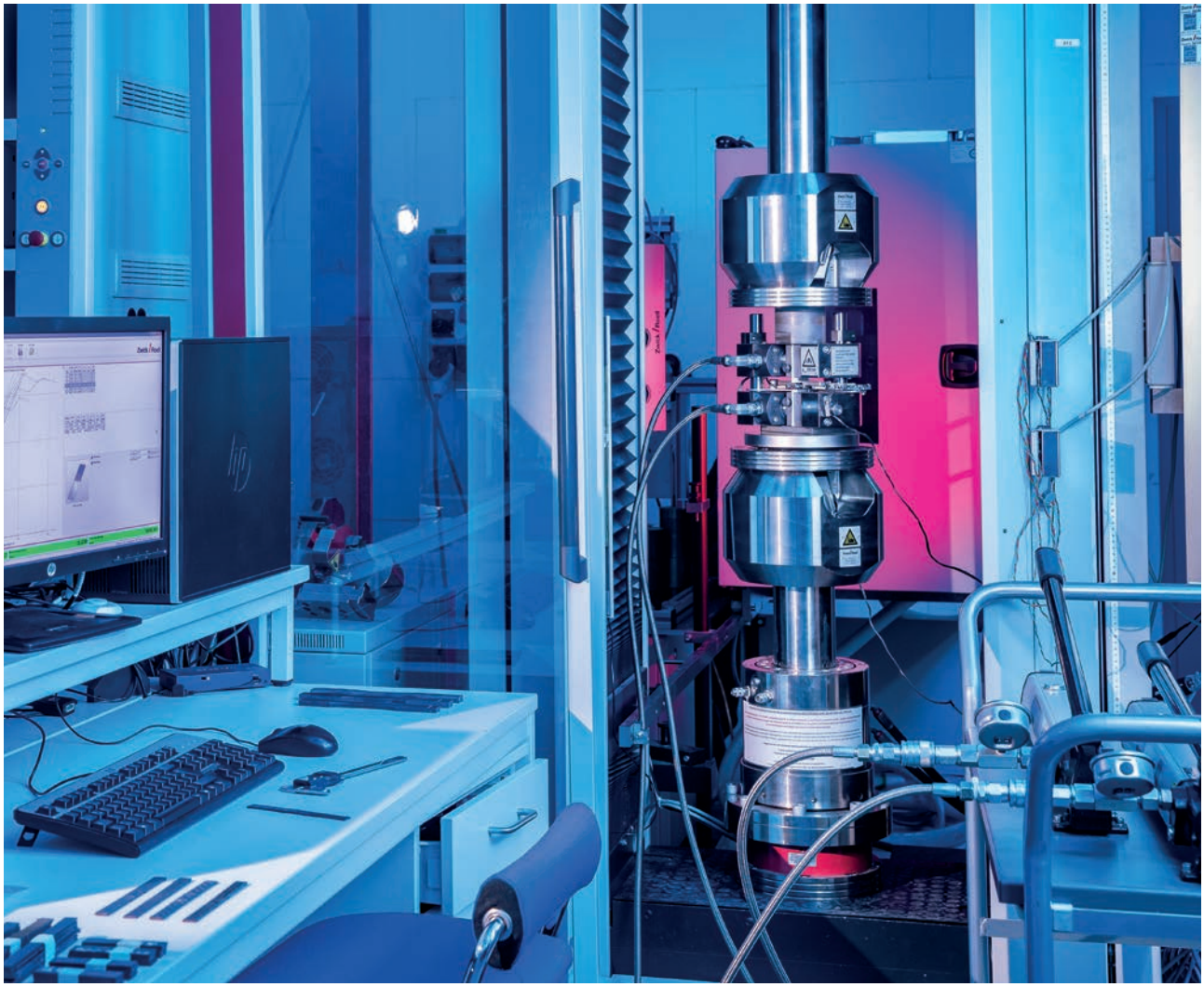
SÄCHSISCHES TEXTIL FORSCHUNGS INSTITUT e.V.

stfi geprüft

Accredited Test Lab

Faszination TEXTIL



The independent, accredited testing laboratory offers customers a wide range of testing services. With this paper we would like to give you a compact and exciting insight into our range of services. For the “short line” to us, the contacts to the fields of expertise are named. We hope you enjoy reading.

