Schunk Fiber-Reinforced Polymers – Your Innovative Ideas can become Reality!

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Schunk Kohlenstofftechnik schunk

Schunk Fiber-Reinforced Polymers

Your Innovative Ideas can become Reality!

Are you looking for new possibilities in your development efforts? Are you hoping to use light-weight components for your highest performance applications? Are you looking for materials that will allow you to make products which were previously considered impossible? Our high-performance fiber composite materials may be the ideal solution for you!

The Right Partner

Schunk Kohlenstofftechnik GmbH has extensive knowledge and expertise in the selection, dimensioning, manufacturing and use of fiber composite materials. Through targeted selections of the materials' components, such as reinforcement fibers and resin systems, we can offer you innovative and custom-tailored solutions for almost every application.

Special Properties of Carbon Fiber-Reinforced Polymers (CFRP)

- High specific strength and stiffness
- Low density
- High fatigue strength
- Excellent corrosion resistance
- Selectively customized coefficient of thermal expansion
- Outstanding damping properties
- Considerable freedom of design
- Material properties are tailored or adapted to the application

Manufacturing Processes for Prototypes and Serial Parts

We use the following processes for manufacturing high-grade fiber-reinforced polymers:

- Filament winding
  Diameter of up to 1,600 mm, length of up to 7,000 mm
- Autoclave pressing
  Length of up to 3,500 mm, width of up to 1,400 mm
- Hot plate pressing
  Length of up to 1,000 mm, width of up to 1,000 mm
- Die pressing
- Resin Transfer Molding (RTM)
- Hand laminating
- Resin infusion technology

Material-Oriented Component Design

When designing, the anisotropic mechanical and physical properties as well as the chemical and thermal limitations of the matrix system need to be carefully considered.

Whatever properties you need for your component, we will try to achieve them through proper selection of the fiber type, fiber content, reinforcement pattern, and matrix material.

Our CFRP components are produced to final size or are finish-machined with high accuracy from near-net-shape preforms.

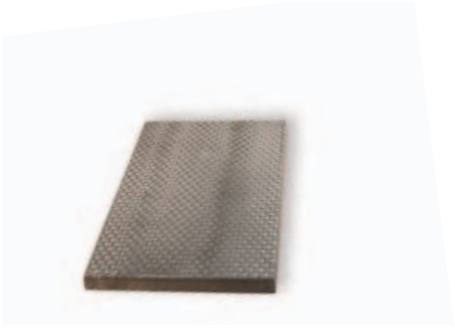
Simulation and Analyses Using Finite Element Analysis (FEA)

When designing components, we use an efficient Finite Element Analysis (FEA) system (MSC NASTRAN). This allows us to solve many application and customer specific problems at an early stage through computer simulation.

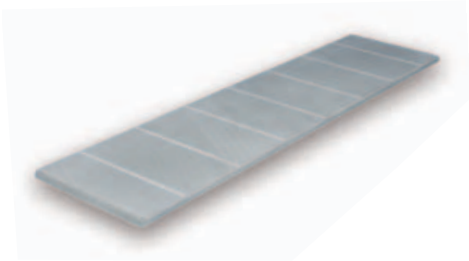
The analyses that we perform include:

- Structural analyses of stress and deformation behavior
- Natural frequency analyses and buckling analyses
- Non-linear calculations for contact problems

These calculations allow the optimal design of components for their respective applications, with regard to stiffness and strength, while minimizing weight.



Components for use in highly corrosive environments
e. g. CF/PEEK vanes for rotary pumps



Components with optimally adapted expansion behavior
e. g. CFRP vanes

Complex vacuum components
e. g. CFRP scattering chamber for the determination of elementary particles

Extremely anisotropic components
e. g. high-performance sports shoe sole with high degree of crosswise rigidity and good (flexible) rolling characteristic lengthwise

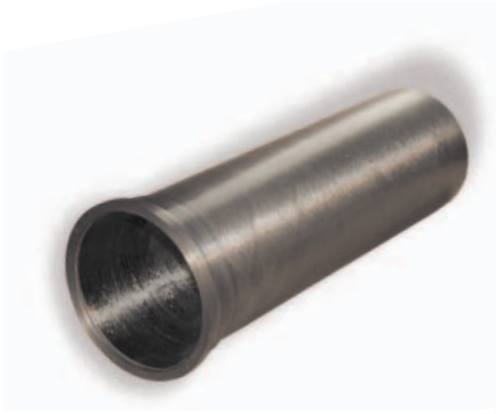
Light-weight materials for mechanical engineering
e. g drive shaft with exceptional torsion stability and low weight

Components with a high degree of stiffness
e. g. robot arm (length: 1.70 metres) with flanged aluminum parts

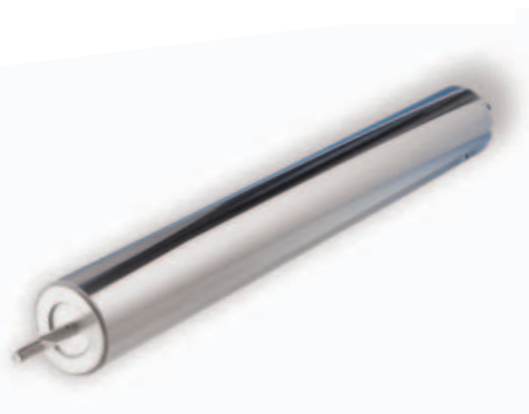
Materials for low-temperature applications
e. g. helium gas tight GFRP cryogenic tank

Components for high rotational loads
e. g. CFRP wound components for turbo-molecular pumps and high-speed centrifuges

