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# Tetex.

EUROPEAN TECHNICAL TEXTILES MAGAZINE

**AUTUMN 2017**

## **SMART TEXTILES**

Soft Sensors for Smart Textiles

Textiles Measuring Stress Levels in Pilots

## **BIOMEDICAL SCIENCE**

Labels that Measure Temperature

## **PRODUCT OF THE YEAR**

Hemtek ST by LEISTER

## **ENVIRONMENTAL AWARENESS**

Breaking Biodegradable Barriers

ISSN 2514-7463





# Editorial



Dear Readers,

Our holiday period is coming to an end, so we can use the cumulated energy for opening the last quarter of the year.

...and it is going to be far from boring!

The upcoming months are packed with interesting events – trade fairs, meetings and

conferences regarding technical textiles. They may become a real mine of knowledge and business ideas for the entire year to come.

This issue of the Tetex Magazine is devoted to all those concepts that have recently been used in the sector more and more often. Smart textiles are now a fact and they gradually en-

ter mass production. If you ask yourself where this trend may lead us and how many industries they will be applied in (or are at this point), you will find the answers in this issue! We hope you will enjoy the experience.

See you soon!

*Dorota Sakowska-Hunt*

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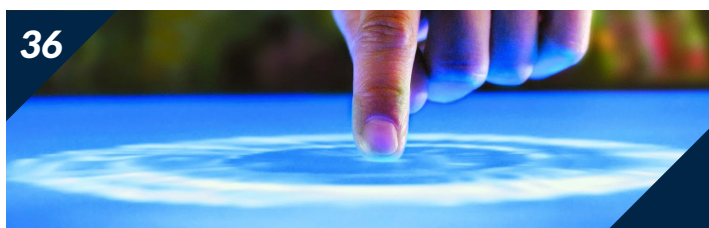
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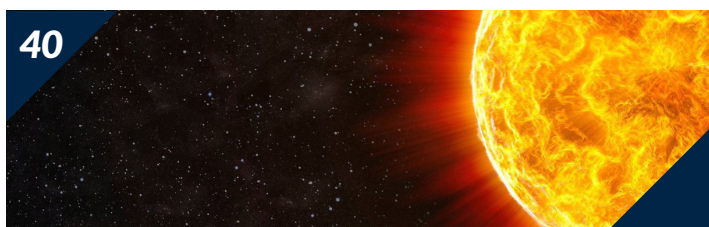
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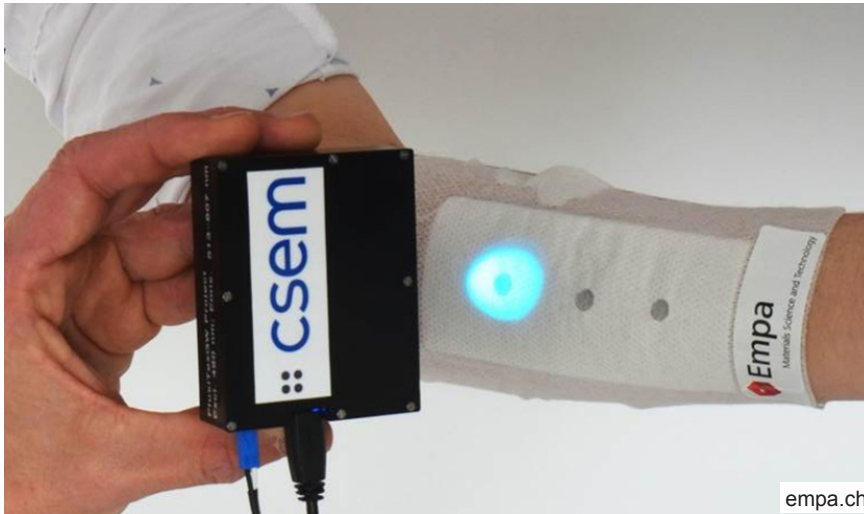


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# The Best Smart Textile Products of 2017

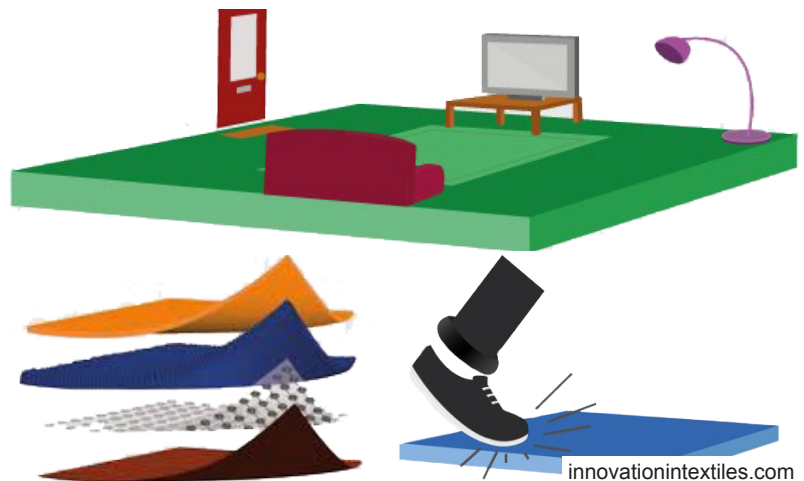


## Smart dressing

Just last year, about \$ 17 billion was spent on materials and procedures related to healing wounds. During wound healing, the body produces specific biochemical substances in a particular order, causing significant changes in numerous metabolic parameters. Each change can be detected by means of special sensors. With this in mind, scientists began work on a portable, cheap and easy-to-use device to measure degree of wound treatment. This dressing also informs the medical staff when the process of wound healing is progressing well. Sensors integrated with the material burn with different intensity, depending on the changes in the pH of the wound.

## Anti-burglary carpet

Although the carpet is still being designed, the idea seems very promising. Hillarys – a manufacturer of furniture and accessories for interior design - has created a series of projects concerning a carpet with anti-burglary properties (according to studies conducted by the company, 64% of respondents indicated that it would be a good idea). Creating such a carpet would require the installation of hundreds of small sensors in its bottom layer. These sensors would “remember” the weight and surface pressure distribution characteristic to family members and pets. If an unwanted person, e.g. the burglar, steps on it, the alarm is triggered.



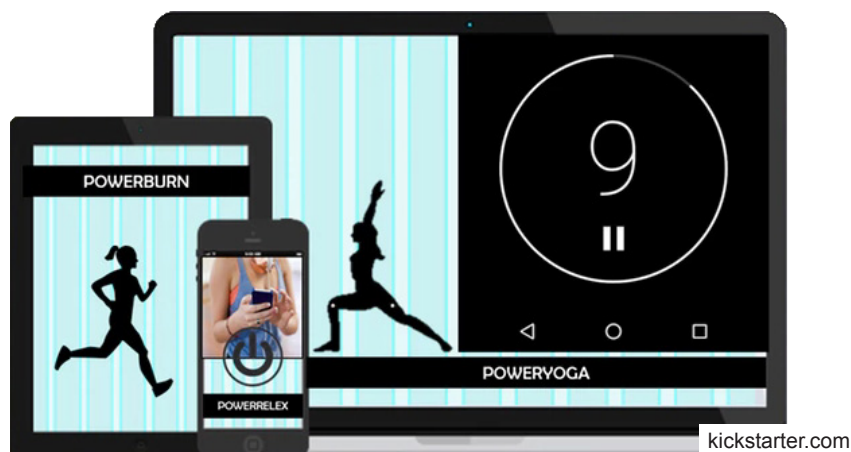
## Headbands improving your sleep experience

We all have problems with sleep from time to time, but many people suffer from a chronic inability to get enough sleep and going to bed early does not help them at all. The Neuroon Open headband is a device that monitors user's sleep (thanks to electroencephalography) in real time, checking for any waves currently operating in the brain. On the basis of personalised information and collected data, the band will adjust the length and quality of your sleep according to your needs. It will specify the time of waking you up and by gradually strengthening the vibrations and LED lights it will gradually lead you from the phase of deep sleep to full awakening.



## Muscle-stimulating shorts

Thanks to the combination of technology and training experience, a product that carves out your muscles even when you are not in the gym has been created. The shorts are equipped with electronic muscle stimulators - a technology with a confirmed positive effect on muscle building. They stimulate your deep muscles and increase the frequency of their contractions. Thanks to this, the effectiveness of your workout increases several times – the developers report that a 20-minute workout in Steelman Powerpants equals 60 minutes of conventional exercise. Those muscle-stimulating shorts may be worn even when carrying out your daily activities – at work, while doing your chores or driving – so the effect is strengthened even more.



## Heated sweatshirt

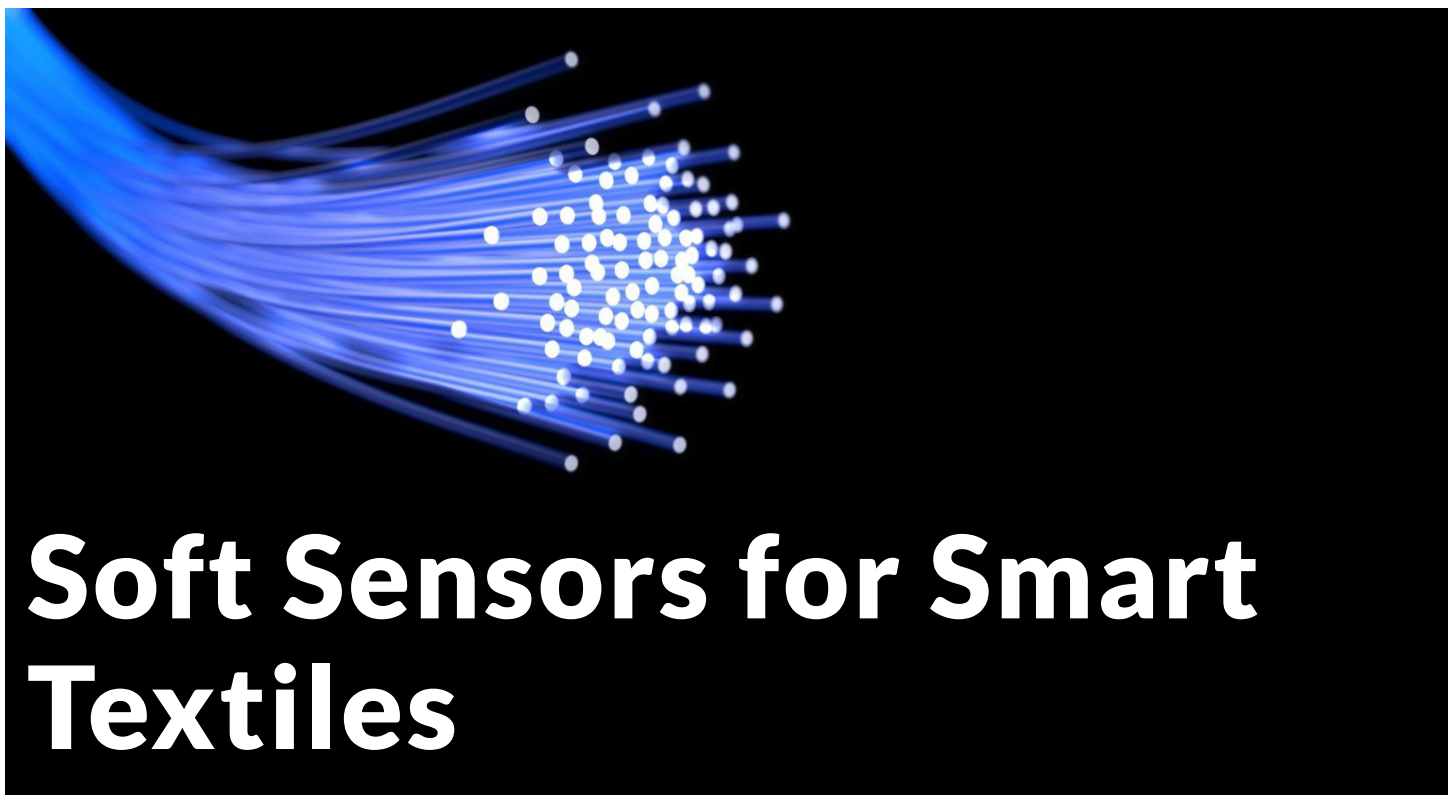
The Polar Seal sweatshirt works in a way similar to portable heaters. Its back is equipped with two heating areas – one on the lower back, the other near the shoulder blades. Using the buttons located in the sleeve, you can fully control your sweatshirt. It has 3 levels of heating and the option of turning on all or selected heating areas. The heated sweatshirt is charged via a regular USB port, with a fully charged battery allowing you to enjoy the pleasant warmth for approx. 8 hours, which is just enough for a long day of skiing or hiking.