For you and the quality of your products – The range of our services

The independent, accredited testing laboratory offers customers a wide range of testing services. The core of our range of services is the testing according to national and international standards, recognized standards for product labels (OEKO-TEX® STANDARD 100), technical delivery conditions or industry-specific regulations (SAE).

Beginning with the starting materials such as fibres and threads are also taken into account as well as semi-finished textile products as woven, nonwoven knitted, braided or composites structures. The test of final products as a "system test" (e.g. personal protective equipment or load securing) complete this part of the range of services.

As flexible as possible – You haven't found a standard? The STFI test laboratory is flexibly accredited for some specialist areas in accordance with the DAkkS regulations. The flexibility according to Category I allows the test laboratory, for example, to verify the free selection of standardized or equivalent test methods within a defined test area and to include them in the accreditation.

Individual products require individual solutions. Here we support customers with the characterization and quality assessment of their products for which no normative specifications are available. Through the interdisciplinary cooperation of various test competencies (textile physics, chemical analysis, electrostatics ...) we try to transfer, adapt or develop new methods – development of test procedures.

What if the quality is questioned? To this end, we offer you a large pool of interdisciplinary skills for independent, neutral quality assessment of textile products - analytical competence. We are constantly working on expanding our range of services. New and special - here we report on newly introduced test methods. These are normative methods or modifications of already integrated procedures.

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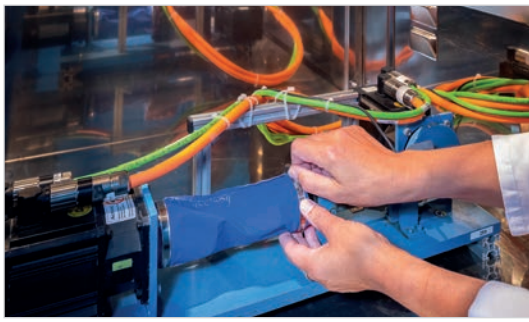


For the structuring of the competencies, test areas and test parameters that we cover in our test laboratory, we have divided these in fields of expertise. This section briefly introduces you to the subject areas and their main focus areas. Using the QR code takes you directly to an overview of the testing services/standards offered in this specialist area. You will find the respective contact person on the last page of this paper.

Textile physical test

We offer you a large number of physical textile tests, from single fibres to yarns and flat textiles such as nonwovens, woven or knitted fabrics. To do this, we use test equipment from well-known manufacturers. In addition to the standard tests (tensile test or the abrasion stress), we always strive to enable you to make special requests.

- Tensile test and tear properties
- Abrasion resistance
- Tests against mechanical risks (e.g. protective gloves)

Textile physiological and ergonomic testing

In this test area important parameters of thermo physiological interactions between human and clothing are tested.

- Thermal insulation behavior
- Moisture management
- Skin contact and grip feeling of textiles

Examination of penetration/ protective behavior

Depending on the intended use, textile materials are tested against the penetration of various media. For example, textiles should have a protective effect against chemicals and oil or be waterproof.

- Moisture behavior
- Waterproofness
- Water absorption
- Water retention capacity
- Resistance to penetration against dangerous chemicals

Colour fastness

Testing the colour fastness of dyes and prints provides important information about the quality of the material and is an important indicator for textile care.

