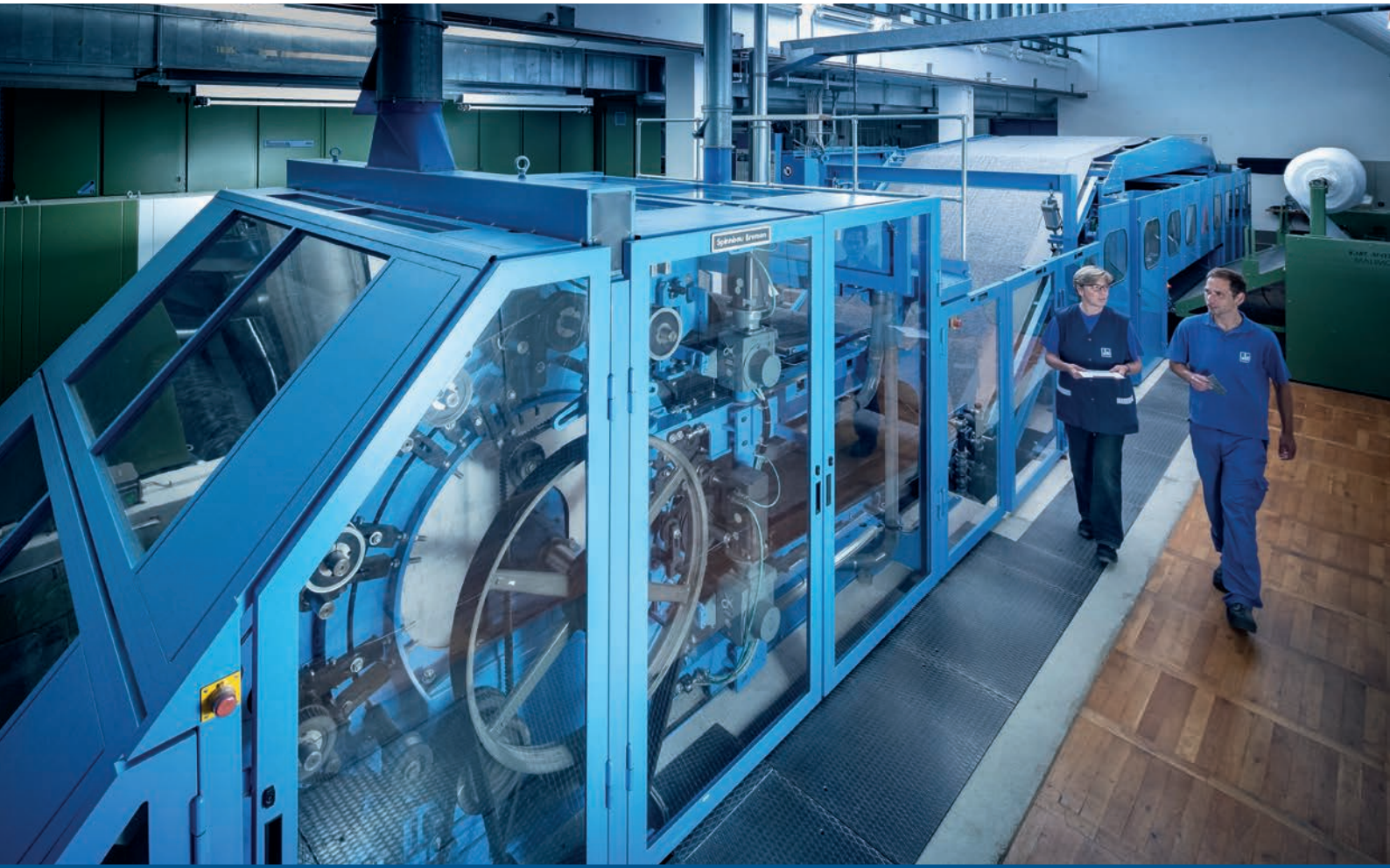
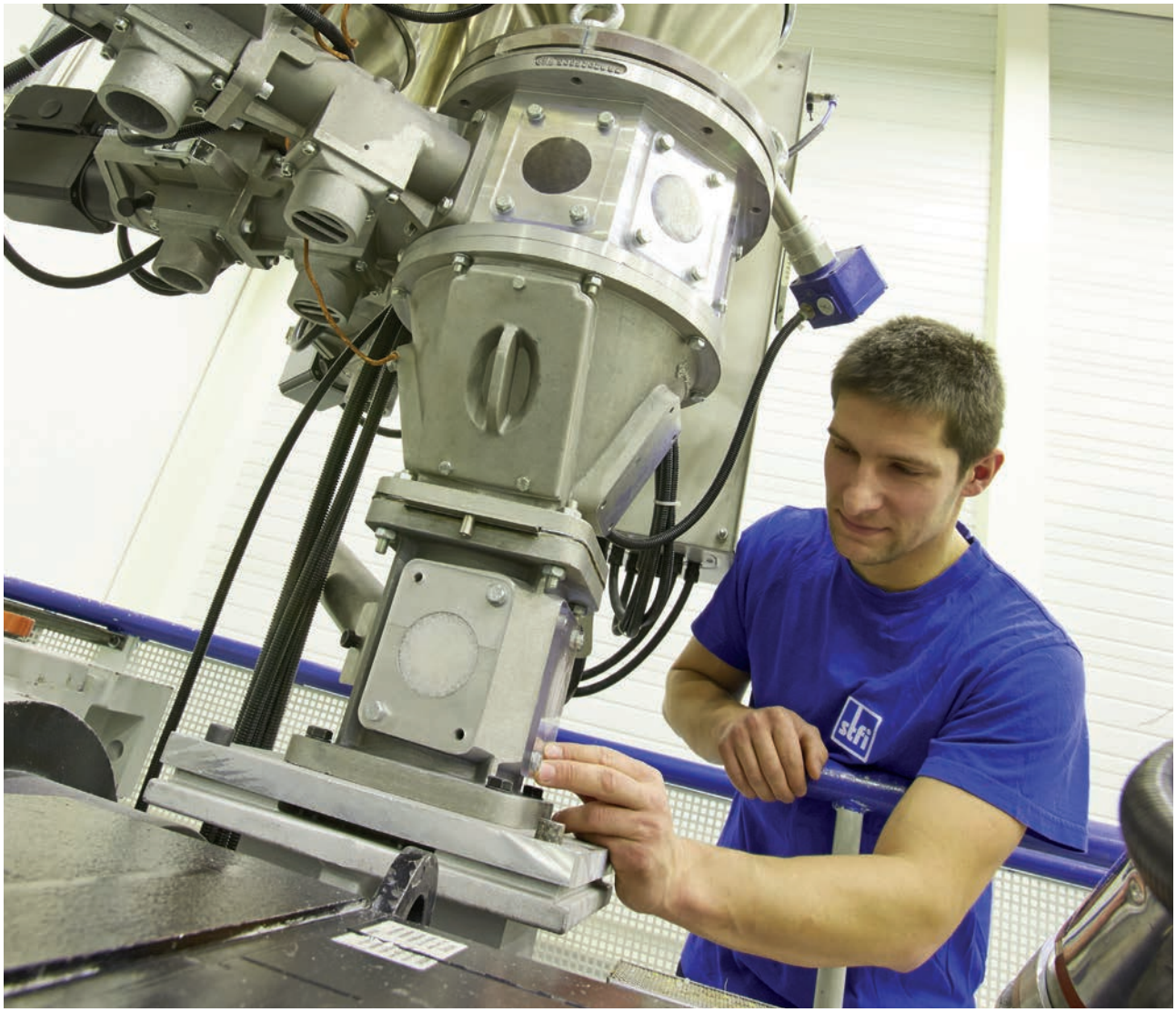
SÄCHSISCHES TEXTIL FORSCHUNGS INSTITUT e.V.

