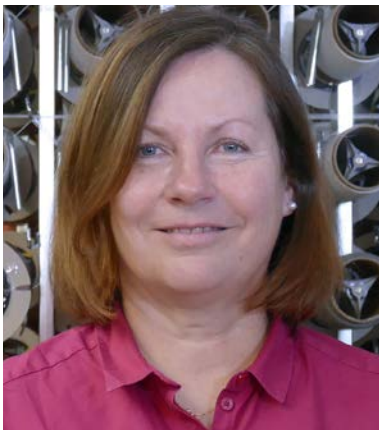
SÄCHSISCHES TEXTIL FORSCHUNGS INSTITUT e.V.

INNOVATIONS ZENTRUM TECHNISCHE TEXTILIEN

Technical woven and knitted fabrics



Technical woven and knitted fabrics

In the field of technical woven and knitted fabrics, we, a 20-strong team of highly qualified technicians, engineers and natural scientists, work on innovative textiles and technologies for customers from industry and research.
In doing so, we can build on many years of experience in various research fields, such as textile reinforcement structures for building and geotextiles, textile lightweight construction, smart technical textiles, health textiles, textiles for horticulture and landscaping, ropes and nets, as well as textiles for maritime applications. We have extensive know-how in the processing of technical fibers and yarns such as carbon, basalt, aramid, wires, but also tubes, wood filaments and conductive materials.
Current topics deal intensively with issues of sustainability. In this context, we focus on the development of high-performance fiber composites made from renewable raw materials such as hemp.
We are also developing textile technology solutions for the greening of buildings. Another special research competence lies in the constructive mechanical engineering development of textile machine modules in order to be able to optimally solve the technological problems of our customers. In addition to the optimization of machine elements, this also involves the linking of machines and processes within the framework of Industry 4.0.
In order to be able to test and evaluate the newly developed textile structures, we also develop testing technologies and testing machines. Within the framework of training courses and workshops, we offer individual training in theory and practice. We look forward to your inquiry and will be happy to work with you and for you on your individual textile solutions. You will find selected technologies on the following pages.

Dipl.-Ing. Elke Thiele
Manager Technical woven and knitted fabrics

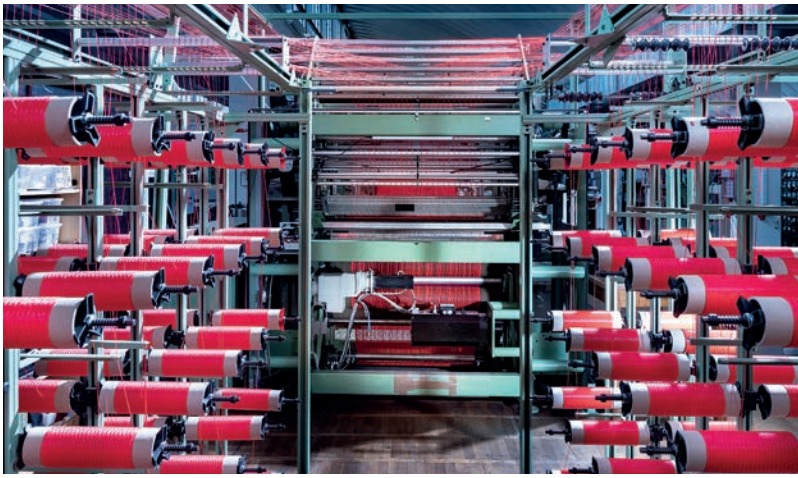
For the production of textile surface and strand structures from threads, yarns or rovings, the STFI's machine park covers the most important manufacturing processes. Textiles can be woven, knitted, embroidered and braided. In addition, STFI's machinery offers in-house manufacturing techniques such as the KEMAFIL® process, a strand manufacturing process, or a diagonal (thread) guiding element with which multiaxial knitted structures suitable for stitch courses can be produced. Another component is the expansion or construction of special machines based on customer requirements.

Spacer warp knitting machine

- RR warp knitting machine for spacer fabrics with a thickness of 32 mm and a gauge of E 22 (E10)

Warp knitting machines

- RL and RR warp knitting machines with gauge F22 to coarse for the production of ropelike yarns
- RR warp knitting machines with double multiaxial guide bar for textiles with diagonal insertion
- Special circular warp knitting machine for the production of diverse tubular textiles and ropelike structures.