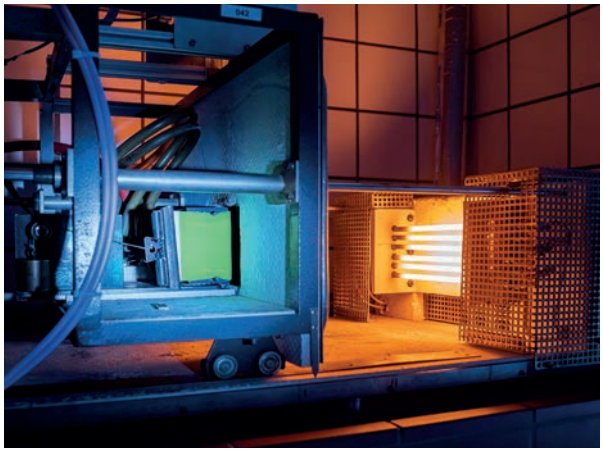
- Colour fastness to heat and rubbing
- Colour fastness to light
- Colour fastness to weathering
- Colour fastness to liquid media

Weathering test

Artificial and natural weathering (outdoor weathering) are used to examine their influence on the durability of materials in a controlled manner.

- Resistance to light, temperature, humidity and rain

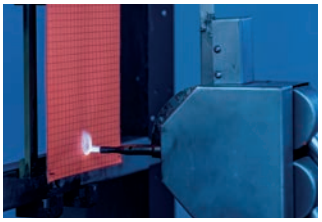
Heat protection



In the area of heat protection testing, various methods of protection against heat hazards are used.

- Heat transfer - Flame
- Heat transfer - Radiation
- contact heat transfer
- protection against thermal risk of electric arc
- Protection against metal splashes

Burning test



In the field of testing the burning behavior, we can perform various methods. Most of these methods come out from others of the areas of protective equipment, automobiles and home textiles, among others.

- Protective textiles
- Automotive interiors
- Home textiles
- Clothing
- Building materials

Electrostatic test

A large number of test and measuring devices are available for electrostatic tests.
The range of services includes:

- Assessment of the electrostatic behavior of textiles and other materials

Measuring of the chargeability of floor coverings by the “walking test”, resistance measurement and discharge behavior.

- Investigations to avoid electrostatic charges when processing textiles
- Testing of the frictional behavior of fibers and textiles

Examination of care and usage behavior

In the field of textile care, the assessments can be made on clothing products, including protective clothing, as well as home and household textiles. Standardized laundry technology for the household sector as well as industrial reprocessing processes are used.

- Dimensional Change
- self-smoothing behavior

Textile chemical and human ecological testing

- Material characterization by spectroscopical, thermoanalytical and rheological methods
- Determination of dynamic surface tension of fluids and their contact angles on textiles
- Analysis of harmful substances (e.g. heavy metals, arylamines, phthalates, solvent residues)
- Determination of fogging characteristics or odourpropagation
- Quantitative analysis of fibre mixtures
- Environmental analysis (water, waste water, exhaust air)
- Protection against chemicals (permeation), cytostatics and pesticides

OEKO TEX® STANDARD 100

Special optical and physical testing

Special equipment is available for selected examinations, e.g.

- Scanning electron microscope with EDX
- KES system according to Kawabata for the determination of tensile, shearing, bending, compression, friction, roughness parameters as a statement for "grip"
- Image processing system with programmed evaluation, e.g. for quantitative detection of surface properties and internal structure of materials

Complex quality evaluation for sun protection textiles

- Development of methods and procedures for objective assessment of the product quality of sun protection textiles in cooperation with the Verband innenliegender Sicht- und Sonnenschutz e.V. (VIS)
- Comprehensive programme of up to 11 individual tests for practice-oriented tests for:
  - Colour, surface and dimensional stability
  - Light transmission and reflection
  - Application-specific stress tests for climate change and scuffing
- getting approved of the "STFI geprüft" signet after successful testing
- Test facility for the load resistance of complex sun protection systems with all components

Testing of personal protective equipment

The corresponding testing options exist for the following product groups of personal protective equipment:

- Protective clothing for workers exposed to heat (EN ISO 11612)
- Protective clothing for use in welding and allied processes (EN ISO 11611)
- Protective clothing with limited flame spread (EN ISO 14116)
- Protective clothing against thermal risks of an electrical arc (IEC 61482-Serie)
- Protective clothing for fire fighters (EN 469, EN 13911)
- High visibility warning clothing (EN ISO 20471, EN 17353)
- Protective clothing for rescue service personnel (DGUV-Regulation 105-003)
- Protective clothing against rain (EN 343)