KOMPETENZ ZENTRUM VLIESSTOFFE

Center of Excellence in Nonwovens





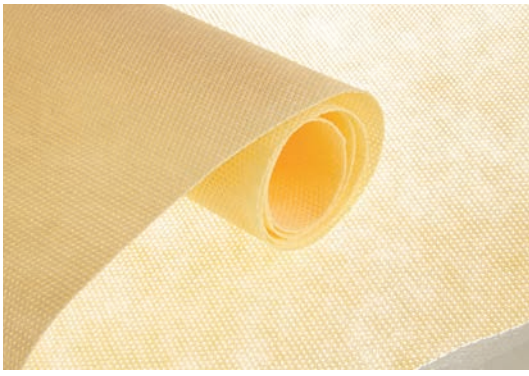
The STFI has been a member of EDANA, the European nonwovens association, since 1990.
The Center of Excellence in Nonwovens is one of the European centres listed by EDANA.

Center of Excellence in Nonwovens

Nonwovens are generally regarded as helpers in disguise because of their often concealed installation and their functionality. Since the Covid-19 pandemia at the latest, nonwovens have increasingly come into public awareness and visible to everyone. Extrusion nonwovens, in particular, offer excellent and adjustable filtering properties which make them ideally suited for the production of protective mouth-nose-masks. Our employees have gained valuable experience in process optimization from many activities and contacts made during the pandemic and they have generated additional knowledge and ideas for current and future research topics.
However, also developments far away from the pandemia had and still have a fixed place in our activity profile. We are directly affected by current developments in the automotive industry not because of declining order numbers, but due to a hype of development requests. From our point of view, the driving force therefore seems to be the common change to e-mobility. Sustainable topics in the areas of lightweight construction, recycling and use of renewable resources continue to be on the agenda of our employees. Changes in social conditions generate new demands on filtration or acoustics where we are working on intelligent solutions.
In order to be able to continuously offer our customers, project partners and employees a modern technical/technological basis and sufficient process reliability, we pay permanent attention to extensive plant technology. Therefore, upgrading and retrofitting are economically effective instruments in addition to installing new technical components.

Our team has also been strengthened with a number of young scientists and technicians to complete the upcoming generation change without any loss of know-how in the long term. With this in mind, we are optimistic about the future and look forward to intensive thematic discussions and exciting professional cooperation with you!

Patrick Engel, M. Sc.
Manager Center of Excellence in Nonwoven



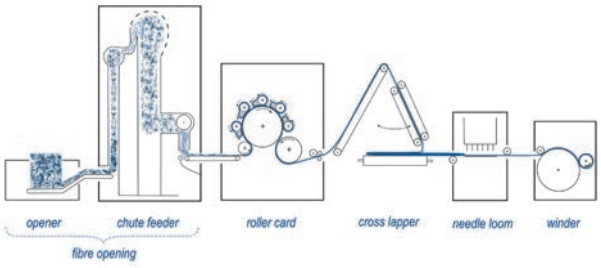
Fibre web plants
(with needle-punching machine)

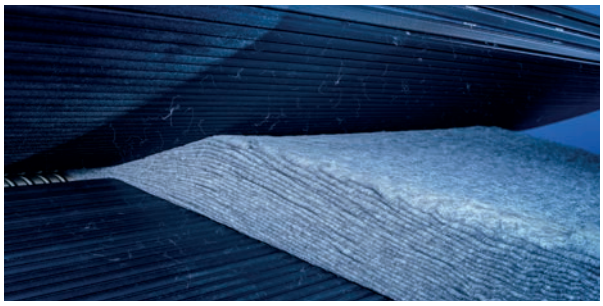
Plant 1

Fibre fineness	1 - 28 dtex
Working width	1,000 - 2,400 mm
Working speed	max. 10 m/min
Mass per unit area	50 - 1,500 g/m²

Plant 2

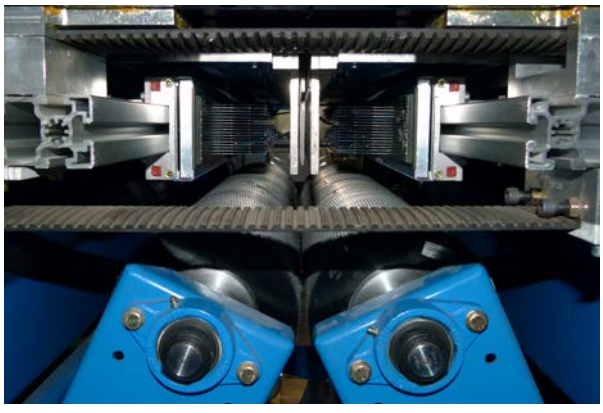
Fibre fineness	1 - 28 dtex
Working width	600 mm
Working speed	max. 4 m/min
Mass per unit area	50 - 600 g/m²





Needle-punching spacer machine
NAPCO®

Working width	up to 1,000 mm
Working speed	max. 3 m/min
Surface distance	up to 25 mm
Fillings	particles, tubes, profiles, films etc.