Super coarse Warp knitting machine

- Weft yars can be processed to a diameter of 130mm
- Warp elements > 20 cm

Net knitting machine

- RL warp knitting machines for the production of high performance net structures

Weaving machine

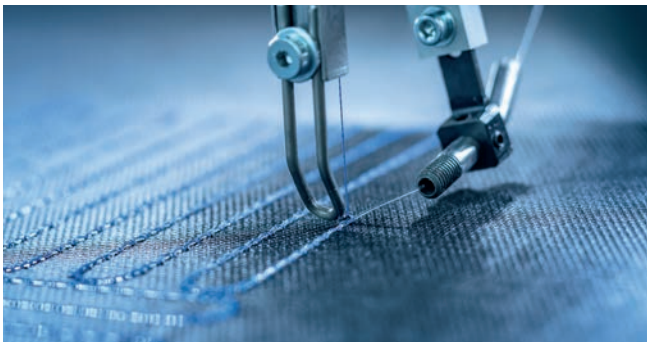
- 3D-Spacer weaving machine for the production of flat, spacer and multilaye wovens from carbon fibers, other high performance fibers and from regular yarns
  - pile thread height: 5-60 mm
  - working width: 1048 mm
- Rope loom for special rope fabrics from any material up to a diameter of 20 mm
- Narrow fabric loom for special technical articles up to 30 cm
- Narrow fabric loop 15 cm for functional and profile wovens

Flat- I Circular knitting machines

- RR flat knitting machine for production of high performance fibers with aramide, glass or PES and for production of true to form semi-finished knitted reinforcement textiles
- RR flat knitting machine with gauge E 14 for functional and medicinal uses
- RR circular knitting machine with gauge E 24

Embroidery machines

- STICKTRONIC SGW 0100 – 800 with W-head, Univesal-Module and active material feeding for use with optical fibers and threads and for application of functional materials and for production of knitted preforms for fiber-reinforced plastics
- STICKTRONIC Type JAF 0115 – 500 with 15-Needle-Universal-Module for bordures and single design embroidery and tubular embroidery for the production of functional textiles
- Combination embroidery machine JGZA with paillette-system, two feeder systems for the application of different sensors to one pattern



KEMAFIL® - Technology

- sheating and wrapping, core-sheath structures
- special rope-like structures with diameters from 2 up to 300 mm
- processing of strip-shaped and cut pieces of textiles as well as other loose and waste material

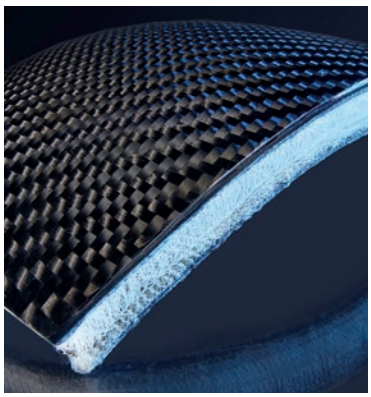
Nets I ropes

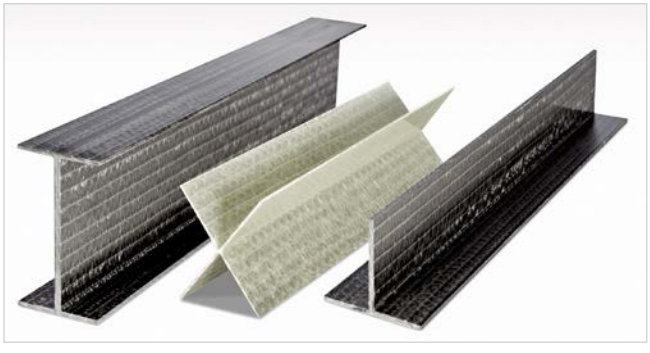
- Nets for protection and safety, cargo nets
- Nets for aquaculture
- Nets for securing loads in transport vehicles
- Safety nets for bridge railings
- Net and rope developments from Natural fibres, high performance fibres and Biopolymeren

- Ropes for traction and carrying equipment as well as for special applications
- Textiles for maritime applications, test under maritime outdoor conditions

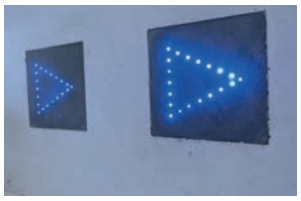
Textile lightweight I Reinforcement structures

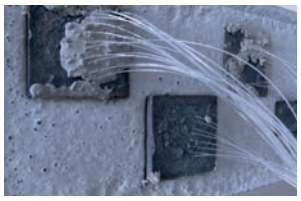
- Textile structures, semi-finished products for composites for lightweight construction
- Processing of high-performance materials (carbon, glass, basalt, aramid, etc.)
- Near-net-shape manufacturing (resource and material efficiency, high substance utilization, waste avoidance)
- Spacer fabrics as elastic core material in strongly curved components
- Multi-layer knitted fabric for rotor blade belts in wind wheels
- Natural fibre materials as preforms
- Development, construction and design of components/preforms/reinforcement structures (e. g. warp-knitted fabrics, spacer fabrics, woven fabrics, knitted fabrics, etc.)
- Local reinforcements
- Consideration of drape behaviour