- Protective clothing against cool environments (EN 14058)
- Protective clothing against cold (EN 342)
- Chemical protective clothing; Type 3, 4, 5, 6 (EN 14605, EN ISO 13982-1, EN 13034)
- Protective clothing against radioactive contamination (EN 1073-2)
- Protective clothing against pesticides (DIN 32781)
- Protective clothing-Antistatic properties (EN 1149-Serie)
- Protective clothing for use where there is a risk of entanglement with moving parts (EN 510)
- Workwear in food business (DIN 10524)
- Protective gloves against mechanical and thermal risks (EN 388, EN 407)
- Protective gloves against chemicals and mi cro-organisms (EN ISO 374-1)
- Protective gloves for fire fighters (EN 659)
- Protective gloves for welders (EN 12477)
- Protective gloves for electrostatic properties (EN 16350)

Testing of geosynthetics

In the field of geosynthetics, we perform tests with regard to textile-physical and hydraulic parameters. Also tests on durability and special practical tests (LA-drum-test) we can perform.

- Mechanical parameters
- Hydraulic characteristics
- Tests for Durability

Testing of filter media (air filtration) and particle filtering half mask

In the field of filter testing, the main focus is on testing of the retention capacity of textile fabrics against airborne particles. In addition to the determination of the Initial fractional efficiency and the dust hold capacity, investigations of the first bubble point can also be done. These tests are accompanied by testing classic parameters from textile physics.

- Pressure differences
- Fractional efficiency
- Pore sizes
- Cleaning behavior of filter media
- Filtering half masks according to DIN EN 149
- Separation performance against liquid aerosols

Testing of fibre composites

Based on the technological competencies, the area of testing fibre composite materials has been continuously expanded. The range of services also includes the production of test plates using common process technologies, as well as the precision cutting or machining of test specimens using a CNC milling machine.

- Tensile tests
- Compression test
- Bending tests
- Energy release rate
- Fibre volume content

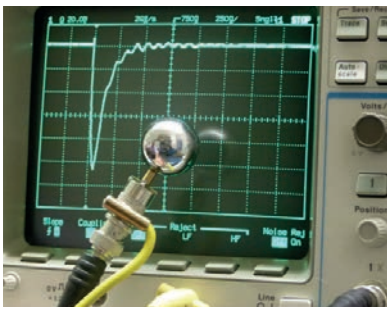
Cargo securing tests

In the field of cargo securing our test portfolio includes testing of textile straps for lashing devices and webbing nets and also the testing of complete load securing systems. Lashing straps are tested both, statically and dynamically, in accordance with the relevant standards. In the case of nets, the test spectrum ranges from nets for protection of personal to air cargo securing nets.

- Tie down straps (load securing on road, water and air)
- Safety nets
- Air cargo safety net 125" x 96"
- Cargo stopper (spider nets)

The range of services of the Saxon Textile Research Institute e.V. (STFI) includes not only tests according to international norms and standards, but also the development of product or application-related test methods. We understand how important a good test can be to the textile material or product development process. Depending on the level of complexity we either develop the procedures mid- and long-term oriented within various research projects or in short-time missions for applications especially designed for the client's needs. For each of your requirements an experienced, interdisciplinary team with a valuable competence in testing exists. Even for the production of possibly necessary parts and elements of the new method a comprehensive mechanical manufacturing lab with CNC machines exists. And all these activities are supported by colleagues coming from important fields like electrical engineering, process or control techniques. We can help you identify an appropriate test standard or develop a new testing methodology to fit your needs.

Electrostatics-Person-Model



Electrostatically dissipative protective clothing must be worn in potentially explosive and inflammable areas. A patented test and evaluation method was developed by STFI in order to assess complete electrostatic dissipative protective clothing systems with regard to the resulting ignition hazards.The aim is to integrate the test method into the currently developed European standard EN 1149-4.
The further development for the range of application of workwear for the electronic´s sector is currently taking place.