## Gloves protecting from vibration

At first glance, these specially designed gloves do not really stand out among others available on the market, they can even be washed in the washing machine. However, the technology used for their manufacturing makes it possible to minimise the risk of hazardous consequences of vibrations emitted by electrottools. Sensors in the gloves, only 2 millimeters in length each, are placed in microparticles and then within the yarn used for making the gloves. When a worker is exposed to dangerous levels of vibration, the gloves notify the wearer that he or she should stop working.



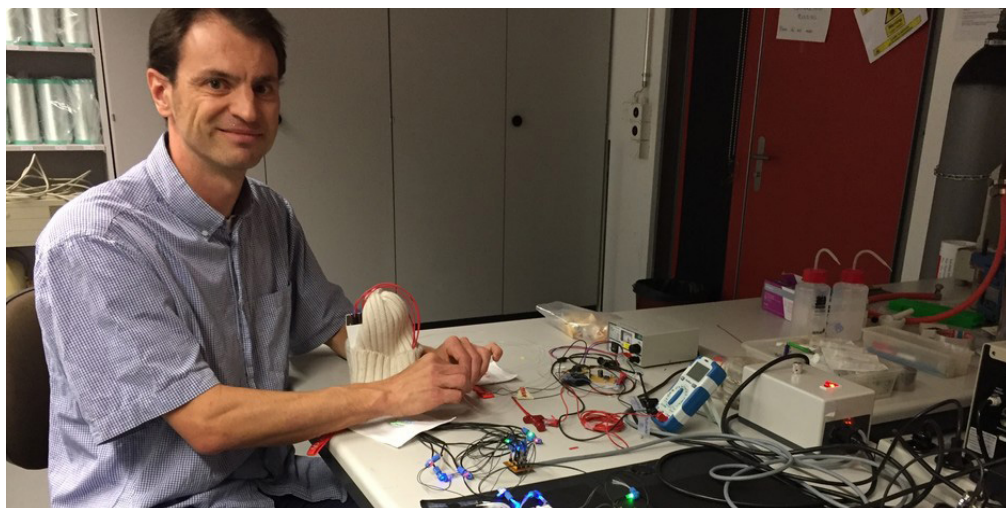




# Soft Sensors for Smart Textiles

Empa researchers have succeeded in producing optic fibers for sensors that are ideal for textiles. This would enable hospitals to monitor whether a patient is developing pressure sores, for instance.

Thanks to a melting technique, the team headed by Luciano Boesel from the materials research institution Empa produced what are known as polymer optic fibers in a particularly flexible form. They used the fibers in a sensor woven into material, which enabled them to measure the heart rate of test subjects. *“Normally, these fibers, which are usually associated with communication technology, aren’t flexible enough”* says Maike Quandt, the first author on the study. If they bend too much, they become damaged. The researchers’ goal was to create sensors that are fully integrated in textiles – in other words, a fiber that can also be sewn and does not break if knotted.





## Also robust in the washing machine

The textile sensor just presented in the Journal of the Royal Society Interface can also be produced industrially and is able to withstand a disinfection wash cycle, as Quandt explains. This makes it just the ticket for the hospital sector to monitor the skin's circulation and prevent bedsores.

The researchers tested their textile sensor in the form of a hat, which enabled them to measure the test subjects' heart rates on their foreheads. *"Normally, you measure the pulse on thin parts of the body, such as a finger or earlobe,"* says Quandt. *"By sending light through the tissue and measuring the light intensity that changes with the pulse as it returns to the detector, however, we can determine the heart rate."*

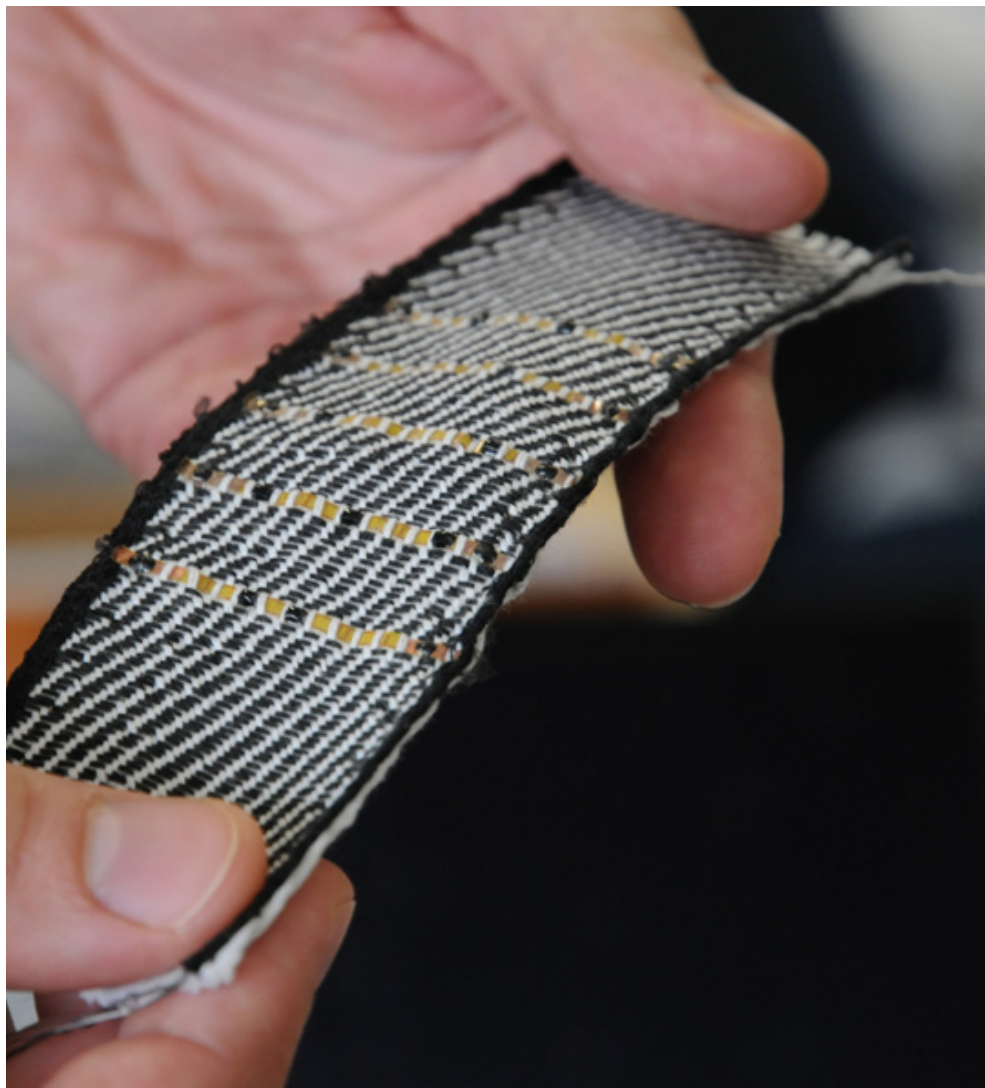
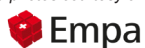
One of the advantages of the new sensor is that it can be used on any part of the body as it measures the reflection of light – i.e. the sensor emits and measures light on the same side of the body. The sensor merely needs to lie on bare skin.

## Other applications in the pipeline

The researchers are now looking to refine their textile sensor so it can measure other data. *"We validated it for the heart rate,"* Boesel told the sda, *"but it would be possible to monitor oxygen saturation or metabolic products with it, too."* Apart from the hospital sector, the sensor might also be interesting for sports clothing, for example – wherever measurements are required without causing any unpleasant rubbing on the skin. The project was conducted in collaboration with the research institute CSEM, Zurich University Hospital and the Swiss Paraplegic Center in Nottwil.

By Angelika Jacobs

Article and photos courtesy of





# Textiles Measuring Stress Levels in Pilots

Smart textile materials will be used to monitor the levels of stress in plane pilots. The idea is executed within the framework of a large European research project involving Nottingham Trent University. The University's Advanced Textiles Research Group, led by Professor Tilak Dias from the School of Art & Design, will study how smart textiles embedded in the seat of the cockpit and pilots' clothing can measure levels of anxiety.

Stress indicators including changing pulse rate, sweating and body temperature will be monitored using a number of sensors embedded in the yarns used for the production of clothing and textiles.



**Professor Tilak Dias**  
NOTTINGHAM TRENT UNIVERSITY  
photo source: ntu.ac.uk





When the heart rhythm is controlled using a system of ECG sensors, it is also possible to monitor fatigue and to determine, for example, the moment of reduced alertness.

Professor Dias commented, "By using smart textiles we're able to provide new prognostic and diagnostic techniques for pilot monitoring in a completely non-intrusive way. This will enable the collection of data which will indicate the psychological experiences a pilot goes through while navigating a plane, potentially through unknown situations."

## Temperature measurement

Temperature measurement will be carried out by means of thermistors and resistance temperature detectors (RTD) embedded in the thread. Yarn able to detect moisture will be developed within the research project.

One of the scientists engaged in the study, Mr Hurley, stated that *"The data collected via the smart textiles technology will be invaluable for the training and development of pilots and help pave the way for new technologies to be integrated into the cockpit quicker."*

*By monitoring a pilot's mental state while testing any new technologies in a simulator, a better understanding can be developed of how these technologies can be integrated into a cockpit."*





# Soft and Stretchy Fabric-Based Sensors for Wearable Robots

**Hybrid silicone-fabric sensor detects fine motor movements by flexing with the body.**

Wearable technologies – from heart rate monitors to virtual reality headsets – are exploding in popularity in both the consumer and research spaces, but most of the electronic sensors that detect and transmit data from wearables are made of hard, inflexible materials that can restrict both the wearer's natural movements and the accuracy of the data collected. Now, a team of researchers at the Wyss Institute for Biologically Inspired Engineering and the Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS) has created a highly sensitive soft capacitive sensor made of silicone and fabric that moves and flexes with the human body to unobtrusively and accurately detect movement.