Random web plant with thermofusion oven

Airlay

Processing of man-made fibres, recycling fibres,

Natural fibres	10 - 100 mm Länge
Working width	1,100 mm
Mass per unit area	300 - 3,000 g/m²

Airlaid

Processing of man-made fibres, recycling fibres,

Natural fibres	0,1 - 12 mm Länge
Working width	1,100 mm
Mass per unit area	30 - 800 g/m²

Stitch-bonding machine

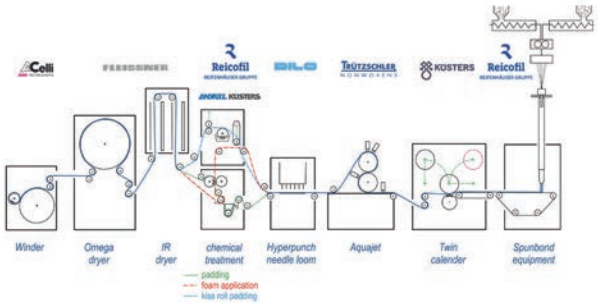
Kunit/Multiknit

Fibre fineness	1 - 10 dtex
Working width	up to 1,600 mm
Working speed	max. 5 m/min
Mass per unit area	120 - 600 g/m²

Malivlies/Maliwatt

Fibre fineness	1 - 10 dtex
Working width	up to 2,000 mm
Working speed	max. 5 m/min
Mass per unit area	80 - 500 g/m²

Spunbond plant Reicofil® 4.5



Processable raw materials
PET, PP, PE, PA, Biopolymere

Configuration
Single beam, bi-component technology, calender, spunlace plant, needle-punching machine, chemical treatment, dryer, winder

Bi-component types
Side by side, core-sheath, segmented pie

Filaments	6,827/m, 4,982/m, 2,634/m, 3,255/m
Material throughput	150 - 500 kg/h
Working width	1,000 mm
Working speed	10 - 400 m/min
Mass per unit area	PP/PE 8 - 500 g/m², PET/PA 18 - 700 g/m²

Meltblown plant

Processable raw materials
PP, PBT, PE, PC, Biopolymere

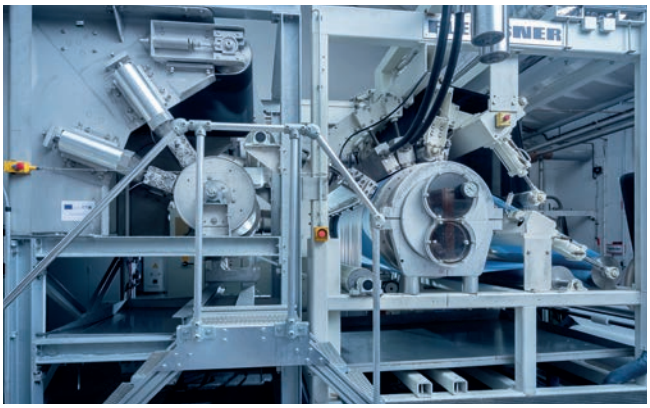
Configuration
Single beam, calender

Material throughput	5 - 90 kg/h
Working width	600 mm
Working speed	2 - 120 m/min
Mass per unit area	3 - 300 g/m²

Spunlace plant

Configuration
Fibre opening, random web roller card, spunlace plant with two drums, perforated drum dryer, winder

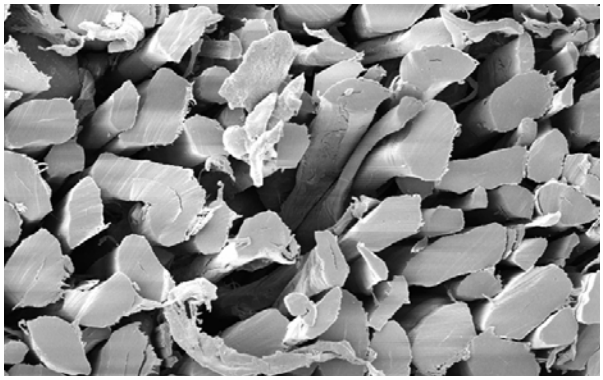
Fibre fineness	0,7 - 7 dtex
Working width	1,000 mm
Working speed	max. 80 m/min
Medium pressure	max. 42 MPa
Jet heads (1. drum)	4
Jet heads (2. drum)	2
Mass per unit area	25 - 500 g/m²