Building I Environment geotextiles I Geosynthetics





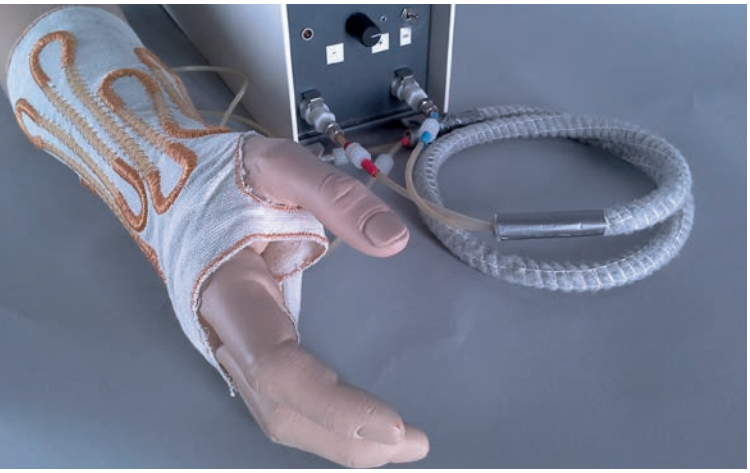
- Textile reinforcements for building construction and civil engineering
- Double curved surfaces
- Luminous concrete
- Components for lightweight bridges
- Functionalised textiles for flat load-bearing structures

- Use of renewable raw materials for slope stabilization and renaturation
- Electrodes for the electro osmosis process for soil drainage
- Wick drains for soil and slope stabilization
- Textile fixedbeds for water purification

- Urban greening and landscaping
- Floating plant islands
- Textile mats for greening flat and pitched roofs
- Textile structures for facade greening

Intelligent textiles in care and medicine

- Smart auxiliary and care textiles
- Monitoring of vital functions by textile structures
- Spacer fabrics for patient positioning
- Textile medical products and medical aids
- Orthoses and textile support structures for the musculoskeletal system
- Cooling and heating systems in bandages/ orthoses
- Textiles for filter systems/dialysis



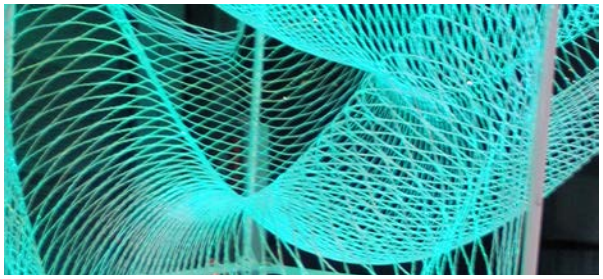
- Sensor textiles with protection and alarm function
- Cut-resistant structures with alarm function
- Integrated product protection with RFID systems

Sensor integrated textile structures for monitoring systems

- Sensors for pressure monitoring on supporting structures
- Moisture monitoring in wooden and concrete constructions

- Collector mats for solar thermal energy
- Modular heating and cooling systems
- Sun sails

- Textile-based curtain wall for thermally insulated greening
- Luminescent shading elements