*"We're really excited about this sensor because, by leveraging textiles in its construction, it is inherently suitable for integration with fabric to make 'smart' robotic apparel,"* says corresponding author Conor Walsh, Ph.D., Core Faculty member at the Wyss Institute and the John L. Loeb Associate Professor of Engineering and Applied Sciences at SEAS. *"Additionally, we have designed a unique batch-manufacturing process that allows us to create custom-shaped sensors that share uniform properties, making it possible to quickly fabricate them for a given application,"* says co-author Ozgur Atalay, Ph.D., Postdoctoral Fellow at the Wyss Institute. This research is published in the current issue of *Advanced Materials Technologies*, and the protocol is available as part of the Harvard Biodesign Lab's Soft Robotics Toolkit.



The Wyss team's technology consists of a thin sheet of silicone (a poorly conductive material) sandwiched between two layers of silver-plated, conductive fabric (a highly conductive material), forming a capacitive sensor. This type of sensor registers movement by measuring the change in capacitance, or the ability to hold electrical charge, of the electrical field between the two electrodes. "When we apply strain by pulling on the sensor from the ends, the silicone layer gets thinner and the conductive fabric layers get closer together, which changes the capacitance of the sensor in a way that's proportional to the amount of strain applied, so we can measure how much the sensor is changing shape," explains co-author Daniel Vogt, Research Engineer at the Wyss Institute. The hybrid sensor's superior performance stems from its novel manufacturing process, in which the fabric is attached to both sides of the silicone core with an additional layer of liquid silicone that is subsequently cured.



This method allows the silicone to fill some of the air gaps in the fabric, mechanically locking it to the silicone and increasing the surface area available for distributing strain and storing electrical charge. This silicone-textile hybrid improves sensitivity to movement by capitalizing on the qualities of both materials: the strong, interlocking fabric fibers help limit how much the silicone deforms while stretching, and the silicone helps the fabric return to its original shape after strain is removed.

Finally, thin, flexible wires are permanently attached to the conductive fabric with thermal seam tape, allowing electrical information from the sensor to be transmitted to a circuit without a hard, bulky interface.

The team evaluated their new sensor design by performing strain experiments in which various measurements are taken as the sensor is stretched by an electromechanical tester. Generally, as an elastic material is pulled, its length increases while its thickness and width decrease, so the total area of the material – and, therefore, its capacitance – stays constant. Surprisingly, the researchers found that the conductive area of their sensor increased as it was stretched, resulting in greater-than-expected capacitance. *“Silicone-based capacitive sensors have limited sensitivity based on the nature of material. Embedding the silicone in conductive fabric, however, created a matrix that prevented the silicone from shrinking as much width-wise, which improved sensitivity above that of the bare silicone we tested,”* says lead author Asli Atalay, Postdoctoral Fellow at the Wyss Institute.

The hybrid sensor detected increases in capacitance within 30 milliseconds of strain application and physical changes of less than half a millimeter, confirming that it is capable of capturing movement on the scale of the human body. To test that ability in a real-world scenario, the team integrated a set of them into a glove to measure fine-motor hand and finger movements in real time. The sensors were successfully able to detect capacitance changes on individual fingers as they moved, indicating their relative positions over time. *“Our sensor’s greater sensitivity means it has the ability to distinguish smaller movements, like slightly moving one finger side-to-side rather than simply whether the whole hand is open or clenched in a fist,”* explains co-author Vanessa Sanchez, a Graduate Student in the Biodesign Lab at SEAS.

While this study is a preliminary proof-of-concept, the team is excited about the many future directions in which this technology could develop. *“This work represents our growing interest in leveraging textile technology in robotic systems, and we see promising applications for motion capture ‘in the wild,’ such as athletic clothing that tracks physical performance or soft clinical devices to monitor patients in their homes. In addition, when combined with fabric-based soft actuators, these sensors will enable new robotic systems that truly mimic apparel,”* says Walsh.

*“This technology opens up entirely new approaches to wearable diagnostics and coupled therapeutics that undoubtedly will pay a central role in the future of home healthcare. It also reflects the power inherent in our focus on collaboration here at the Wyss Institute, as it draws insight and inspiration from both Conor Walsh’s Biodesign Lab and Rob Wood’s Microrobotics Lab, which are central to our Bioinspired Robotics platform,”* says Wyss Founding Director Donald Ingber, M.D., Ph.D., who is also the Judah Folkman Professor of Vascular Biology at Harvard Medical School and the Vascular Biology Program at Boston Children’s Hospital, and Professor of Bioengineering at SEAS. This research was supported by the National Science Foundation’s under Grant No. CBET-1454472, the Scientific and Technological Research Council of Turkey (TÜBİTAK) BİDEB-2219 Postdoctoral Research program, DARPA, and the Warrior Web Program under Award No. W911NF-14-C-0051. Opinions, interpretations, conclusions and recommendations are those of the authors and are not necessarily endorsed by the U.S. Army.

By Lindsay Brownell

Article and photos courtesy of

WYSS  INSTITUTE





# Labels on Medications That Measure Temperature



To preserve their effectiveness, medications should be stored and transported under strictly controlled temperatures. Unfortunately, after they arrive at the pharmacy or are purchased by the patient it is not possible to verify whether those procedures were satisfied during the entire process of production and distribution.

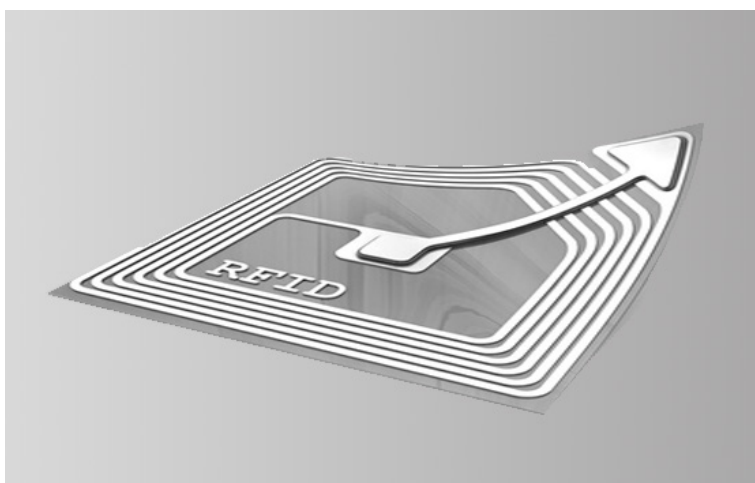
The Polish start-up Smart Textiles has decided to change that. The company developed special stickers that may be pasted on the packaging to "measure" the temperature in which the drugs were stored. This measurement is possible since the stickers are equipped with the NFC technology and RFID radio systems.

## How do those labels on medications work?

When the medication arrives to the receivers, they can use a smartphone and a mobile app to check the conditions in which it was stored and, consequently, if it is still suitable for use.

The project met with very positive feedback not only among patients, but manufacturers as well. The latter are usually blamed for any faults in the final product, while in some cases it should actually be shifted to, for example, the shipping company. The stickers would therefore protect producers from high costs they incur in the event of an error.

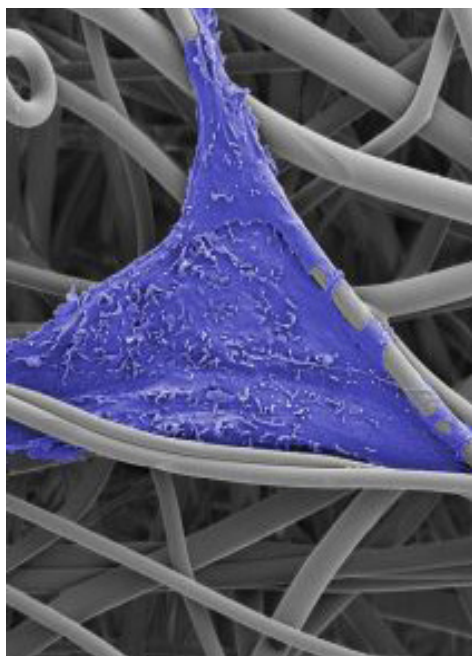
In the near future, Smart Textiles will release a test version of their stickers. The price will reach approx. 20 cents apiece.





# Sustainable Biomedical Textiles for the Future

The textile and clothing industry has a long history in Switzerland. In order to remain competitive in the international market, the industry relies on innovations. The “SUB-ITEX – Sustainable Biomedicine Textiles” research initiative was set up by Empa and Swiss Textiles, the Swiss textile industry association, for this very purpose. Through innovative approaches and knowledge transfer, researchers and players in the industry are working tirelessly together to promote innovations in the field of biomedical textiles, and to bring them to the market more rapidly.



Textiles are especially suitable for use on and in the human body. The body itself consists of many fibers too, including muscle, tendon and nerve fibers. Textiles can also be used to make copies of entire organs or parts of them. One current example of this is a major project involving Empa, called “Zurich Heart”: under the aegis of the Zurich University Medicine initiative, in collaboration with the University Hospital, the University and ETH (Swiss Federal Institute of Technology) Zurich, Empa researchers are developing an artificial heart pump. This will include a fleece textile with a layer of heart muscle cells, which will not be detected by the blood as a foreign body.

*“We need to say goodbye to the idea that the development of textiles revolves around cotton T-shirts”,* says René Rossi, Subitex project manager and head of Empa’s Biomimetic Membranes and Textiles lab. Instead, according to Rossi, their research is focused on a very wide range of ceramic, metal, wood, and synthetic fibers.

*“A textile is not just a cloth either, but rather a two-dimensional entity derived from a one-dimensional material: a fiber,”* he adds. The entities derived from this are flexible, malleable, stretchable, and light knitted, woven, or crocheted fabrics. Rossi continues: *“Theoretically, there are no limits to textile materials or their properties.”*



Many Swiss textile companies have also recognized this, successfully transforming themselves into specialist manufacturers of highly technical and high-quality products. They have networked more and more intensively with researchers and have skilfully occupied economic niches. Empa offers its services as a research partner precisely because it draws a line from basic research, as in the case of the “Zurich Heart” project, all the way to products that are close to the market. For example, it has developed optical fibers that are used in hospitals to measure the vital functions of premature babies, or as biosensors with pH-sensitive fibers to monitor wounds.

Other examples of applications include textile pressure sensors that can be installed in wheelchairs, for instance, in order to show incorrect pressure loads; textile plasters that release medication in a targeted way; and a wettable chest strap that can be reliably used for long-term monitoring of electrocardiograms for cardiovascular patients.





## A Research Initiative with 15 Industrial Partners

In order to promote further innovations and make even better use of the vast all-round potential of textiles, Empa and the Swiss industrial association, Swiss Textiles, established the "SUBITEX" research initiative two years ago. The development and use of innovative materials, fibers, fabrics and processes should assure Swiss textile companies a long-term competitive advantage in the global market. As part of this initiative, ten projects co-financed by the Commission for Technology and Innovation (KTI) have already been launched. Fifteen textile companies have now joined the initiative, including Flawa AG, Cilandar, E. Schellenberg Textildruck AG, Mammüt Sports Group, Schoeller Textil AG, Serge Ferrari Tersuisse AG, and TISCA Tischhauser & Co. AG.

So that it can pass on even more textile expertise to Subitex partners, Empa has invested part of the financial contributions from Subitex in the "Self-care materials" research program of the Competence Center for Materials Science and Technology (CCMX) of the ETH domain. This program investigates the substance emission and absorption properties of fiber structures. The CCMX program is a mix of basic and industrial research and is extremely lucrative, because the Swiss National Fund (SNF) contributes the same amount to the program as that contributed by the industry.