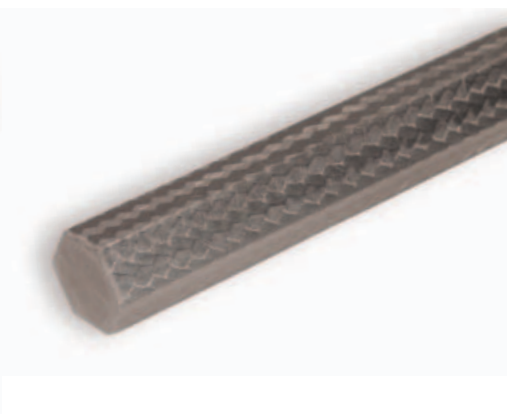
Materials and components for medical technology
e. g. for artificial hip joints (CF/PEEK)



Components for high-performance pumps
e. g. CFRP sleeves for motors



Components for mechanical engineering
e. g. CFRP light-weight rollers (also available with metallic and ceramic coatings)



Components in "Net-Shape Technology"
e. g. X-ray translucent external fixators; complex geometries are possible

Customized Properties

Selection of the Optimal Fiber/Matrix Systems

Fiber composite materials can be varied for a wide range of applications by using different fiber/matrix combinations.

Selection of both fiber and matrix material can be made according to your specifications. We are happy to advise on such selections.

Fiber materials include carbon, glass, and aramid fibers. Matrix materials comprise epoxy, phenolic, and polyimide resins, as well as thermoplastics such as PEEK, PPS, PSU, PEI and many more.

Our Know-How for Your Projects

Schunk Kohlenstofftechnik GmbH offers you comprehensive support through the entire process of designing and producing high-performance carbon fiber-reinforced polymer components. Our development and application engineers are happy to share their expertise with you from the start.

Even if you have only one product idea at first we will be glad to assist you in developing it. We consider ourselves as being partners from concept to completion.

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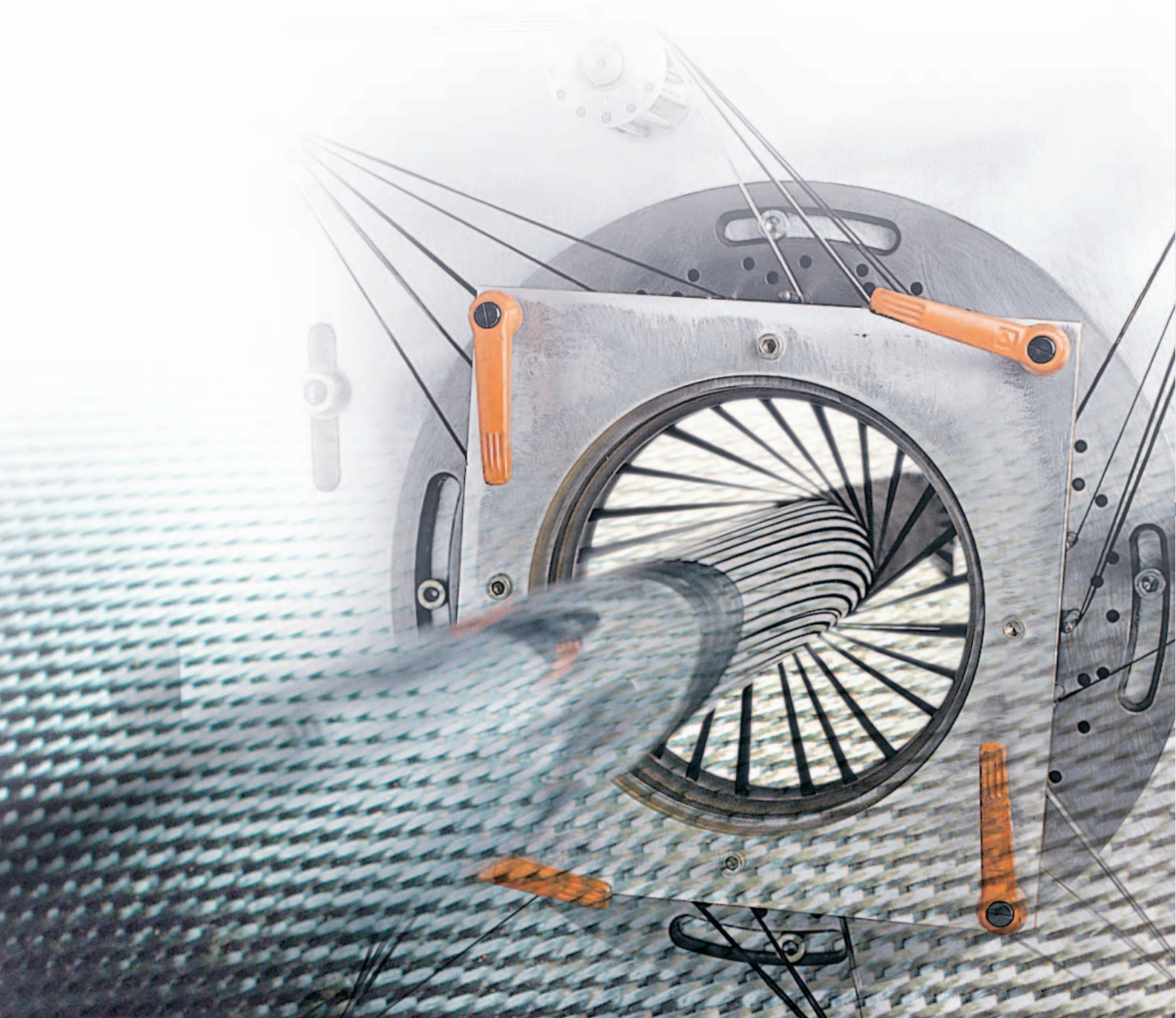
Further contact information can be found on the back of this brochure.

Welcome to Schunk!



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