TECHNICAL TEXTILES

THE INNOVATIVE
MARKET LEADER IN
TECHNICAL TEXTILES

Automotive / Construction / Transport and Aerospace /
Energy / Sport / Personal Protection / Advertising /
Medical Technology / Geotechnology / Apparel and
Home Textiles / Reinforcement and Coating Substrates
TECHNICAL TEXTILES
THE INNOVATIVE MARKET LEADER
CREATING ADDED VALUE FOR OUR CUSTOMERS

Technical textiles are opening up new end uses; they are replacing conventional materials and are used as reinforcing materials in composites for a wide range of applications, including the mobility, energy, construction and leisure sectors. In the technical textiles sector, KARL MAYER has consolidated its expertise in machines for producing technical textiles, so that it can cater optimally for the current and future needs of its clients.

With our innovative machine portfolio, we are the go-to partner for the industry. We are the drivers of technology and innovation in composites and lightweight construction technology. New materials, such as fibre-reinforced plastics containing carbon and glass, are a few of the important future technologies for the automotive and aerospace industries. We are also making an important contribution to future challenges like saving energy and resources. There we can benefit from our many years of experience working with our partners, for example in the wind turbine sector and in the increasingly important construction industry.

We also concentrate on efficient production in conventional applications, such as advertising banners and other coating substrates, as well as geotextiles, such as in road building.

By working closely with our customers, our aim is to develop systems that offer the best cost–benefit ratio. We do this by using our sophisticated standard platforms as the basis for developing customised solutions.

In this way, we are supporting our customers by developing unique selling points in their markets and helping them to become the technology leaders. This brochure aims to show what added value KARL MAYER’s systems can bring to the various applications of technical textiles.

We would be pleased to help you to achieve your goals and are looking forward to meeting you in person!
LEADER IN PRODUCTIVITY
With the latest generation of raschel machines with parallel weft-insertion the fabric output has increased by as much as 10%. For example, the maximum speed of the WEFTTRONIC® II RS 268° has been increased from 1,450 rpm to 1,600 rpm.

USE OF CARBON COMPONENTS
Using carbon bars on our latest generation of tricot machines with course-oriented weft-insertion has improved the temperature stability and rigidity. The specific use of fibre-reinforced plastics for highly dynamic and highly stressed parts, such as the guide bar levers, has also increased performance.

AUTOMATION, INTUITIVE OPERATION
KAMCOS® 2 (KARL MAYER COMMAND SYSTEM) is our operator interface for configuring, monitoring and adjusting the electronic functions of the machine. Also available are the KARL MAYER CONNECT app and easy and intuitive user assistance. Third-party software can also be accessed via multiple interfaces.

NEW ONLINE SUPPORT
Innovative online systems simplify the day-to-day work of users. The new KARL MAYER CONNECT service app guarantees efficient, fault-free communication between the customer and KARL MAYER’s service organisation. In the future, the acquisition of spare parts will also be supported online by the SPARE PARTS WEBSHOP.
**HIGHER MACHINE GAUGE**

Completely new opportunities are opening up in product design by developing our latest generation of tricot machines with course-oriented weft-insertion with a unique gauge of E 40.

**SUSTAINABILITY**

With its machine portfolio, KARL MAYER can provide the global market with sustainable machine solutions. The fabrics that can be produced also provide the potential for sustainability. Processing high-performance fibres, such as carbon and glass, and the associated savings that can be made, for example in concrete as a raw material in the construction industry, and in energy in the automotive industry, are just two promising applications.

**NEW APPLICATIONS**

In the constantly evolving field of production technologies for manufacturing fibre-reinforced plastics, KARL MAYER is making a significant contribution to the individual processing of high-performance fibres. By combining different materials in various configurations, complex semi-finished products of optimum design can be produced, which makes the best use of the performance potential of the fibres.

**OPTIMISING THE PRODUCTION PROCESSES**

On the basis of our industry-proven standard components, we at KARL MAYER can develop solutions for individual machines in order to guarantee that our customers’ ideas and products will be successful. By cooperating closely with them, we can develop new, optimised technologies to guarantee efficient production processes.
KARL MAYER can offer you added value for every application:

- Maximum productivity
- High, reproducible quality through automatic process control
- High level of flexibility by combining a wide range of different materials, for example
- Customised design of the end product
- High machine availability, through its product-supporting service organisation

APPLICATIONS

AUTOMOTIVE

The automotive industry is a producer of highly sophisticated products. For some time now, engineers have been focusing on using carbon and other high-performance materials based on textiles. In the future, car chassis and bodies made from high-performance fibres will no longer be a rarity. The increasing use of lightweight components reinforced with textiles in a car is offering huge opportunities. In the automotive industry especially, criteria such as low weight, high stability and customised rigidity are playing a decisive role. KARL MAYER’s technology can help you to achieve these ambitious goals.