Testing method for measuring of the UV-protection of textile welding protective clothing

Welders are exposed at their daily work with high dosed harmful UV(C)-radiation. This results verifiably to cancer-related skin alterations. To date, there is no normative procedure to determine the UV-protection effect of welders clothing. In cooperation with textile manufacturers and other institutes a correspondingly testing and assessment method was compiled, which supply information of the UV-transmission rate and the maximum possible daily wearing time of a ready-made welders clothing. The new method contributes to minimize the health risks of welders.

Protection against grinding sparks

In contrast to the testing and evaluation of the resistance of textiles to welding droplets – standardized since decades - there is currently no normative procedure for checking the protective function against the considerable amount of grinding sparks. In cooperation with textiles and garment manufactures a method for the testing and assessment was developed, which is now under consideration to extend the international standardization for industrial heat and flame protection garments. The new method is highly practice-oriented and allows the visual but also objective evaluation of the protection effect of flame retardant textiles.

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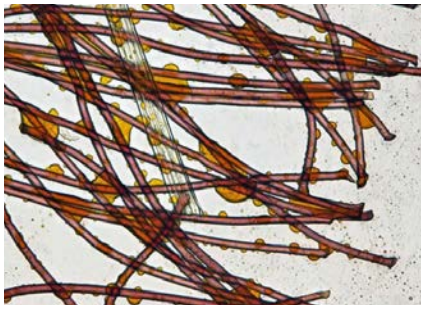
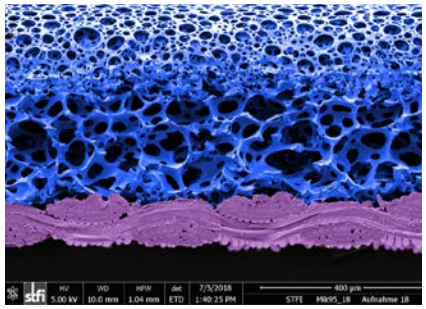
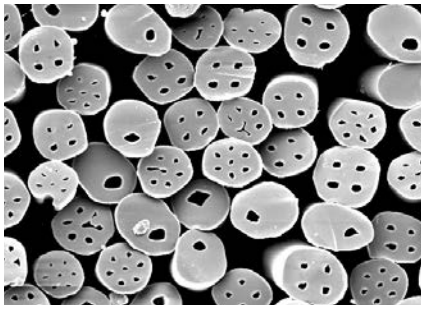

The STFI pools his competence in the testing area. An interdisciplinary team "Analytic Group" is part of the accredited testing laboratory according to DIN EN ISO 17025 and responsible for different textile analyses. To the core competences of the three headed team count fiber- and quality analysis, damage analysis and complaint´s processing as well as surface- and structure analysis. The used measurement equipment is going from preparation technology over several microscopes (e.g. digital microscope, scanning electron microscope, confocal 3D laser scanning microscope) to equipment of the chemical-physical analytics (e.g. rheometer, gas chromatography, dynamic differential calorimetry).

You need help with analyzing of textiles or have specific questions to the topic? The "Analytic Group" is your contact and will gladly help you.

Core competencies

Part of the accredited testing laboratory according to DIN EN ISO 17025

Fibre and quality analysis
- Qualitative and quantitative fiber analysis
- Micro-chemical swelling and dissolution tests
- Grease and oil detection
- Verification of mildew spores
- Melting point determination

Damage analysis and complaint´s processing
- Objective and interdisciplinary working process
- Portfolio of technological know-how in different textile specialized fields

Surface and structure analysis
- Cross sectional- and surface analysis of single fibres, coatings, technical textiles, clothing, composites
- Layer thickness measurement of membranes and composites
- Contact angle measurement (wetting behavior, surface energy)

Technical equipment

Preparation technique
- Microtome and cryo-cutting unit
- Embedding/grinding and polishing unit

Microscopy
- Heating table microscope
- Digital microscope
- Confocal 3D laser scanning microscope
- FT-IR Spectrometer and IR Microscope
- Scanning electron microscope (SEM) with energy dispersive X-ray spectroscopy (EDX)
- Image analysis software

Chemical-physical analytics
- Differential Scanning Calorimetry (DSC)
- Rheometer
- High performance liquid chromatography (HPLC)
- Gas chromatography (GC)
- Contact angle measurement

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Adhesion is important!