For this purpose, Empa's electrospinning and microfluidics systems develop fiber systems from smart polymers. These systems respond to external influences such as temperature, pH value, humidity, or pressure. Today's systems use small, passive capsules that can only release substances by decomposing. What makes self-care materials special is that their innovative fiber systems release substances in a targeted way over a specific period of time when they are "activated". Very small fibers made from smart polymers can be used not only in biomedical textiles and fabrics, but also in packaging films for the food industry.

By Martina Peter

Article and photos courtesy of



# SGIA Judges Award HEMTEK ST 2017



Leister Technologies AG, the worldwide leader in plastic welding and hot-air equipment, is proud to announce its HEMTEK ST banner welder has received the Specialty Graphic Imaging Association's (SGIA) Product of the Year Award in the Finishing – Equipment – All Others category.

More than 70 companies competed in the 2017 Product of the Year Awards, submitting 222 entries over the competition's 49 categories — the largest field of competitors in the awards program's history. All entries will be displayed in the Golden Image Gallery at the 2017 SGIA Expo (New Orleans, October 10–12). Ray Weiss, SGIA's Digital Imaging Specialist, coordinated the yearly awards program and said competition was tight.

*"This was the best year for entries that I can remember," Weiss said. "In addition to the sheer volume of competitors, product quality was outstanding. Leister Technologies' award was well-earned!"*

The capabilities of the affordable, new HEMTEK ST stationary welder include hem welds, pole pockets, and hems with rope. Users of the machine quickly can weld promotional banners or tarpaulins from corner-to-corner in a single pass with ease.

The coveted Product of the Year jewel awards will be presented in a special ceremony Monday, October 10, in conjunction with the 2017 SGIA Expo, and exhibitors will be able to display them in their booths.

Leister Technologies AG has been the worldwide leader in plastic welding and hot-air equipment for more than 65 years. The Swiss manufacturer's plastic-welding products are used in roof







sealing systems, floor coverings, plastic sheeting, earthworks, hydraulic and tunnel engineering, process equipment manufacturing and for vehicle repair; its process heat products are used for activating, heating, curing, melting, shrinking, welding, sterilizing, drying and warming.

Leister's global headquarters is in Kaeiswil, Switzerland with sales and service centers in more than 90 countries. With a commitment to quality, the company is ISO 9001 certified, and develops and produces all its products and accessories (more than 10,000 items) on its own state-of-the-art manufacturing premises.

Leister Technologies LLC Headquartered in Chicago, Leister Technologies LLC is a subsidiary of Leister Technologies AG. It supports the sales and service of Leister's full line of process heat, plastic welding, laser and microsystem products through its wide network of distribution partners across North America.

SGIA — Supporting the Leaders of the Digital & Screen Printing Community Having its origins in the screen printing industry, SGIA embraced the digital revolution early on and is now the trade association of choice for professionals in the industrial, graphic, garment, textile, electronics, packaging and commercial printing communities looking to grow their business into new market segments through the incorporation of the latest printing technologies. SGIA membership comprises these diverse segments, all of which are moving rapidly towards digital adoption. As long-time champions of digital technologies and techniques, SGIA is the community of peers you are looking for to help navigate the challenges of this process. Additionally, the SGIA Expo is the largest trade show for print technology in North America. *"Whatever the medium, whatever the message, print is indispensable. Join the community — SGIA."*

Source

**LEISTER**

# The Cutting-Edge Solution in Reinforced Tarpaulins!

**The Saplan – High Security anti-burglary tarpaulins are an innovative security solution for securing semitrailers and warehouses.**

This system is based on steel cords providing double protection:

- mechanical - against cutting with sharp tools
- electronical – alarm starts when the circuit breaks

## Mechanical protection

The system is based on two rows of steel cords. Depending on the installation needs, the cords may converge in one or two separate spots. Steel cord insulated with a 0.9 mm braid is permanently heat sealed to the BS900 tarpaulin.

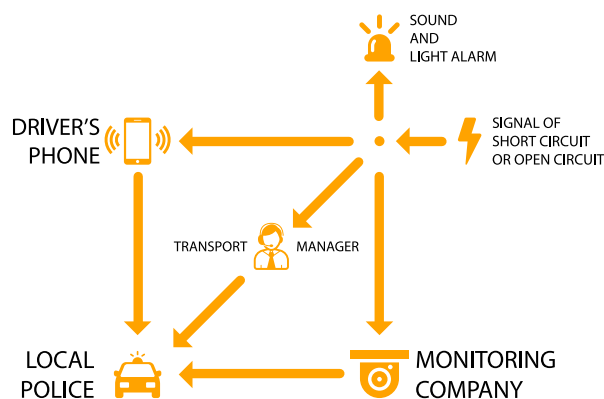
In the basic version for semitrailer sides and tent halls, Saplan – High Security is reinforced with steel cords forming a grid intersecting at right angles. There is also a version dedicated for trailer roofs – CAROPLAN.

## Electronical protection

The system has an in-built anti-sabotage system reacting to abnormal overload suggesting an attempt to damage the tarpaulin or its uncontrolled displacement. In the event of cutting or damaging the circuit, the system triggers a sound and light alarm. Additionally, a notification is sent to the monitoring company, relevant authorities, dispatcher and drivers. The system is also equipped with its own power system, loaded while driving, which can power the system up to 35 days.

## GPS system

The system is equipped with a GPS module, which uses the GSM/GPRS network to plan and monitor the route in real time. In case of theft, it makes it possible to locate the semitrailer. Also, it informs about leaving the previously set route/area. The system has the additional A-GPS function, which supports the GPS network wherever the signal is weaker.



SAPLAN - High Security had its first run during Frankfurt, Techtextil 2017 where it met with a big interest from visitors and customers.



## Why choose Saplan – High Security?

- Innovative patented system of reinforcement
- Double protection – mechanical and electronical
- Certified alarm system lowering the costs of fleet insurance
- Customisable tarpaulin size
- Very good tarp flexibility
- Best price on the market
- Wide colour range (all colours of BS900 fabric)

### BS900



900 g/m<sup>2</sup>



650/500 N



29 | 58 cm



210 cm

1003	3002	5002
6026	7038	7500
9005	9016	PRINT 9917



## REINFORCED MATERIALS



SAKOPLAN-HIGHSECURITY

CAROPLAN

SAKOTEX

SAKOPLAN



**SAKO**  
EXPO  
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[www.sakoexpo.com.pl](http://www.sakoexpo.com.pl)







## WORLD OF UNIQUE PROMOTIONAL BAGS FOR YOUR COMPANY

We live at a time when the concern for the natural environment has become not only fashionable but even necessary due to the growing number of waste which very often requires utilization using toxic chemicals. Allbag company has set itself a goal to take care of our Mother Earth by offering environmentally friendly advertising bags.

Taking care of the natural environment has become the necessity. Not only consumers should bear it in mind, but first of all, this is the role of entrepreneurs and business owners to promote ecological behaviour among people as we use their services every single day. As a matter of fact, the greater number of products on the market, the better infor-med and conscious consumers we are.

In Allbag company a large-scale effort has been made to produce paper bags which are considered 100% ecological and the ones which are ideally suitable for advertising industry. Besides being environmentally friendly our bags have yet another advantage - they are reusable, as contrary to single-use plastic bags. Strength and durability of our bags are their main attributes. Even in the event of any damage our bags are fully recyclable and thus minimize waste on our planet.

As one may perceive, purchasing material bags is also indicative of our proecological attitude. In this way, we take a common responsibility toward present and future generations. Allbag company produces bags which are made of high quality materials.





As a result, our clients can be certain to receive a fully worth product which will serve them reliably for a long time. It is worth adding that our product assortment includes paper bags which are approved for contact with food and have all the necessary certificates required in Europe and America. All bag cotton bags are made of Calico, the staple 100% cotton fabric whose ecological values have been approved by TUV-Rheinland Certificate. This way, not only do we tailor our services to the needs of our clients but we also ensure a responsible attitude towards environmental standards.



Cotton bags are sewn using the highest quality Calico fabric. The entire production process takes place in Poland. For that reason, by purchasing our products the clients support the development of the Polish economy and receive the product which fully complies with the European standards. The standard models of bags which enjoy huge popularity with customers measure 39x41 cm and have a long handle. We also make bags according to individual orders, which may include non-standard dimensions and shapes. Our clients can add any sewing accessories to their bags such as a pocket, a zip, snap fasteners and choose the suitable bag bottoms, bag gussets or the handles with the minimum quantity of 100 pieces.

Cotton bags are made from twelve different colours of Cotton drawstring rucksacks also constitute an important cotton (including ecru cotton Calico fabric). Upon request, part of our product range. They are made of Calico fabric we can dye the fabric with any colour with the minimum quantity of 3000 pieces. It should be noted that, having been made from Calico fabric, which is not chemically adjusted for washing, the cotton bags are not suitable for mechanical or dry-cleaning techniques. Besides single-coloured cotton bags, our offer also includes cotton drawstring storage bags for jewelry and little things, as well as the aforementioned Calico bags and full printed bags. with the weight from 125 to 140 g/m<sup>2</sup>. Currently, we have four color versions of rucksacks: ecru, white, black and red.





# Sustainable Solutions at Both Ends of a Product Lifecycle



## DuPont is advancing eco-efficient, high-performance textiles with Apexa® and Sorona® fibers

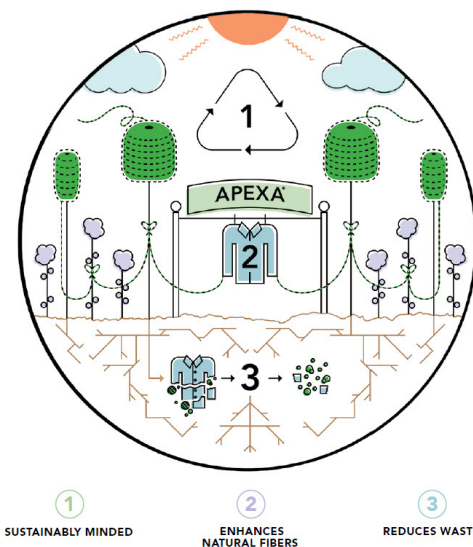
With innovation and technology driving performance and versatility, the textile industry has undergone an important evolution over the past several years. Yet despite these important strides towards elevating textile materials, environmental impact remains a key challenge that the industry has yet to overcome. Waste in the textile industry is not a new issue, but it is one that is growing significantly. By 2030, fashion waste from production and consumer disposal is expected to increase by 60 percent. Additionally, only 20 percent of apparel is recycled at end-of-use<sup>1</sup>. Cost barriers and other challenges have created major hurdles in the wide-scale adoption of textile recycling, signifying a significant need and opportunity to develop innovative solutions to address the current and rapidly growing waste issue.

The need for thoughtful, responsible and sustainable solutions to manufacturing textiles is critical, and through a series of revolutionary textiles, DuPont is committed to driving innovation to reduce environmental consequences and make a transformational impact on the textile industry for the long term.