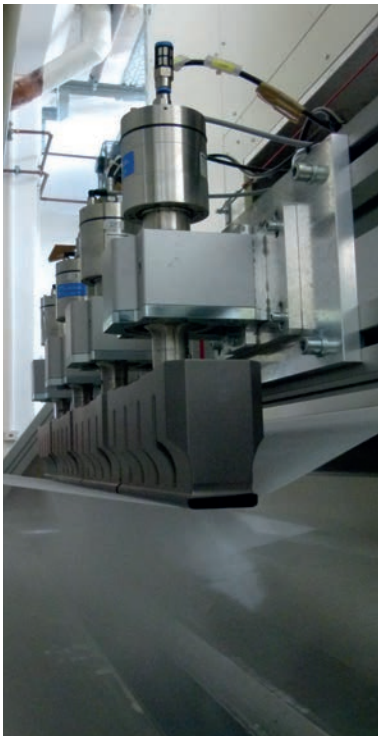


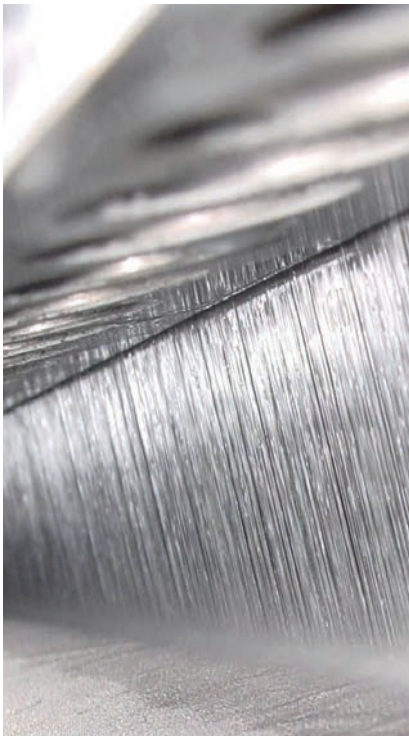
Fibre nonwovens

Carding process
Random laid web process – Airlay (long fibre)
Random laid web process – Airlaid (short fibre)

- Needle-punched nonwovens
- Stitch-bonded nonwovens type Maliwatt
- Stitch-bonded nonwovens type Malivlies, Kunit, Multiknit
- Random web nonwovens Airlay (thermo bonded)
- Random web nonwovens Airlaid (thermo bonded)
- Needle-punched spacer nonwovens Typ NAPCO®
- Nonwoven composites
- Processing of carbon and other high performance fibres (aramid, glass, metal, basalt, ...)
- Processing of Reclaimed fibres
- Processing of regrowing materials (hemp, flax, nettle, sisal, coconut, jute, kenaf, kapok, ...)
- Bio-based fibres

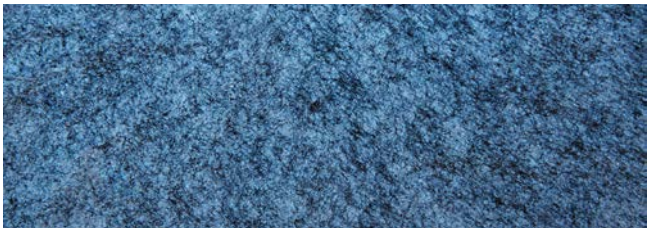






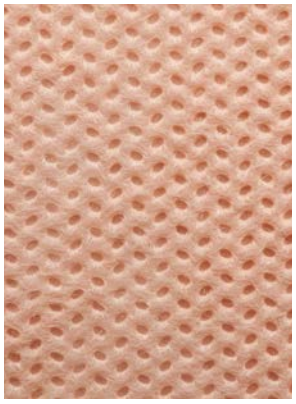
Spunlaced nonwovens

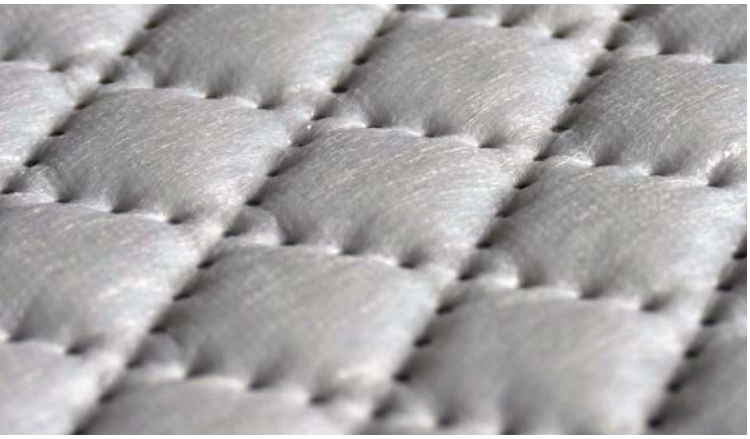
- Process optimisation to reduce the specific energy consumption
- Investigations to improve the service life of jet heads
- Test of perforated belts, patterning screens, structuring screens and perforated screens (2D, 3D)
- Production of functional composite structures
- Process water management
- Ultrasonic dewatering



Spunbonded nonwovens

- Development of innovative nonwoven products
- Testing of newly developed polymer materials for spunbonding
- Development of biodegradable spunbonded nonwovens
- Process optimisation for micro-filaments and hollow filaments