YOUR BENEFIT – OUR SOLUTION

- Efficient energy consumption through lightweight constructions
- Passenger protection through the selective use of high-performance fibres (crash safety)
- Corrosion resistance through high-performance fibres with suitable matrix systems

END USES

- Structural body components
- Exterior
- Interior (including blinds)
CONSTRUCTION INDUSTRY

The vision for the future of the construction industry is: building lighter, more efficiently and more intelligently, and to think and act in a way that will conserve resources. On the one hand, it is a question of efficiency — using lighter building materials conserves resources. On the other hand, the aesthetics are important for creating concrete structures with finer and more varied shapes and forms for the same strength and rigidity. Repairing and restoring existing buildings and bridges is another area of the construction industry that is gaining importance. In conventional applications, such as textile roofs, the textiles produced on our machines can deliver attractive use and design possibilities.

TRANSPORT AND AEROSPACE

The aviation industry is the best example of the successful use of carbon fibres. Manufacturers are increasingly using components containing high-performance fibres to replace aluminium components in their latest models. This decreases the weight considerably and reduces the costs of fuel and maintenance. In commercial vehicles especially, high demands are placed on the toughness, loading capacity and durability of the materials used.

YOUR BENEFIT – OUR SOLUTION

- High-performance fibres prevent corrosion and increase the service life
- A thinner concrete covering conserves resources and energy
- More varied design possibilities since the materials are freely formable
- Repair work can be carried out faster for a lower overall cost

END USES

- Aircraft construction
- Commercial vehicles
- Boat-building and shipbuilding
- Public transport
- Lorry and truck tarpaulins
- Securing loads
ENERGY

On the wind turbine market in particular, composite structures can help with the development of lighter, longer rotor blades with a better performance. This enables coastal regions and areas where there is less wind to be exploited, further reducing costs. The experience gained here can also be transferred to other areas where lightweight construction technology can reduce the weight for the same performance spectrum.

YOUR BENEFIT – OUR SOLUTION

- Lightweight constructions improve efficiency and simplify transport in inaccessible areas
- Reduced maintenance costs
- Possibility of designing optimised blade geometries

END USES

- Wind turbines
- Oil rigs

SPORT

Higher, further, faster. The sports industry needs strong yet lightweight textiles. Customised material compositions using high-tech fibres guarantee high strength for low weight.

YOUR BENEFIT – OUR SOLUTION

- Lightweight constructions improve the performance spectrum
- Design freedom, increased customisation
- Small- and large-scale production, thanks to flexible machines
- Prestige associated with using carbon

END USES

- Sports and recreational equipment
- Bicycles
- Helmets
- Motorbikes
PERSONAL PROTECTION

A wide variety of protective clothing is used in many areas. For example, in this sector KARL MAYER offers technologies for producing multilayered, multiaxial textiles from aramid fibres for bulletproof vests, as well as machines for producing biaxial, weft-inserted, warp-knitted textiles from high-performance yarns with a large number of filaments.

YOUR BENEFIT – OUR SOLUTION

• Optimisation of the manufacturing processes through the production of multilayered, warp-knitted textiles
• Increased tear propagation resistance and abrasion resistance through specific textile constructions
• Combination of different materials in one production step
• Improved comfort through the use of flexible, high-performance fibres

ENDUSES

• Trousers, gloves, etc.
• Bulletproof vests
• Hard ballistics
• Car components

ADVERTISING

Textiles for use in the advertising sector have been especially developed to be lightweight and transparent, yet strong. They should ensure that the advertising message is as visible as possible and they should be efficient and economical to produce – because their use is frequently temporary and location-specific. This type of warp-knitted textile can be used as the print carrier for example for outdoor and indoor advertising, for decorating stands at exhibitions and in the construction industry as privacy screens.

YOUR BENEFIT – OUR SOLUTION

• Maximum productivity through high fabric output, thanks to the wide working width
• Broad spectrum of uses through high machine flexibility
• Choice of different working widths, adapted to suit the subsequent processing stages

END USES

• Billboards
• Frontlit
• Backlit
• Blockout
• Mesh
MEDICAL TECHNOLOGY

The medical sector has high demands on the quality of the textile materials used in its field. Innovative materials with specific stress/strain characteristics are used here, as well as hollow fibres for blood filtration. Carbon offers particular advantages here. For example, a prosthesis is very flexible and adapts easily to the body’s movements. It is also stable and can cope with high demands and high levels of stress.