## Naturally Sustainable By Design

DuPont takes cues from nature to create eco-efficient materials that not only diminish negative effects on the environment, but also enhance the performance of end-use products. A reduced environmental footprint does not have to sacrifice important product attributes, and can in fact elevate them, whether softness or durability, stretch or insulation. With DuPont's textile innovations, products can be both eco-efficient and high performing.

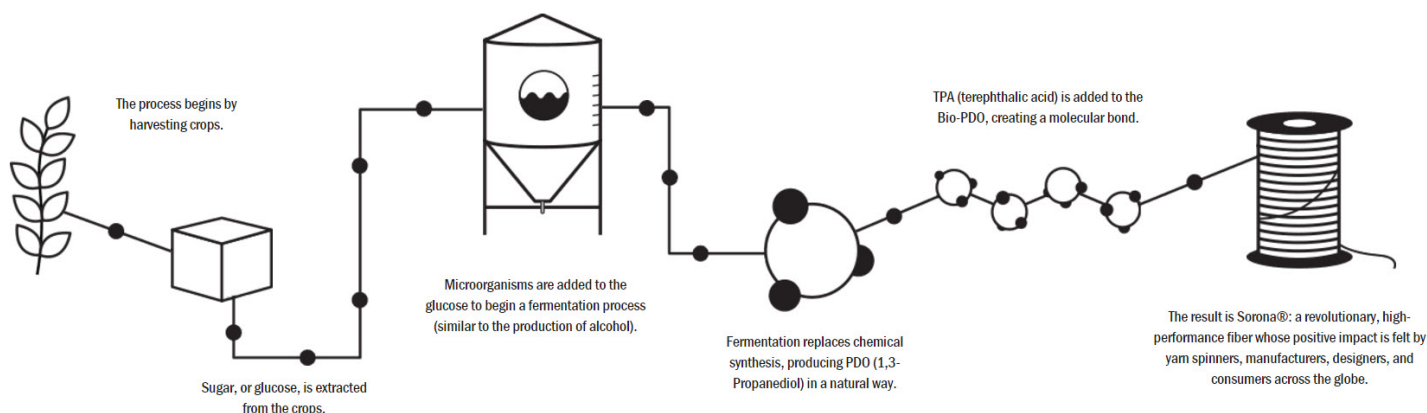
DuPont is assessing the lifecycle of products and driving advancements both at the beginning and at end of a product's life. Within apparel, DuPont has developed two groundbreaking technologies that complement each other and offer solutions at both ends of a product's lifecycle.



## Bio-Based at the Beginning

To elevate sustainable options for textile sourcing, DuPont has developed Sorona®, a bio-based fiber that is made from 37 percent annual renewable plant-based ingredients, combining sustainability and performance for a versatile and eco-conscious fiber. The production of Sorona® reduces dependence on fossil fuels and emits fewer greenhouse gas emissions compared to other petroleum-based products like nylon, providing environmental efficiency benefits throughout the supply chain.

In addition to its eco-innovation, Sorona® offers high-performance benefits that brands and consumers have come to demand. Its properties range from superior softness, excellent stretch recovery, UV protection, moisture wicking and durability, with applications that include athleisure, ready-to-wear, luxury fashion, outdoor gear, insulation, denim, intimate apparel and swimwear.



## Breaking Biodegradable Barriers

Complementing Sorona® and its eco-efficient solution at the beginning of a product's life, DuPont has also pioneered a breakthrough fiber that provides a sustainable option at the end-of-use. Developed through patented and innovative technology, Apexa® is a biodegradable polyester that fully decomposes and breaks down into simple CO<sub>2</sub> and H<sub>2</sub>O via an industrial composting process. While it can be recycled, incinerated or landfilled, Apexa® is intended primarily for disposal by composting and in-soil degradation. The fiber allows for biodegradation as Apexa® monomers create weak spots in the polymeric chains, making them susceptible to degradation through hydrolysis. Moisture cleaves the large polymer molecules into small ones, which are then consumed by naturally occurring microbes and converted to carbon dioxide and water. The process has been tested to ensure there is no harm to the environment during every stage of decomposition.

In addition to reducing waste and impact on the environment, Apexa® blends with sustainable natural fibers – such as cotton, wool, cellulose or silk – with enhanced strength, softness and durability. It adds a smoother feel, dyes easily for vibrant and fade-resistant color, and most importantly, proves that performance and sustainability do not need to be mutually exclusive.

## Sourcing Sustainably

DuPont's textile innovations validate biotechnology's positive impact on textiles, specifically in improving sustainability while enhancing performance. Compared to traditional synthetic fibers, both Sorona® and Apexa® elevate performance attributes, with reduced environmental impact to help solve the growing textile waste problem. As the apparel industry remains a main contributor to pollution and waste, sustainable textile sourcing will become more critical for the entire supply chain to commit to and adopt.



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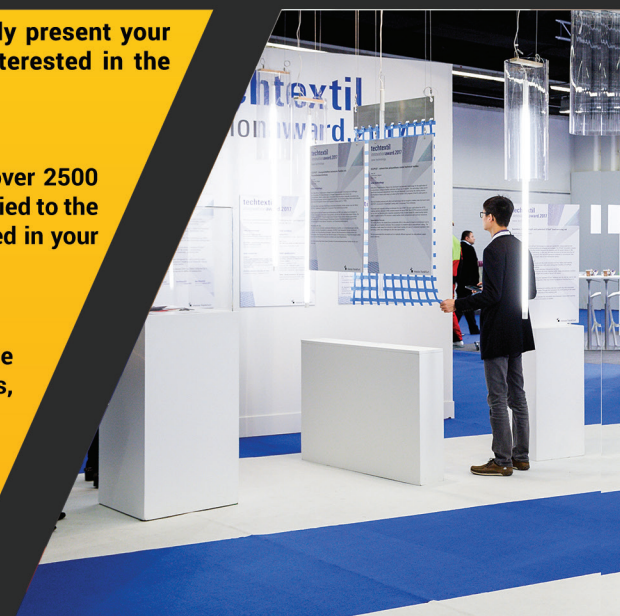
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# EcoVero™ Fibers – New Industry Standard in Eco-Friendly Viscose

**EcoVero™ branded viscose fibers achieve the next milestone in Lenzing's sustainability journey by offering eco-friendly viscose with the lowest environmental impact in the industry**

## **Rising consumer awareness of environmental awareness**

The environmental awareness of consumers has been growing steadily over the last decade, more recently in the fashion and textile industry. Textile consumption is expected to double by 2025, and the industry is anxiously looking for more sustainable solutions with minimal eco-footprint. Achieving low environmental impact requires developing eco-friendly raw materials and a sustainable manufacturing process.

Lenzing addresses this unmet market need for more sustainable viscose by launching EcoVero™ fibers that set a new industry standard in sustainable viscose based on three pillars: the use of sustainable wood sources (FSC® or PEFC® certified), an ecological production process (significantly lower emissions and water impact than conventional viscose), and full supply chain transparency by identifying EcoVero™ fibers in the final product.

## **EcoVero™ fibers - use of sustainable wood sources**

EcoVero™ fibers are made from wood, a natural and renewable raw material. The wood comes from sustainable forestry plantations that are certified by industry-leading associations such as FSC®. Lenzing has a comprehensive wood sourcing policy that goes above and beyond the call of duty to ensure that the most sustainable wood sources are used for viscose production.





## EcoVero™ fibers - significantly lower emissions and water impact than conventional viscose

Lenzing enforces strict environmental standards during viscose production and has invested millions over the years to achieve eco-friendly production process. For example, Lenzing's viscose production sites where EcoVero™ fibers are produced comply with the stringent guidelines of the EU Eco Label, a world-leading environmental manufacturing standard.

The EU Eco Label is a sign of environmental excellence and is awarded to products and services meeting high environmental standards throughout their lifecycles: from raw material extraction to production, distribution and disposal. In addition, the flagship viscose production in Austria uses a significant amount of renewable bio-energy in the manufacturing process.

## EcoVero™ fibers - full supply chain transparency

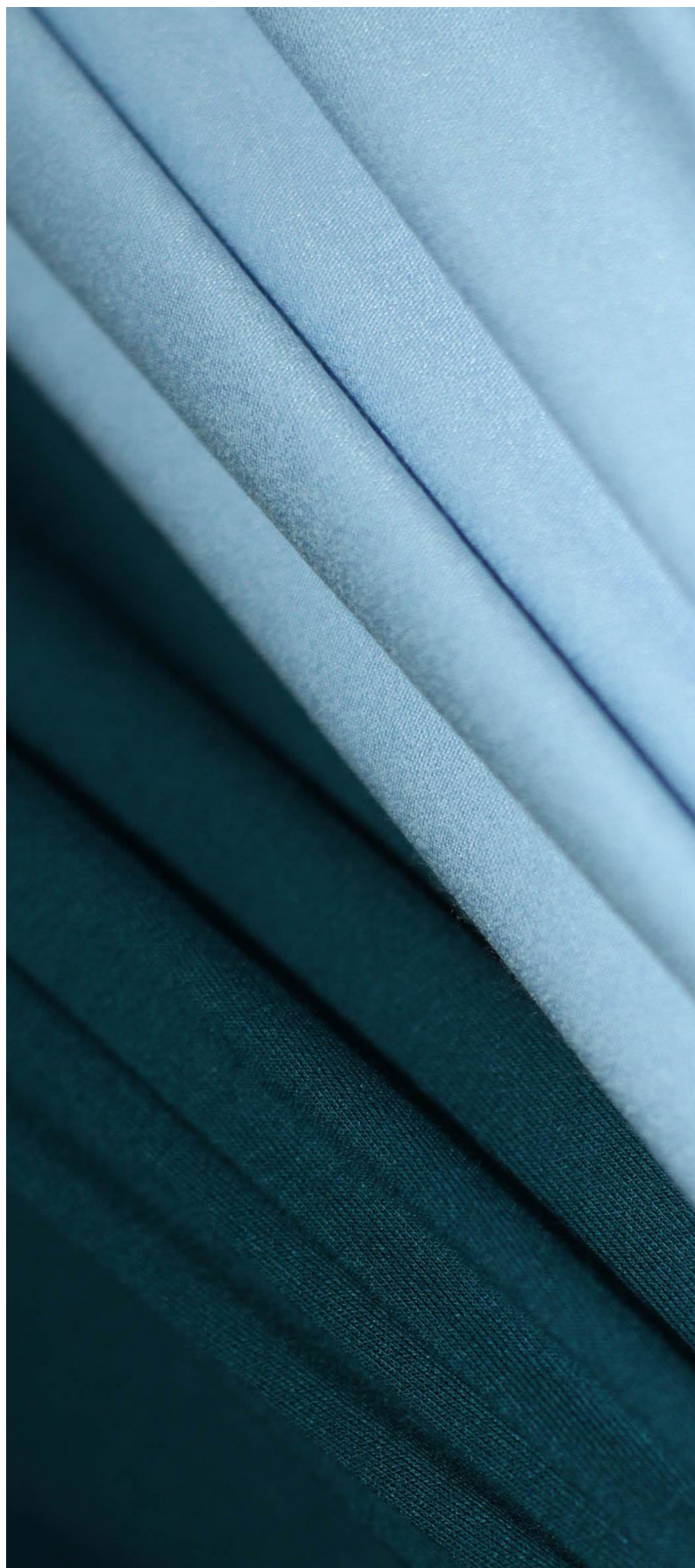
With EcoVero™ fibers, Lenzing launches one of the most environmentally friendly viscose fibers. A special manufacturing system enables us to identify EcoVero™ fibers in the final product, long after the textile processing and conversion steps. Thus, retailers and brands are fully assured that they are indeed incorporating the eco-friendly viscose, and not a generic market viscose. *"With this special identification technology for EcoVero™ fibers, we are supporting the trend in the fashion industry towards greater transparency. It is becoming increasingly important to know where the products come from and which path they have covered,"* Robert van de Kerkhof, Chief Commercial Officer, explains.