The characterization of high-performance fibers (carbon, glass, basalt) regarding to mechanical parameters (tensile stress, modulus of elasticity, elongation) places special demands on testing technology and laboratory staff. Nevertheless, these procedures can be regarded as "established" in the STFI. The additional module FIMABOND from the company TEXTECHNO is a novelty in connection with testing of high performance fibers. With the FIMABOND, single fibers can be precisely embedded in a drop matrix system. Almost all common thermosets and thermoplastics can be used as matrix systems, regardless of their shape (powder, granulate, foils; fibers ...). The pull-out-force and pull-out-lengths are tested in the FAVIMAT. The fiber-matrix-adhesion is an important parameter for the strength of the later fiber composite. This process is used particularly in the context of improving sizing systems.

Storage of textiles in activated sludge

Based on an inquiry about the biodegradability of textiles in an aqueous medium, a special method was developed by modifying the standard method DIN EN ISO 14851 "Determination of the ultimate aerobic biodegradability of plastic materials in an aqueous medium – Method by measuring the oxygen demand in a closed respirometer".

The challenge was that various investigations, including strength, were to be carried out after storage. Due to these follow-up tests, the standard procedure had to be modified. Among other things, it was necessary to increase the volume of the medium and thus significantly enlarge the experimental setup.

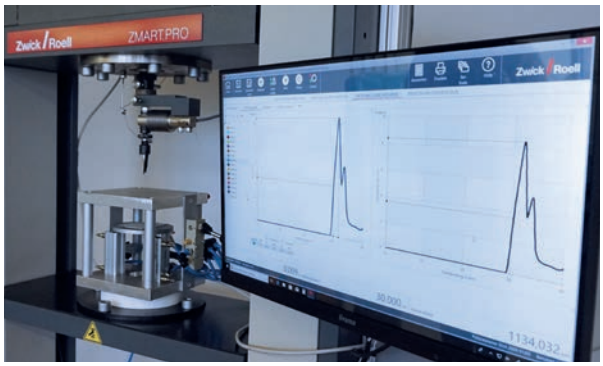
Activated sludge from a municipal wastewater treatment plant was used as the inoculum. The entire experiment was carried out on an interdisciplinary basis in close and constructive coordination between the client, biologists and test personnel. The method developed allows the influence of microbiological action on textile materials to be described very well by follow-up tests, especially with regard to the practical properties required.

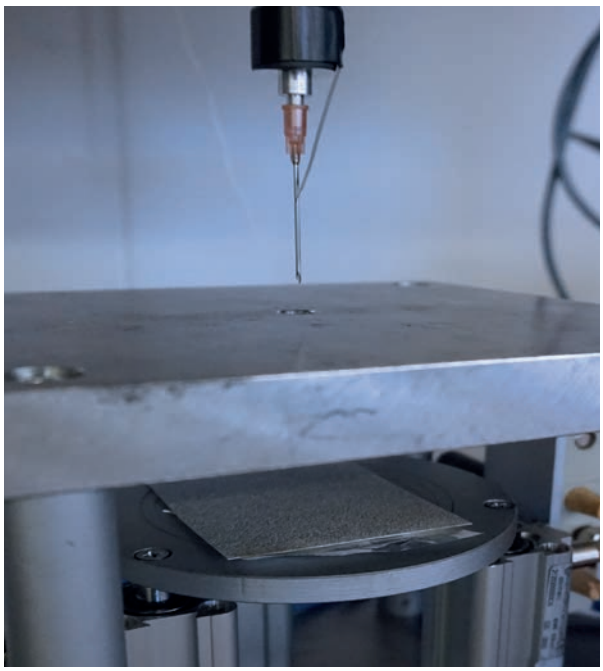
Information & Consulting

- **Training/Education/Qualification**
- **Research for standards**
- **Development/revision of test instructions and test standards**
- **Definition and implementation of technical delivery conditions**
- **Joint training for the occupational profiles of textile and chemical laboratory technician**
- **Standard and individual programmes with a high practical content for qualification and further training for newcomers and career changers in industrial companies, procurement agencies, tendering bodies**

