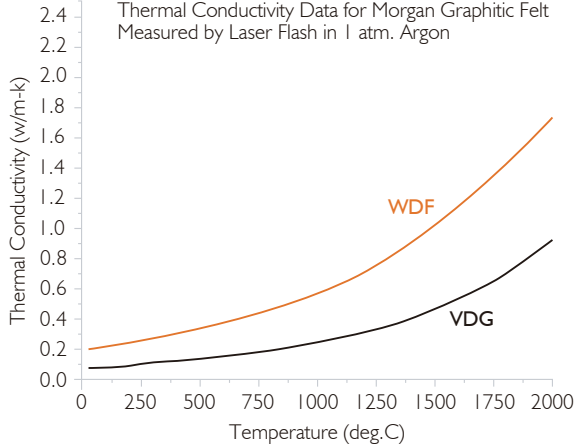
VDG-P: An ultra-high purity VDG Felt

WDF: Graphite Felt that is heat treated to a minimum of 2,500°C and exhibits very low thermal conductivity

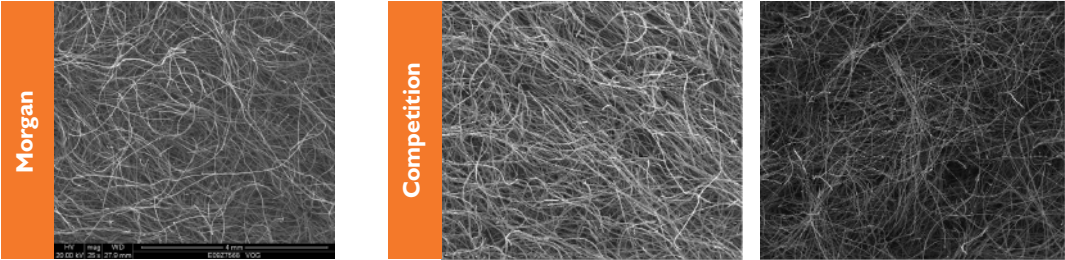
WDF-P: An ultra-high purity WDF felt



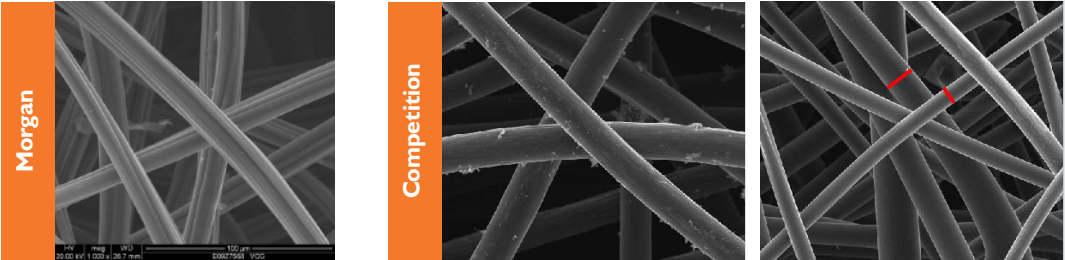
Felt Insulation Typical Properties		
	VDG	WDF
Density, g/cc	0.09	0.08
Linear Shrinkage ¹ , %	1	negligible
Water Absorption, %	1	negligible
Min Carbon Assay, %	99.0	99.9
Surface Area (Nitrogen), m ² /g	0.6	0.7
Min Process Temp, °C	1,900	2,500
¹ Measured after hearing to 3000°C		



Morgan Soft Felts offer Excellent Structure



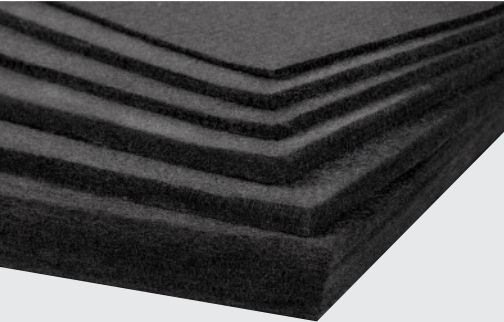
Well dispersed fibers
No voids
No fiber bundles



Single fiber type
Clean fibers

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For more technical information,
please contact semiconductor@morganplc.com



Available in various thicknesses

Choose from a range of thicknesses from 1/8" to 1" and from a width options 42" and 48" to accommodate diverse insulation and padding requirements in applications.



Precision Cut Parts



Pre-rolled Stitched Felt Cylinders