## Marketing Service for EcoVero™ fibers

EcoVero™ fibers, our next milestone in Lenzing's sustainability journey, offer an extensive marketing service package and are part of Lenzing's Branding & Licensing Program. Fabrics containing EcoVero™ fibers can be certified at our in-house certification centers in Europe and Asia.

## Launch of EcoVero™ fibers in autumn 2017

The new EcoVero™ fibers will be launched at the global textile trade shows from autumn on. Right now the sampling phase has started and special customers are developing products using EcoVero™ fibers.







# Polygiene and Sinterama First to Launch 100% Recycled Permanent Odor Control Technology at Fiber Level

Polygiene, the world leader in odor control and freshness technology, have developed, together with Sinterama, the European leader in polyester yarn production, a 100% recycled fiber “NEWLIFE” with Permanent Odor Control Technology as opposed to standard topical application in the yarn and fabric finishing stages. Featured in Sinterama’s Newlife™ range, the process offers customers a 100% post-consumer recycled, anti-bacterial yarn. As the yarn is treated at fiber-level it will bring considerable benefits to the customer in terms of odor control, easy care and longer lasting garments, and open opportunities for the two brands in important categories: workwear and the care-sector, with potential to develop into other categories as well.

Polygiene Permanent Odor Control™ – a silver chloride derived from recycled silver from electronic waste - inhibits and guards against the growth of odors arising from microbes such as bacteria and fungus. Bad smells develop when odor-causing bacteria settle into the fabric, mix with sweat and multiply. The treatment is permanent and products treated with Polygiene stay fresh and remain hygienic between washes, earning Polygiene’s tagline “Wear More. Wash Less®”.

Sinterama’s Newlife™ is a unique, complete and certified system of recycled polyester filament yarns coming from 100% post-consumer PET bottles sourced and processed into a polymer through a mechanical process and spun into yarn exclusively and entirely in Italy that is also 100% recyclable at the garment level. This whole process constitutes Sinterama’s proprietary High Tech Conversion Model (HTCM) which has become a benchmark in mechanical recycling.

Christian von Uthmann, Polygiene CEO says, “we’re excited to begin working with Sinterama as this will open new doors for us in categories where we see large growth potential. The care sector where we first started, as well as the corporate/workwear industry will both benefit as Polygiene treated fabrics will be capable of withstanding industrial level laundering. In addition, the shorter lead-times with the ability of pre-treated fabrics to be stored and colored is an exceptional market advantage to an even wider audience.”

Guglielmo Fiocchi, Sinterama CEO says, “we are very proud of the cooperation with such an innovation leader as Polygiene. The agreement fits perfectly with the tradition and the strategy of Sinterama to develop and innovate constantly, giving our customers durable, healthy, green solutions, with additional features to delight the end user”

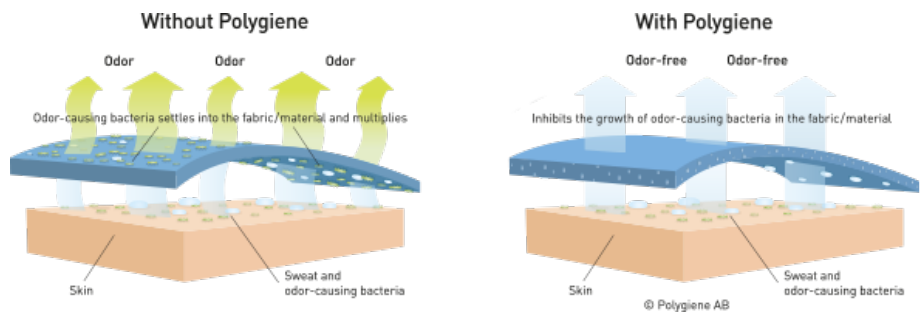
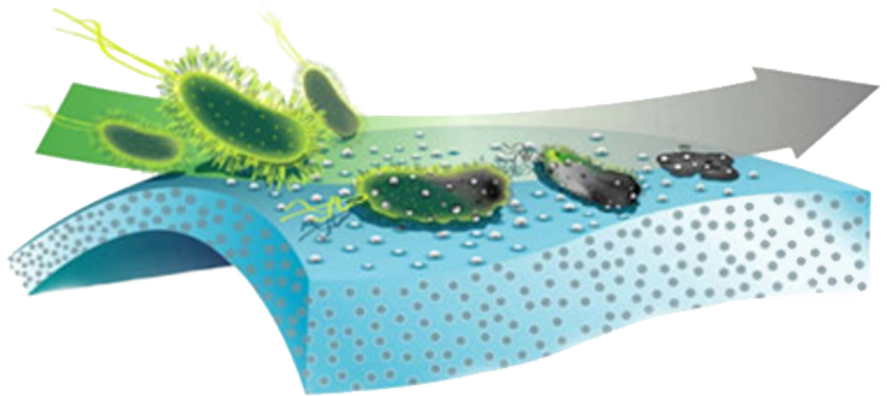
This advancement will deliver a number of consumer benefits:

- Polygiene is a permanent treatment. It cannot be washed out however many washes and repeated wear it undergoes. However, a yarn's outer surface is subject to abrasion. By adding Polygiene to the yarn fibers, the wear and tear damage is minimized, keeping treated garments odor free for the life of the fibers (in the garment).

- By treating the fibers, products can be washed at higher temperatures, a key benefit to the healthcare and workwear industry.

- Highlighting the companies' shared recycled green stories and Polygiene's wash less ethos, users of Newlife™ with Polygiene can expect to stay fresh irrespective of the washing temperature and number of times they have worn the garment.

Sinterama sees the application appealing to a number of sectors. Matteo Soppera, Head of Product Marketing notes, *"marrying together Polygiene technology and Sinterama's experience in recycled, high-tech polyester filament yarn, is a new concept for the textile market and will offer our customers improved performance"*.

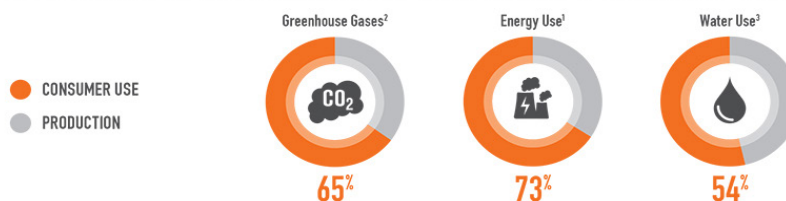


Source  
Polygiene®  
STAY FRESH

**2/3** OF THE ENVIRONMENTAL IMPACT OF APPAREL OCCURS DURING CONSUMER USE<sup>1</sup>

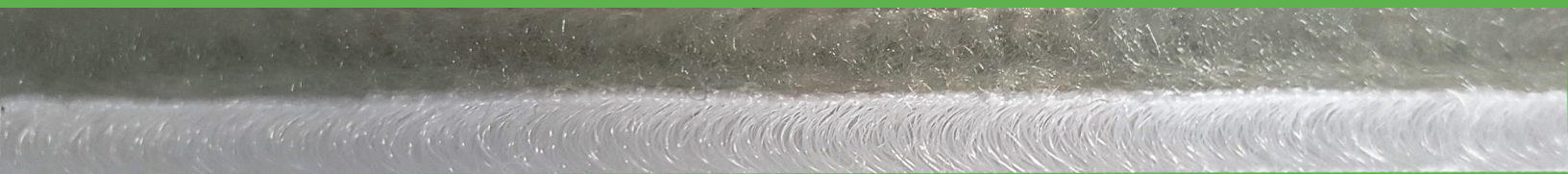


#### BREAKDOWN OF ENVIRONMENTAL IMPACT DURING A GARMENT'S LIFECYCLE





# New Generation Restorative Component Ecological Substitute of PUR Foam



The TSH-Tarczynski company, holding more than 10 years of experience in distributing fillings for furniture and automotive industries, incorporated a new line of composite materials into its offer.

AIRKNIT-Hightech nonwoven is a product used mainly for car seats by brands such as Mercedes, Audi or BMW, and furniture cushions, such as the ones found in office chairs. The nonwoven fabric is laminated with a 3D fabric, creating the so-called "Sandwich variant – e-Air component", owing its name to the resulting layered structure.

The uniqueness of the material is determined by its special properties. They meet all quality and humanoecological requirements applied to products used in furniture and automotive industries, including the main one – direct contact with the skin.

Specific vertical arrangement of AIRKNITU fibres and the 3D fabric enables the AIRKNITU spacer layer to maintain the flow of air and heat, transported later on to the flexible bottom ventilation layer, the so-called 3D fabric.



### The main advantages of e-Air components are:

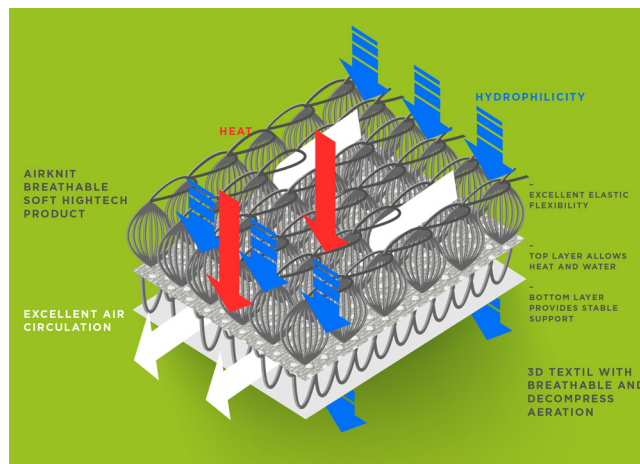
- The component is tailor-made for lamination with upholstery fabrics
- Flexible seating component "Non Wovens"+3D fabric
- Environmentally friendly replacement of foam in car seats
- Delivers high standard and comfort of use
- Scarce heat emission
- Excellent air circulation
- Breathable thermo-regulating area
- Excellent localised flexibility
- The product is fully recyclable, so it is not harmful to the environment.

e-Air components are currently in the testing phase, but have already collected some positive feedback.

They have been tested in particular in the automotive industry, but also as air-pads under horse saddles to improve cushioning and fix possible defects of saddles.