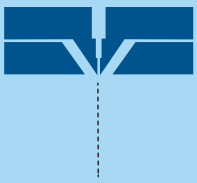


Meltblown nonwovens

- Development of innovative meltblown nonwovens
- Production of composite nonwovens type SMS, CMC and further process combinations
- Testing of newly developed polymer materials
- Process development for the use of special additives

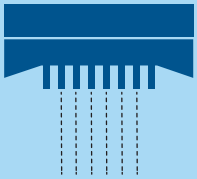
RF4 Singlerow
Meltblown technology

Optimum barrier and filtration properties



Multirow
Meltblown technology

Perfect elasticity and absorption properties

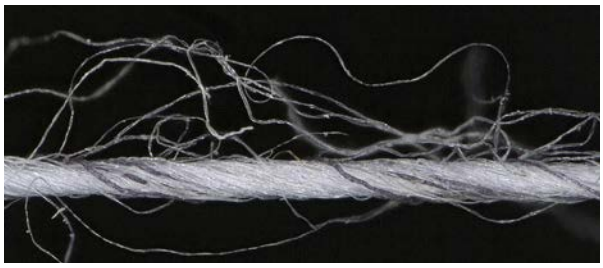


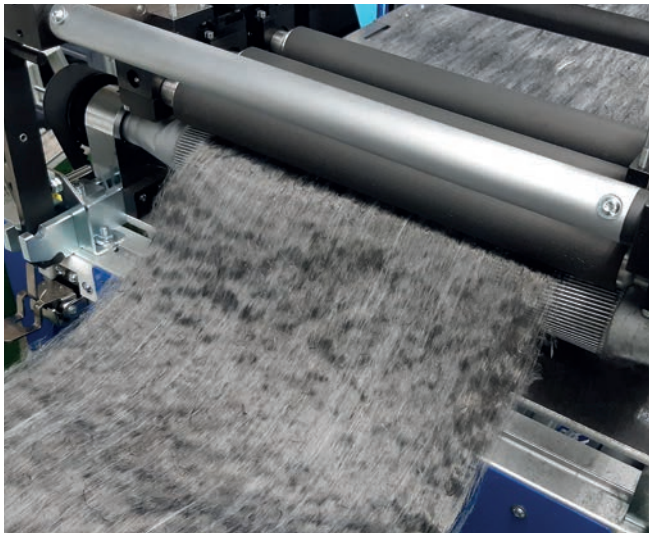
Load-bearing orientation of high-performance fibres

- Consisting of staple fibres (100 % rCF or fibre blends)
- Inline bonding method to obtain a strand-like product
- Manufacturing of doubled and stretched staple fibre webs (Mixtures with thermoplastic fibres)
- Thermal fixing into tape structures up to 300 mm width

Fibre reprocessing and yarn production

- Preparation of natural and chemical fibres (particularly special fibres)
- Sliver production, production of yarns and twists
- Quality assessment of fibres, semi-finished and final products





AK INNOVATION AWARD

Textile recycling

- Cutting, cut-grinding and tearing of textile waste, also from special fibres, like glass, aramid, carbon
- Material cycles and recycling friendly construction

- Products made of reclaimed fibres, direct processing to form fabrics from nonwoven waste
- Secondary use
- Recycling of smart textiles

Sustainable Textile Recycling - Cooperation Network RE4TEX®

RE4TEX® NETWORK

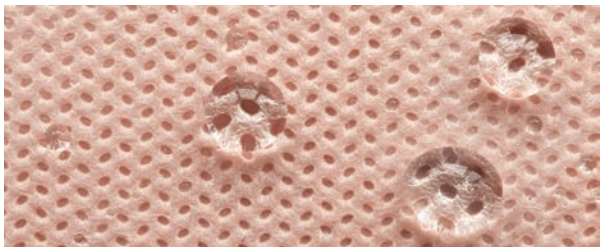
The ZIM network RE4TEX® (Recycling for Textiles) focuses on activities around the recycling of textile production waste. The optimisation of existing recycling processes and the development of completely new recycling processes, the application of non-industry specific processes and the instruments of recycling-oriented design and sustainable management are strategic fields of action of the network and scope of the network activities. Actors from different branches come together to develop and implement innovative solutions for process and technological applications by combining existing competencies.