YOUR BENEFIT – OUR SOLUTION

• Precise handling of delicate fibres
• Small-scale production, thanks to flexible machines
• Design freedom for individual customisation
• Efficient use of machines through special customer solutions (cut-to-length weft-insertion)

END USES

• Prostheses
• Blood filtration
• Instrument engineering
• Mobility

GEOTECHNOLOGY

Requirements such as separation, filtration, drainage, reinforcement, tension equalisation and protection are becoming increasingly important in the construction industry. Warp-knitted geogrids or geocomposites can be used here. The requirements for the physical characteristics of the textile substrates demand top-quality production methods in order to optimally exploit the properties of the high-performance fibres.

YOUR BENEFIT – OUR SOLUTION

• Conservation of resources through increased service life of the end product
• Processing of high-performance fibres and exploiting their maximum strength levels
• Optimum processability, even in adverse conditions of use
• Combination of several requirements by joining different textiles to grid structures

END USES

• Mining
• Bank and slope reinforcement
• Road and railway building
• Landfill and tunnel construction
• Reclamation of opencast mines
• Drainage
APPAREL AND HOME TEXTILES

We can supply machines for producing for example knitted interlinings for the clothing industry. Depending on the area of application, these can be used to permanently retain the shape of the garment, prevent creasing and improve function. Home textiles are characterised by their individuality, wide variety of designs, their colours and the types of materials used. Our machine concepts enable us to offer you the best solution for your particular requirements.

REINFORCEMENT AND COATING SUBSTRATES

All sorts of warp-knitted coating substrates, which are usually made from high-strength polyester yarns, feature two straight yarn layers in the 0° and 90° directions. They are fixed with the knitting yarn to produce a textile substrate with a particularly high tear propagation resistance and exceptional tensile strength values for low weights per unit area.

YOUR BENEFIT – OUR SOLUTION

- Maximum productivity through high fabric output, thanks to the wide working width
- Production of the finest, warp-knitted textile constructions from delicate fibre materials
- Wide variety of patterns, thanks to the flexibility of the machine technology

END USES

- Interlinings
- Protective clothing
- Bedding
- Upholstery fabrics
- Blinds and privacy screens
- Outerwear

YOUR BENEFIT – OUR SOLUTION

- Maximum productivity through high fabric output, thanks to the wide working width
- Broad range of applications through modular machine technology
- Wide variety of fabric constructions, due to the production of product-specific openings

END USES

- Swimming pools
- Sun screens
- Trade fairs
- Adhesive tapes
- Tarpaulins
EXAMPLES OF TRENDS
KARL MAYER AS A DRIVER OF TECHNOLOGY

LIGHTWEIGHT CONSTRUCTION TECHNOLOGY USING CARBON-FIBRE MATERIALS IN CAR PRODUCTION

The race is on worldwide to develop the car with the lowest weight. Together with increasing the efficiency of the drive technology, lightweight engineering is the most important way of achieving sustainable mobility. It reduces the weight of the car that has to be accelerated, produces fewer emissions and consumes less energy. A lower body weight also increases the range of the car. KARL MAYER can offer solutions here for efficiently producing customised, semi-finished products. Our clients are already reliable suppliers to innovative, mass-production car manufacturers.

CARBON TEXTILES IN SHIPBUILDING

Faster, lighter, further also applies to the shipbuilding sector. Fibre-reinforced plastics can reduce energy consumption by reducing the overall weight. What is more, they can also withstand adverse conditions at sea, and maintenance costs can be minimised by using non-corroding fibres. In the example, the composites are reinforced with carbon textiles – produced on KARL MAYER’s machines – to cope optimally with the stresses likely to occur, and there is virtually no limit to the development of innovative, functional designs.