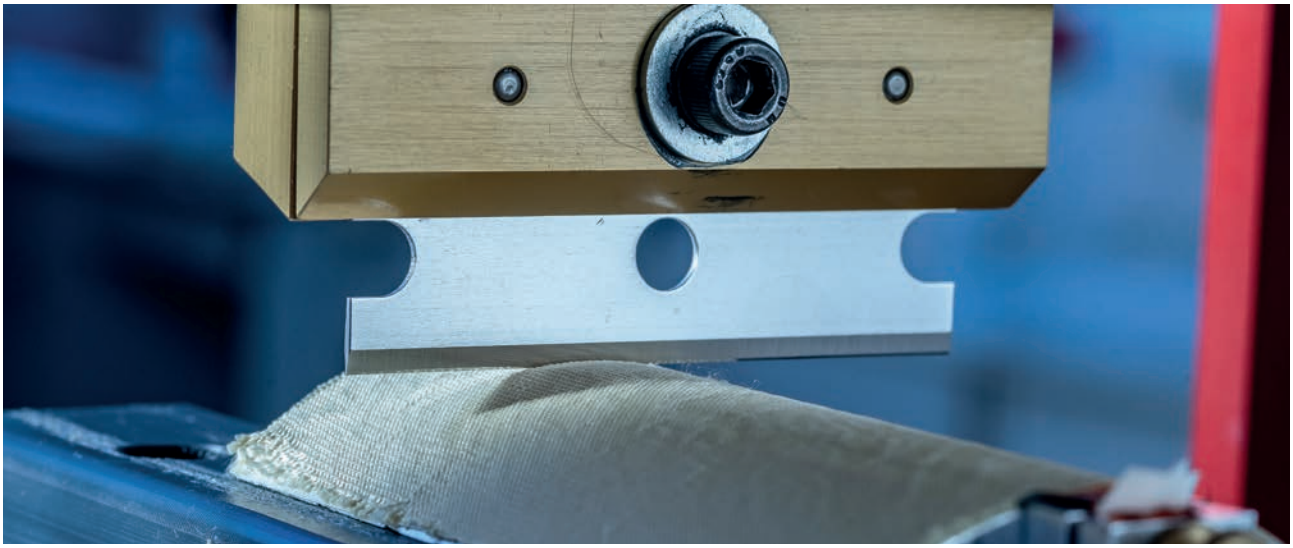


- Extensively luminous textiles, lighting net
- Smart luminous structures

- Early-warning systems for dykes and slopes

AKADEMIE

The training and further education of skilled workers as well as the qualification of lateral entrants are measures that are essential for the company's success. With its education programme, STFI would like to contribute to the success of your textile company. We have been an innovation partner and service provider for our customers for 30 years. For more information, visit www.stfi.de/en/.

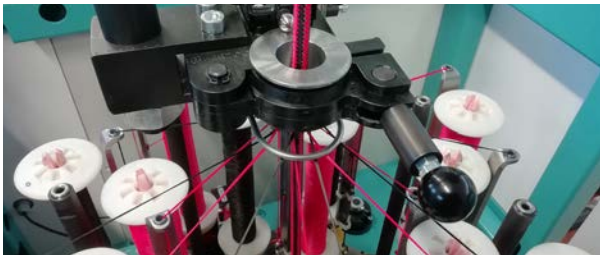


- Development of multiaxial technology for series production
- Development of textile machines for the production of near-net-shape textiles
- Development of feeding, cutting and positioning technology on warp knitting machines - single yarn feeding
- Combination of textile technologies
- Test machines for cut resistant tests
- Development of new textile machines/technologies

Development of novel testing methods, technologies and machine engineering

Ring-shaped endless braids made of high-performance fibres

The aim of the research project was the development of a new type of technology with the associated machine technology for the production of seamless, ring-shaped mesh structures for applications, which are primarily aimed at lifting gear, textile seals and textile reinforcements in fibre composite and concrete components.



Cryogenic fatigue bending test of Fibre ropes

The main focus of the project was the development of a novel test method and the realisation of a corresponding test rig concept for the fatigue bending test of fibre ropes under defined adjustable test temperatures in a range from -30 to 20°C.

Sample Technora®,
new (left), loaded (right)

Wood-Textile-Folded Structures
Folded structures made of textile carrier with rigid applications

In a world that is constantly becoming more open, discretion and differentiation are becoming more and more difficult, but also more important. In areas of our working world, private and public life, discretion zones are necessary, which are created by setting up portable, self-supporting protective walls. The walls should be customisable in size and shape and foldable for transport. Applications can be seen indoors, e.g. foldable partitions for open plan offices, and outdoors, e.g. privacy screens for hazardous areas. Multi-layer wood-textile composites were developed by using origami mathematics. The textile serves as a two-dimensional hinge for the finished construction. Depending on the technical requirements, a corresponding functional layer (e.g. wood or plastic elements) must be fixed to the upper side of the textile. The folding kinematics are determined by the geometry of the rigid wooden elements.

Sensorpad for Upholstery


Photo: IHD


Photo: IHD

In Germany, around two thirds of people in need of care live in their home and are mostly cared for by relatives. This leads to a need for systems which, on the one hand, ensure a high quality of life for people in need of help and care and, on the other hand, enable relatives without medical or specialist nursing training to provide care services independently. The aim of the project was to develop sensory textile systems that rapidly aid the caregiver with decision-making regarding the necessary care.
Polymer optical fibres are suitable for the detection of pressure, temperature and humidity. Based on this approach, a concept was developed for a textile-integrated sensor system to detect the above-mentioned variables. In the course of tests, various textile sensor prototypes were designed. The sensor principle used is the measurement of the change in light intensity caused by micro- and macro-bending in polymer optical fibres.

Further research projects in the field of technical woven and knitted fabrics can be found on our website.

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