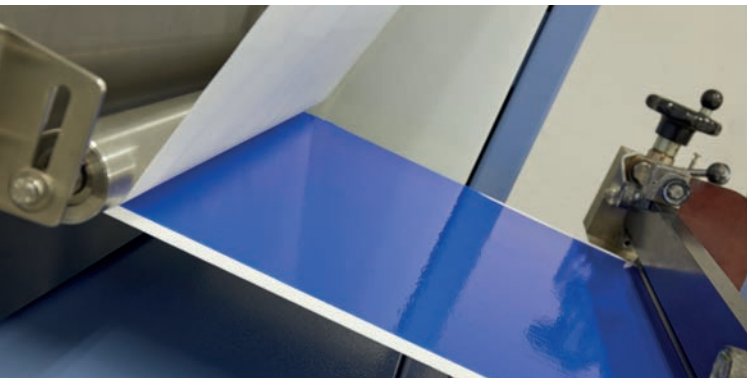
Gefördert durch: Bundesministerium für Wirtschaft und Energie aufgrund eines Beschlusses des Deutschen Bundestages
ZIM Zentrales Innovationsprogramm Mittelstand

The ZIM project 16KN086801 is funded by the Federal Ministry of Economic Affairs and Energy (BMWi) via the project management organisation VDI/VDE/IT within the framework of the "Central Innovation Programme for SMEs" (ZIM).

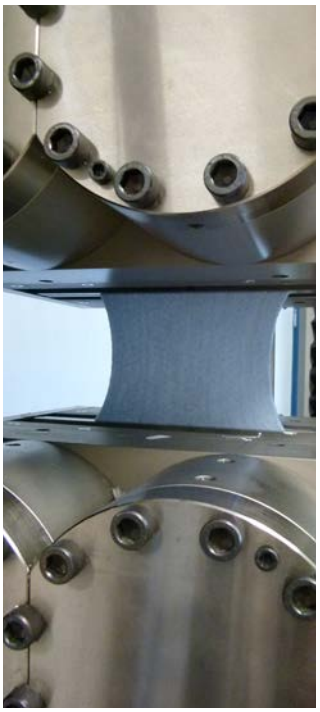
After-treatment of nonwovens

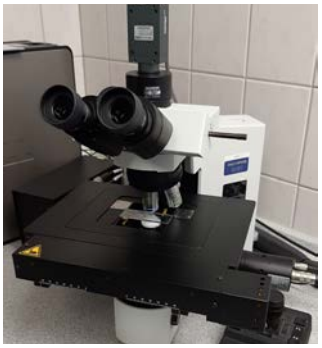
- Thermofixing
- Laminating
- Calendering
- Coating
- Impregnating
- Spraying
- Spunlacing





Nonwoven testing





- Melt flow index (MFR / MVR)
- Tensile trength
- Residual moisture
- Fibre fineness
  (automatic detection of fibre)

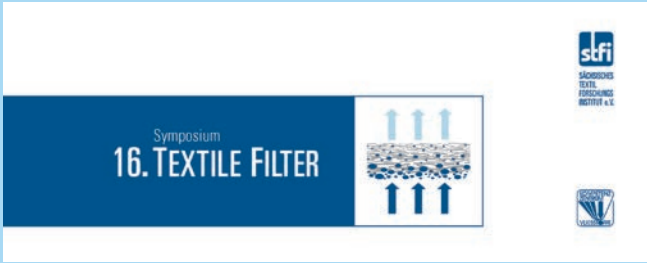
EDANA – NIA

edana
NONWOVENS™ INNOVATION ACADEMY

The organisation rotates between nonwovens centres of excellence, with an initial focus on Europe, and particular emphasis on the host's area of expertise and current research projects. Any research or academic institute or university department interested, is invited to join this network.

Further information of seminar and event dates:
https://www.stfi.de/en/events

Colloquia and symposia



Novel silicone PLA composite material for furniture applications

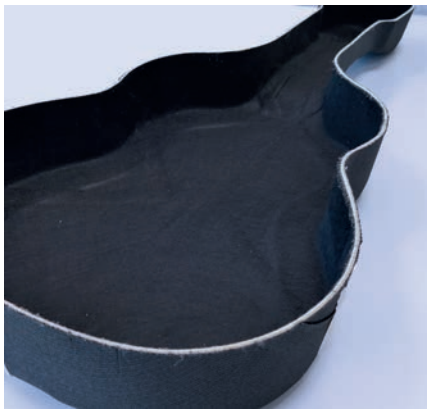
The research aim was to develop a new silicone PLA composite material that meets special requirements for furniture applications without the usual flame-retardant additives. It was intended to come up with an environmentally friendly product that is largely based on PLA biopolymers. Hydroentanglement of spunbond and staplefibre nonwovens make it possible to produce thin nonwovens whose shrinkage behavior below 150 °C allowed further processing in the coating process. The spunbonded nonwovens had significantly higher mechanical strength compared to the spunlaced nonwovens, but at the same time less flexibility. High resistance showed in the flex test and comfortable grip performance were decisive that spunlaced nonwovens were favored, regardless of the lower strength values.

