COMPOSITES – FIBERS AND MATERIALS

PANOX®
Oxidized PAN Fibers
Carbon fibers and composites – made by SGL Group.

- Comprehensive product range
- Integrated value chain
- Only European carbon fiber manufacturer
- Consistently high quality
- Many different processing technologies
- Innovative tailored solutions
- High security of supply
- Close-to-customer sales and distribution network
- Global presence
Thermal stabilization of PAN fibers

With many different processing technologies and comprehensive production, material, and application know-how, we can offer our customers tailormade solutions for their requirements – for example in automotive production, the wind energy sector, and numerous other industrial applications.

PANOX oxidized PAN fibers

Utilizing our expertise in the manufacture of carbon fibers, we produce oxidized, thermally stabilized polyacrylonitrile (PAN) fibers. PANOX is the industry standard when it comes to non-flammable textile fibers. The excellent textile processing properties of PANOX open up a wide range of applications from fire-protective apparel to fire-retardant furniture and machine, automotive, and aircraft components exposed to heat or fire risk or used for insulation.

Unique integrated value chain

SGL Group covers the complete value chain of carbon fiber products: from precursor via carbon fibers, fabrics, and prepregs to the finished CFRP components. Our carbon fibers produced by SGL Group in Europe and North America form the basis for all processing steps in fiber-reinforced composite applications.

Carbon fiber-reinforced plastics are high-performance materials with unique properties. They are used where other materials have reached their limits and are indispensable in many industries today, e.g. for lightweight components with ultra-high strength and stiffness.

SGL Group is the only European manufacturer to cover the entire carbon fiber value chain: from raw material we produce ourselves all intermediate steps to the finished end products. In this way, we can guarantee the highest product quality and security of supply.

With many different processing technologies and comprehensive production, material, and application know-how, we can offer our customers tailormade solutions for their requirements – for example in automotive production, the wind energy sector, and numerous other industrial applications.

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Video: From fiber to finished component

https://www.youtube.com/sgigroup
PANOX® oxidized PAN fibers – the industry standard for fire and heat resistance

- High LOI value (limiting oxygen index)
- Excellent flammability classification
- High thermal stability
- Very good chemical resistance
- High electrical resistivity
- Low thermal conductivity
- Ideal for textile processing
- Excellent blending and handling characteristics
PANOX® thermally stabilized textile fibers

PANOX is the industry standard when it comes to non-flammable textile fibers. PANOX is an oxidized polyacrylonitrile (PAN) fiber that does not burn, melt, soften or drip. It is produced by thermal stabilization of PAN at 300 °C (572 °F). This gives rise to an oxidized textile fiber with a carbon content of approx. 62%.

Due to its special properties, our oxidized PAN fiber is used in a wide variety of applications around fire and heat protection. Besides high thermal stability, PANOX offers excellent chemical resistance and very good electrical insulating properties. Our PAN fiber is ideally suited for textile processing and can be easily processed. Typical applications include:

- **Fire- and heat-protective apparel:** Our oxidized PAN fiber is used – in combination with other fibers – in thermal liners for gloves and protective apparel worn by fire fighters, military and police personnel, steel workers, and racing drivers.

- **Building and aircraft interior furnishing:** PANOX fabrics are used to provide fire resistance in aircraft seats and furniture for public buildings. In the case of fire, PANOX helps delay ignition or melting of upholstery foams and the release of toxic gases.

- **Industrial applications:** Our oxidized textile fibers are used in industrial plant and equipment for applications such as welding blankets, bellows, packings, filters, and gaskets.

- **Automotive components:** PANOX is used as a thermal and acoustic insulating material in various automotive components. Nonwovens made from crimped PANOX fibers are utilised, for example, as engine compartment insulation. In milled form, PANOX is used to replace asbestos in friction linings.