### Potential areas in which e-Air components may be used:

- automotive
- upholstery fillings
- foam mattress fillers (ventilation areas)
- ventilation panels in borders



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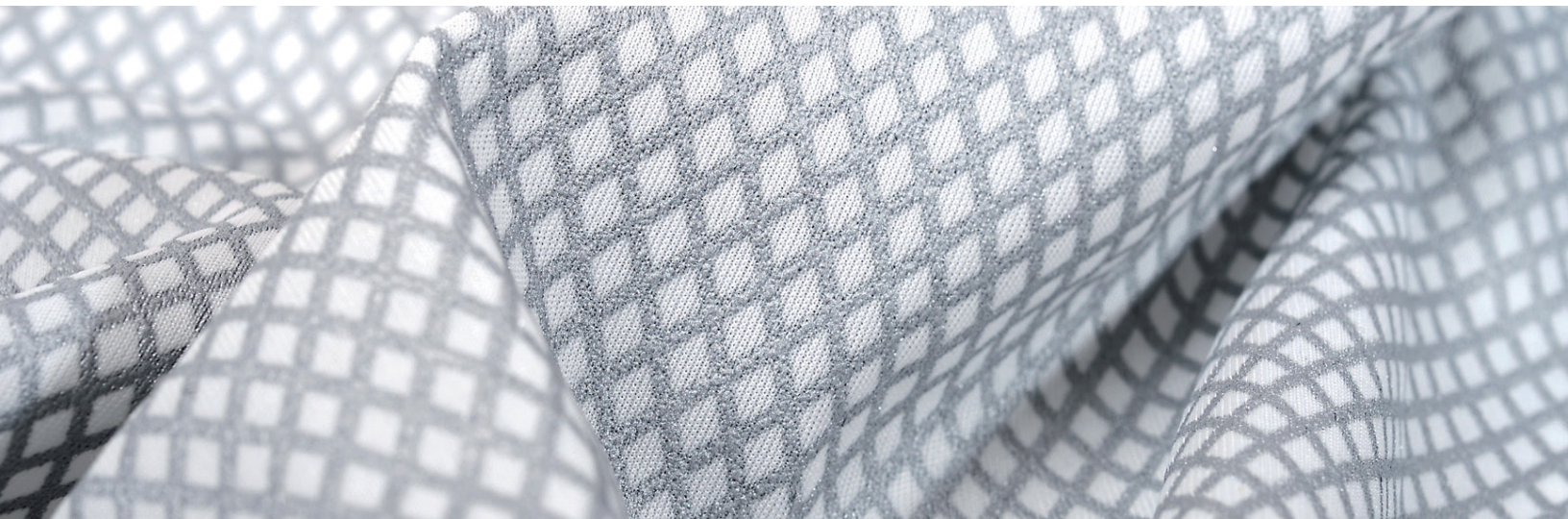
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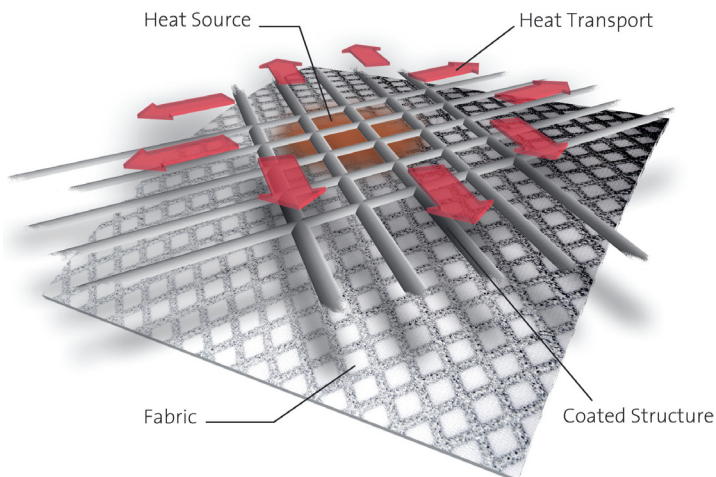


# Outlast Launches Outlast® Xelerate PCM + Heat Spreader

During the night, many people suffer from “intolerable heat build-up”, which makes it difficult to get a restful night’s sleep. Outlast’s climate-regulating phase change materials (PCM) which absorb, store and release excess body heat to reduce overheating and sweating, are a great solution to this. Now, Outlast moves ahead: The innovative company is launching the revolutionary enhancement “Outlast® Xelerate” supporting and accelerating the “normal” PCM performance intensively. Inside, PCMs are combined with a “heat spreader” technology, absorbing and spreading heat quickly, so that the PCM process can run even more actively.

Outlast® phase change materials provide an optimum climate, where unpleasant temperature fluctuations are more balanced and perspiration can be significantly reduced. If that is not enough, you can now benefit from the new development “Outlast® Xelerate”. *“We thought about new, innovative ways we could improve our standard PCM technology,”* explains Martin Bentz, Managing Director of Outlast Europe GmbH. *“And we succeeded. With Outlast® Xelerate we offer a product now combining the PCM technology with the technology of a heat spreader. This material can more effectively spread heat, which is absorbed by the PCM, over a larger area. Thus, the melting and crystallization process of the PCM can be more rapid, and PCM can work more proactively with greater effectiveness.”*

And Volker Schuster, R & D Director at Outlast Europe, adds: “In the laboratory, we have proven that with the help of Outlast® Xelerate technology, the thermal conductivity can be increased by up to 30%.” The advantage for consumers is obvious: With Outlast® Xelerate sweating is reduced even more and the heat and moisture management is working more effectively.



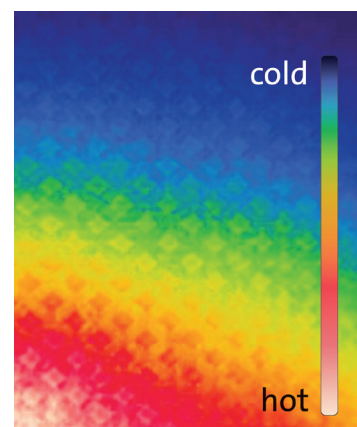
## How it works?

But how do PCMs work? Not too hot, not too cold – just right. That is the easy way it works. Pioneer and market leader is the American company Outlast Technologies LLC, headquartered in Golden/Colorado, regarding the research, development, design and marketing of temperature regulating phase change materials (PCM). The PCM technology Outlast® was originally developed for NASA to protect astronauts against the extreme temperature changes in space. Outlast® technology utilizes phase change materials (PCM) that proactively absorb heat, store it and release it for optimal thermal comfort. Big advantage: Sweat production is significantly reduced.

## Proactive climate regulation

Outlast® technology is comparable to ice in a drink; as it changes from solid to liquid, it absorbs heat and cools the drink, keeping that drink at the desired temperature for a longer period of time. Outlast® phase change materials work in the same way. The PCMs have the capacity to absorb, store and release excess heat. This gives any product containing Outlast® technology the ability to continually regulate the skin's microclimate. As the skin gets hot, the heat is absorbed, and as it cools, that heat is released. Outlast® technology is not wicking technology, which manages moisture by reacting to your sweat and pulling it away from the skin. Outlast® technology will proactively manage heat while controlling the production of moisture before it begins. That's the Outlast® difference. The benefits of Outlast® products at a glance:

- Absorbs excess body heat
- Manages moisture
- Reduces overheating
- Reduces chilling
- Reduces perspiration
- Continuously adapts to thermal changes



What is affected by the PCM is the microclimate on the skin. How sensitive the human body is to temperature fluctuation here becomes clear looking at the small range of the comfort zone: The human body temperature is 36.6°C on average. The inner temperature (e.g. heart, kidneys) is the core temperature and ranges between small limitations, normally it is 37°C. The shell temperature of the skin and limbs as a rule is lower and varies between 28°C and 33°C. If the normal temperature between 36.5°C and 37.4°C differs slightly at the top, we are talking of fever, if it sinks below it leads to hypothermia. If this range can be positively influenced by dynamically working Outlast® materials it is possible to maintain the personal comfort zone and to reduce annoying peaks of being too warm or too cold. Especially looking at prosthesis this brings a special plus for comfort.



Outlast Technologies LLC, a privately held U.S. corporation, is the worldwide leader in phase change materials (PCM) and applications. Outlast® technology is the heat management technology originally developed for NASA that enables any textile to absorb, store and release heat. Outlast® technology pro-actively responds to changes in skin temperature to manage heat and reduce moisture for everyday comfort. For over 20 years, Outlast has been committed to the development of new fibers, fabrics and coatings incorporating phase change materials, expanding the use of Outlast® technology across more than 300 brands and a multitude of products in apparel, footwear, bedding, packaging and labels, and accessories.



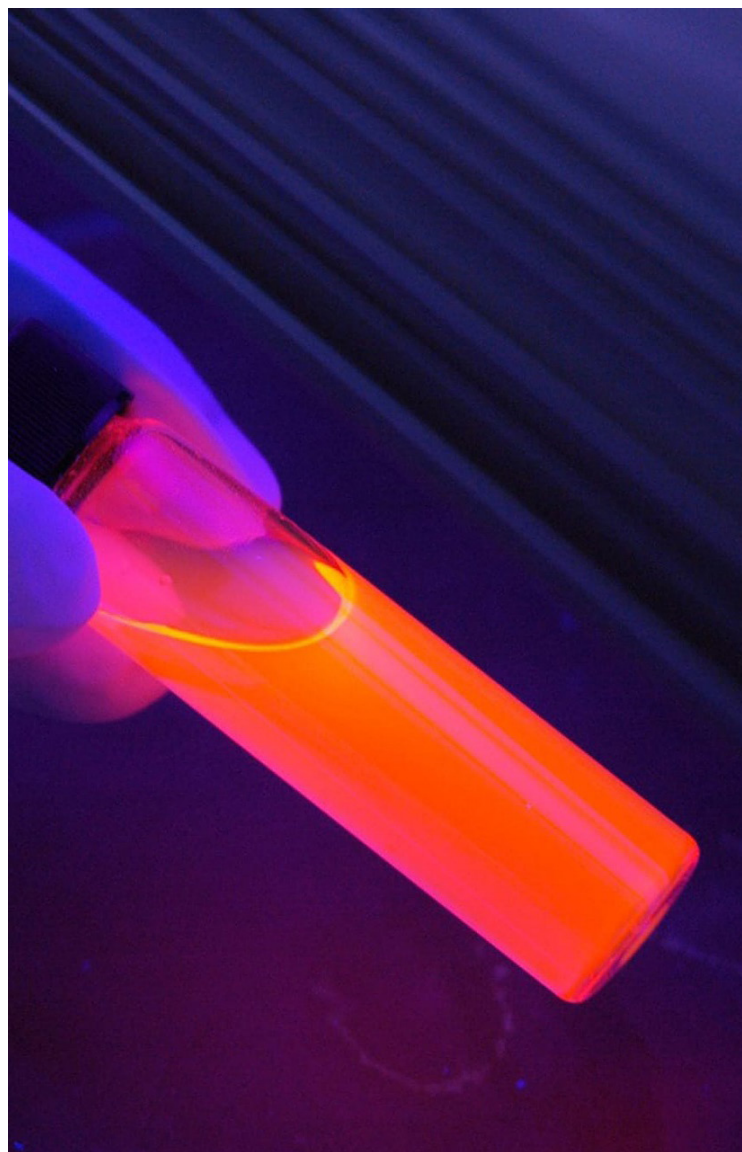
# First Aqueous Transparent Flame Retardant Coating for Wide Range of Combustibles

Dainichi Giken Co., Ltd., a pioneer of aqueous inorganic polymers in Japan, announced today that it has co-developed a new aqueous transparent flame-retardant coating, Landex Coat Flame Retardant Clear, in partnership with Daimaru Kogyo Co., Ltd., a leading Japanese chemical trading company, and Teijin Limited, a technology-driven company with businesses in advanced fibers, plastics and films, composites, healthcare and information technology. Sales of Landex Coat Flame Retardant Clear will start on September 1.