BARBECUE FURNITURE MADE FROM TEXTILE-REINFORCED CONCRETE

Warp-knitted grid structures made from glass or carbon fibres are an effective alternative to conventional steel reinforcement in concrete components. The key to sustainability is the corrosion resistance of the fibres for a high, weight-specific tensile strength. By considerably reducing the area of the reinforcement, and the thickness of the concrete covering that is usually needed, the high inherent weight of large concrete structures can be greatly reduced by reducing the thickness of the component. The end uses of reinforced concrete can also be extended considerably. With its extensive machine portfolio, KARL MAYER can provide the right solution for every end use.
LONGER ROTOR BLADES FOR WIND TURBINES

To increase the wind yield, wind turbines with rotor blade lengths of more than 80 m are being built. Because of the dynamic and static stresses that occur, these dimensions can only be achieved by using specific reinforcing fibres and by optimising the aerodynamics of the blade geometry. For the user, this means optimum feeding-in of selected materials, fixing them in place and laying them to produce the required 3D shape. KARL MAYER’s multiaxial machines can efficiently produce semi-finished products from carbon and glass fibres for this application, at laying angles of 0° or between +/-20°. The machines are extremely productive and handle the fibres gently. The properties can be customised by combining these fibres with other materials.

STRENGTHS OF THE TECHNOLOGY MADE BY KARL MAYER TECHNICAL TEXTILES:

• Highly productive processing of high-performance fibres like polyester, glass, carbon, basalt and aramid
• Maximum performance of the end products for optimum use of the fibre properties, thanks to
  – homogeneous preparation
  – gentle handling of the fibres
  – defined laying and fixing
• High flexibility of the layered structure through
  – simultaneous processing of different fibre materials
  – different laying angles
• Combining several processing stages by processing different types of materials (yarns, substrates, powders, meshes)
• Increased freedom when designing the end products by specifically manipulating the draping characteristics
• Quality assurance of the end products, thanks to reproducible production processes and the use of suitable monitoring systems
• Solid machine technology and cost efficiency by combining industrially proven standard components with customised solutions
• The possibility of integrating KARL MAYER’s solutions helps our customers to optimise their entire production process
INNOVATIVE PORTFOLIO AND AN EXPERT DEVELOPMENT PARTNER

WEFT-INSERTION WARP KNITTING MACHINES

Our weft-insertion warp knitting machines can produce dense fabrics as well as meshes with product-specific openings. And, of course, this is all done in the best quality and at optimum productivity levels.

The textiles are usually made up of three yarn systems. The weft and filler yarns give the products their unique appearance. The knitting yarns from another guide bar fix the textile according to the construction.

Special features of the technology and advantages of the machines:
- No waviness, since the yarn layers lie straight at angles of 0° and 90°
- Insertion and fixing of the weft yarns only at product-relevant locations
- Flexible product design, thanks to the Multispeed system and weft repeat functionality
- High productivity through working widths of up to 6,800 mm and maximum machine speeds of 2,000 rpm
- Machine gauges of up to E 40, depending on the application
- Wide range of applications because of the high variety of yarns that can be processed

COMPOSITE MACHINES

Textile machines for non-crimp fabrics

Our machines are synonymous with maximum productivity and quality when producing multi-axial constructions. They have been developed specifically for processing glass, carbon, aramid and other technical high-performance fibres.

Special features of the technology and advantages of the machines:
- Production of multilayered non-crimp fabrics (NCFs)
- Possibility of processing continuous filament yarns or fibre tapes
- Laying angles from +20° to –20° are possible
- Fixing of the layers with a knitting yarn system
- Combination of weft layers with other semi-finished products

Fibre-spreading assembly units for unidirectional fibre tapes

Machines for producing dry, unidirectional fibre tapes with low weights per unit area from continuous filament yarns.

Special features of the technology and advantages of the machines:
- Production of low weights per unit area
- High productivity
- Production of tapes with widths of up to 800 mm
- Modular machine concepts allow additional fixing means to be introduced, such as adhesive meshes, powders and films
OUR KNOW-HOW IS YOUR STRENGTH

• Realisation of end-use-oriented technical solutions supported by the expertise of recognised experts in processing technology
• Tailor-made, customer-specific, complete solutions based on industry-proven standard modules and components guarantee
  – the service life of your machines through stable machine technology
  – cost-efficient solutions
• Customised modification of existing processes enables you to refine your production operations
• Pre- and after-sales concepts support your processing technology in the long term
• Our global service network provides you with rapid, targeted technical support
• Our experts can guarantee maximum safety specifications by looking at your processes as a whole
• Our global orientation always puts us close to our markets and to our customers and their needs
# OUR MACHINE PORTFOLIO

THE PERFECT SOLUTION FOR ALL YOUR REQUIREMENTS

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<tr>
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<th>AUTOMOTIVE</th>
<th>CONSTRUCTION INDUSTRY</th>
<th>TRANSPORT AND AEROSPACE</th>
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<th>ADVERTISING</th>
<th>MEDICAL TECHNOLOGY</th>
<th>GEOTECHNOLOGY</th>
<th>APPAREL AND HOME TEXTILES</th>
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