- **Aircraft brake disks:** Our oxidized PAN fiber is the precursor for aircraft brake disks made from carbon fiber-reinforced carbon (C/C). Thanks to PANOX, brake disks can be produced that withstand landing temperatures of more than 1000 °C (1832 °F).
We supply oxidized PAN fibers with a special finish that guarantees excellent handling properties in textile processes. The material can be processed on standard textile machinery into needled or spunlace nonwovens in a wide range of weights and can easily be blended with other fibers, such as polyester. The use of PANOX enhances the comfort and mobility of the wearer and improves moisture absorbency.

PANOX is available in different single filament counts, lengths, densities, and finishes. It can be supplied as continuous tow or staple fibers.

Nomenclature key

PANOX T320-1.7/1.39-A110

1 Brand name
PANOX

2 Fiber type
T = tow
C = crimped staple

3 Continuous tow
Filament number
320 = 320000

Crimped staple fibers
staple length
38 = 38 mm
51 = 51 mm
63 = 63 mm
76 = 76 mm

4 Mechanical properties
Linear density/fiber density
1.7/1.39
2.2/1.38
2.2/1.41

5 Sizing
A10 = antistatic
A140 = antistatic
First choice for heat/fire protection and insulation

PANOX is a textile fiber supplied by SGL Group, which – thanks to its unique chemical structure – does not burn, melt, soften or drip. Its limiting oxygen index (LOI) of 50% is considerably higher than that of other organic fibers and meets the requirement for flammability class S-a according to DIN 66083. As a result, end products containing PANOX fibers offer not only high thermal stability but also excellent heat and fire protection. They also have good insulating properties due to the low thermal conductivity of our material.
Continuous fiber tow for yarn production

PANOX continuous fiber tow is supplied with a suitable finish for spinning and can be processed into yarns for knitted and woven fabrics. The tow is available with different individual filament counts.

Manufacturing process

Material data of our PANOX® continuous fiber tows

<table>
<thead>
<tr>
<th>Properties</th>
<th>Units</th>
<th>T320-1.7/1.37-A110</th>
<th>T320-1.7/1.39-A110</th>
<th>T320-1.7/1.39-A140</th>
<th>T320-2.2/1.38-A110</th>
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</table>
Crimped staple fibers for textile structures

Crimped PANOX fibers are produced from continuous fiber tow. They are supplied with a suitable finish for the production of nonwoven fabrics and in different lengths.

Material data of our PANOX® crimped staple fibers

<table>
<thead>
<tr>
<th>Properties</th>
<th>Units</th>
<th>C63-1.7/1.39-A140</th>
<th>C63-2.2/1.38-A140</th>
<th>C63-1.7/1.39-A110</th>
<th>C63-2.2/1.41-A140</th>
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<tr>
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<td>2.2/2.0</td>
<td>1.7/1.5</td>
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<tr>
<td>Elongation at break</td>
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<tr>
<td>Tensile strength</td>
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<tr>
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</table>

Other fiber lengths available on request.
A comprehensive range of application-optimized, high-performance solutions.

To develop new ideas, you need partners who can contribute added knowledge and think outside the box. As the only European carbon fiber manufacturer, we offer more than just our comprehensive product portfolio.

With our many different processing technologies, we supply solutions perfectly matched to your requirements, application, and technical conditions: precisely tailored high-performance materials for the development and production of competitive lightweight design innovations.

- Unique product portfolio
- Innovative technologies and solutions
- Production sites close to sales markets
- Technology & Innovation Center in Germany with international networks

We have wide-ranging expertise in raw materials, advanced manufacturing processes, and long-standing application and engineering know-how. We have a comprehensive portfolio of carbon, graphite, and carbon fiber products and our integrated value chain covers everything from carbon fiber to composites. With a global sales and distribution network and modern production sites in Europe, North America, and Asia, we are close to our customers throughout the world.

We use this broad base to offer our customers the best solutions possible. That’s how we live up to our claim: Broad Base. Best Solutions. This claim is also upheld by our corporate SGL Excellence philosophy of continuous improvement.

More information can be found by visiting:
www.sglgroup.com

Facebook sglgroup
YouTube sglgroup
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