Here we show you the news out of the field of testing at STFI, which can also be sometimes special.
New test devices, new procedures, modified procedures all around the testing.

Puncture test cannula

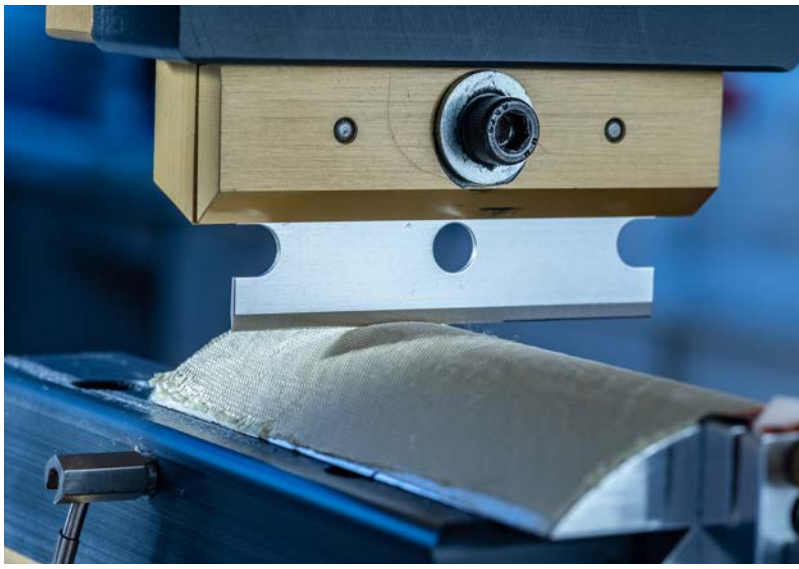


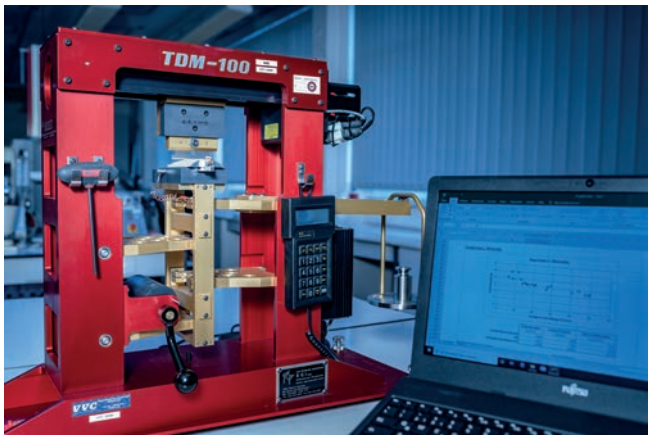


The STFI was involved in the development of a DIN SPEC for determining the puncture behavior using a cannula. The aim of DIN SPEC 91365 was to provide a test method with which materials and products can be examined with regard to their resistance to penetration by a cannula.
Perforation detection is realized via the contact of the cannula with an electrically conductive film after the test material has been completely perforated.

Cutting test DIN EN ISO 13997

With the inclusion of the cutting test according to DIN EN ISO 13997 in the standard for protective gloves (DIN EN 388), the STFI expanded its testing options by purchasing a TOMODYNAMOMETER TDM-100. This is specially designed for testing the cut resistance of protective clothing. The test determines the resistance that a textile material offers when a blade is cut through. The blade is pulled once over the specimen under load until it is cut through. The aim of the procedure is to determine the load at which a cut with a length of 20 mm is created. The result can be classified according to DIN EN 388.





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