Nonwoven liner for optimized wear comfort in high density protective clothing

The multilayer material can be used together with personal protective clothing produced as functional vest. Absorption of moisture to support thermal regulation during sweating can be realized as well as heat storage of the heat emitted by the body for a time of approx. 10 minutes. Heat storage is realized by plates consisting 80 % phase change material (PCM). These plates dimensioning 100 x 50 mm and a thickness of up to 4 mm are located at the whole surface. The arrangement inside of nonwoven bags allows a precise adaption to individual body sizes over the whole breast and back area.

Project: optiformTEX

In the framework futureTEX within the BMBF funding programme "Twenty20 – Partnership for Innovations", a new technology for flat natural fibre (NF) semi-finished products with load-appropriate topological fibre mass distribution was developed. This innovation allows a significant weight reduction of up to 30 % for lightweight components, especially in automotive interiors. The result was the optiformTEX module "3D-Lofter" for the local reinforcement of nonwovens by means of defined fiber accumulations; developed and built by the project partner Oskar Dilo Maschinenfabrik KG, Eberbach. One module has been integrated into the laboratory needle nonwovens plant at STFI and is available for customer trials and subsequent research projects.



Contact

Patrick Engel, M. Sc.
Manager Center of Excellence in Nonwovens
Needle-punched Nonwovens, Fibre Nonwovens, Spunlaced Nonwovens
Phone: + 49 371 5274-209
E-Mail: patrick.engel@stfi.de

Dipl.-Ing. Tim Hühnerfürst
Spunbonded Nonwovens, Meltblown Nonwovens, Chemical Bonding, Materials
Telefon: + 49 371 5274-1217
E-Mail: tim.huehnerfuerst@stfi.de

Johannes Leis, M. Sc.
Textile Recycling, Sustainability
Phone: + 49 371 5274-254
E-Mail: johannes.leis@stfi.de

Dipl.-WA Ralf Taubner
Spunbonded Nonwovens, Meltblown Nonwovens, Needle-punching and Finishing of Spunbonded Nonwovens, Biopolymers
Phone: + 49 371 5274-262
E-Mail: ralf.taubner@stfi.de

Dipl.-Ing. (FH) Mulham Tahhan
Spunlaced Nonwovens, Nonwoven Composites, Carded Nonwovens, Measurment Technique
Phone: + 49 371 5274-204
E-Mail: mulham.tahhan@stfi.de

Dipl.-Ing. Chem. (FH) Johanna Spranger
Meltblown Nonwovens, Chemical Treatment, Biopolymers, Textile Filter
Phone: + 49 371 5274-218
E-Mail: johanna.spranger@stfi.de

Dipl.-Ing. (FH) Andreas Nestler
Spunlaced Nonwovens, Nonwoven Composites, Carded Nonwovens, Measurment Technique
Phone: + 49 371 5274-208
E-Mail: andreas.nestler@stfi.de

Dr.-Ing. Barbara Schimanz
Needle-punched Nonwovens, Nonwoven Composites, Needle-punched Spacer Nonwovens, Textile Filter
Phone: + 49 371 5274-202
E-Mail: barbara.schimanz@stfi.de

Liana Lein, M. Sc.
Nonwoven Composites, Biopolymers, Natural Fibres, Wipes, Spunlaced Nonwovens, Textile Filter
Phone: + 49 371 5274-255
E-Mail: liana.lein@stfi.de

Dipl.-Ing./Dipl.-WI Ina Sigmund
Preparation and Quality Assessment of Natural Fibres, Sliver and Yarn Manufacturing, Fibre Nonwovens, Nonwoven Composites
Phone: + 49 371 5274-203
E-Mail: ina.sigmund@stfi.de

Sächsisches Textilforschungsinstitut e.V. (STFI)
An-Institut der Technischen Universität Chemnitz
Managing Director: Dr. Heike Illing-Günther
Annaberger Straße 240 I 09125 Chemnitz I Germany
Phone: +49 371 5274-0 I Fax:+49 371 5274-153 I stfi@stfi.de I www.stfi.de
Layout I Text: Dipl.-Des. (FH) Berit Lenk, Patrick Engel M. Sc.
Photos I Graphic: STFI, D. Hanus, W. Schmidt, I. Escherich, Reifenhäuser Reicofil