Landex Coat Flame Retardant Clear, the world's first halogen-free aqueous transparent acrylic flame-retardant coating, significantly improves the flame retardancy of diverse combustibles, including timbers, papers, fibers, rubbers and plastics. The transparent coating is simply applied to the surface to maintain the material's original texture. Dainichi Giken expects Landex Coat Flame Retardant Clear to produced sales revenue of one billion JPY by fiscal 2020.

Landex Coat Flame Retardant Clear uses FCX-210, Teijin's phosphorus flame retardant made with Teijin's proprietary molecular-design technology, which maintains the original properties of base resins using only small amounts. FCX-210, developed mainly to improve the flame retardancy of resins, is used widely in electronics and automobiles parts and now is finding uses in other fields where high flame retardancy is required, such as architecture and interior design. Teijin is targeting flame-retardant business sales revenue of three billion JPY by fiscal 2020.

Landex Coat Flame Retardant Clear, in addition to maintaining the color shades and textures of materials in living spaces, also strengthens resistance to



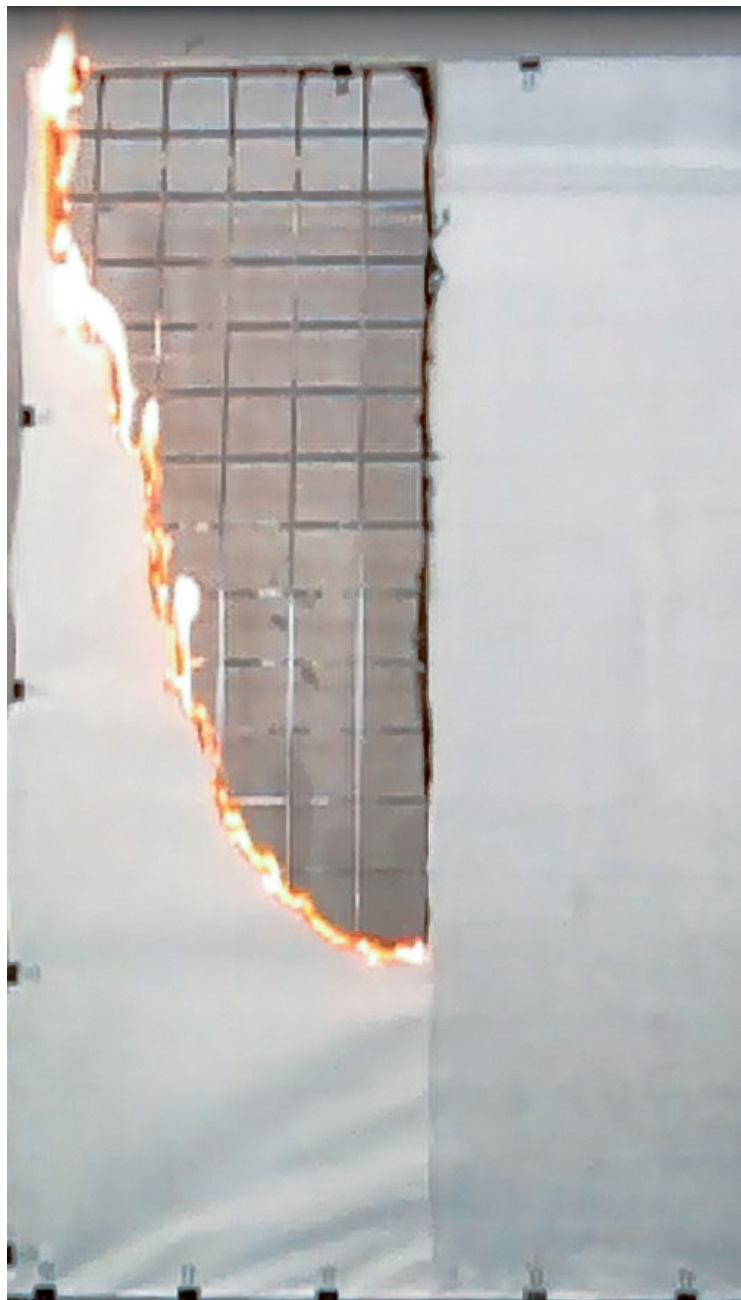
weather and mold. Its range of applicable materials is much wider than those of conventional flame retardants. Dainichi Giken will apply to have Landex Coat Flame Retardant Clear certified as a non-combustible material and receive a VTM-0 rating for thin films under the UL 94 standard. Incorporation of Teijin's FCX-210 flame retardant enables Landex Coat Flame Retardant Clear to qualify as a halogen-free material.

Japan's Act to Promote the Use of Wood in Public Buildings was enacted in 2010 to stimulate increased use of wood in large buildings, but wood's relatively low fire-proofing and fire-resisting properties have hindered the implementation of this policy. According to the Fire and Disaster Management Agency's statistics in 2016, more than 11,000 residential fires occurred in Japan, resulting in some 900 deaths, 70% of which were elderly people of ages 65 or above.

To ensure greater safety for people evacuating burning buildings, there is a strong demand for the use of more flame-retardant wood, paper and fabrics in interior materials. However, wood impregnated with conventional flame retardants eventually loses its appealing texture and appearance. While acrylic-resin coatings can help prevent this process, their range of use is limited due to their combustibility. In addition, widely used flame-retardant coatings impair the original textures and appearances of materials and are limited in their range of applicability.

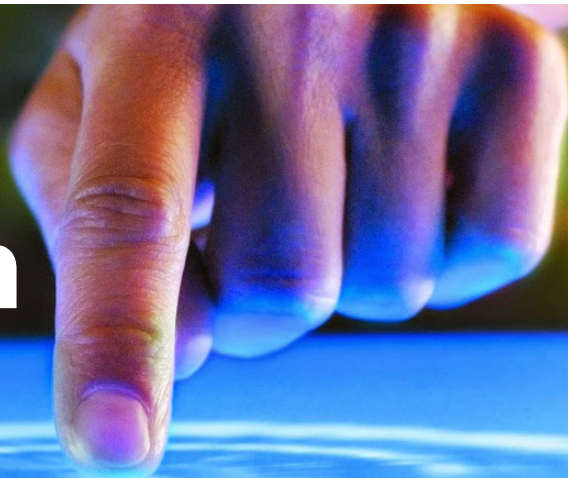
In response, Dainichi Giken's expertise in aqueous inorganic polymers, Teijin's phosphorus flame retardant incorporating proprietary molecular-design technology, and Daimaru Kogyo's special acrylic resin have been leveraged to develop Landex Coat Flame Retardant Clear, the world's first halogen-free aqueous transparent acrylic flame-retardant coating for use with a wide range of combustible materials without impairing their original textures.

Source  
**TEIJIN**





# Surfaces that Touch



In innovative environment of **Techtextil 2017 Hornschuch** company presented smart materials for the contract area as well as for automobile and commercial vehicle interiors.

## Ideal for contract areas

For many years, Hornschuch has been successful in the contract area with high-quality skai® upholstery materials. The surface specialist is impressive with a plethora of possibilities and is successful in the restaurant, hotel, and cruise ship industries, and also in peripheral medical areas, as well as in stadiums, airports, and other public buildings. There, skai® upholstery materials can be used not only on furniture, but also on panels on the wall. The products have characteristics that are particularly popular for room design such as B1 flame-retardant coating, robustness, ease of cleaning, and light-fastness.

## Textile designs are in style

Impressive designs and excellent technical characteristics are hallmarks of all high-quality skai® materials. At Techtextil, Hornschuch presented several new upholstery materials, such as the two B1 articles skai® Paduna Stars NF und skai® Paratexa NF, both which textile embossing and therefore super trendy.

## Amazingly realistic

The brand-new upholstery material skai® Paratexa NF taps into the current textile trend. The fine surface structure in combination with its modern textile look and the trendy selection of colors create a particularly natural feel. Available in 15 colors in the muted pastel spectrum from the very beginning. Recently, the premium product was awarded the Label iconic Award





2017: interior innovation – Winner. The innovation was also successful in the renowned iF Product Design Award 2017. The material leaves nothing to be desired with regard to workability. It also meets the stringent B1 flame resistance standard and is therefore ideal for use with design-oriented contract area.

## Textile magic

Glossy metal surfaces continue to be very trendy in addition to textile looks. The new skai® Paduna Stars NF combines both trends in a single surface, because the material also has a delicate textile structure. In 16 trendy metallic colors – including trendy taiga, nightblue, ruby und berry – the material looks elegant and sophisticated. It is particularly excellent as an eye-catcher and for decorative applications – on furniture or on the wall. As this innovative material also meets the B1 flame resistance standards, it is ideal for use in the contract branch.



## Skai® digital print – individual designs

Hornschuch's customers can now equip limited small series and individual projects with designs from the high-quality skai® digital print collection, thereby gaining advantages at the Point of Sale. The high-quality upholstery materials skai® Pandoria Plus and skai® Toledo EN are the basic grades with three different embossings each - elegant leather grain, classic textile grain, and fine micro-pore structure. They are directly digitally printed and then finished with a coating. The two variants differ primarily in their flame-retardant properties. The skai® Pandoria Plus grade has a higher level of flame resistance. 12 innovative motifs are available with the various embossings. They are intended to serve as an inspiration and to illustrate the possibilities of digital printing, but naturally they can also be ordered. The designs are impressive with their intensely brilliant colors and unique 3D-effects. They range from wood, to textile, to phantasy motifs.

Each design can fundamentally be converted to digital direct printing such as when an Allover-Logo print is desired. The minimum amount is 100 meters.



## Laminating expertise from Herbolzheim

The firm kek-Kaschierungen in the Southern Baden town of Herbolzheim has been an important part of the Hornschuch Group for several years. As a finisher, kek has been active in the development, production and distribution of individual lamination solutions for over six decades. In the automotive sector in particular, but also in the textile and furniture industry, the Herbolzheim company is renowned for its high level of professionalism and technical expertise. In the fields of lamination, stamping, cutting and upholstery, kek offers a wide range of solutions from a single source. At Techtextil, kek showed the interested visitor examples of the individual lamination steps for artificial leather and upholstery materials.



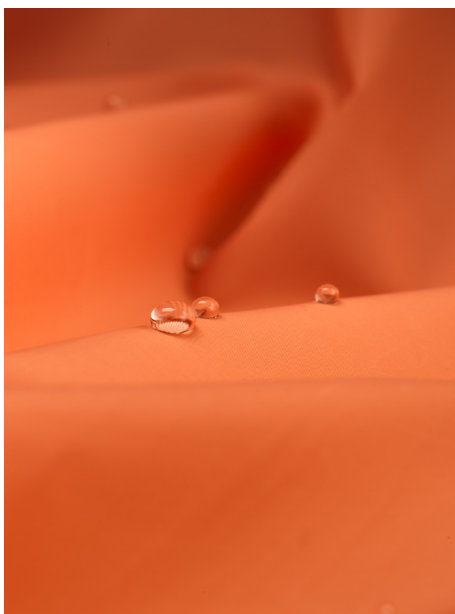


# Metallic Sheensporty Elegance and Concealed Function

Feather-weight, metallic reflective effects, concealed function and natural fiber qualities with bio technologies are just some of the highlights of the current Schoeller collections. Developed and produced among the mountains of Switzerland, innovation, comfort, appearance and ecology have always played a central role in Schoeller textiles.

## SUMMER FREEZE

The fine, aluminum-coated schoeller®-spirit fabrics in Schoeller summer 2019 are so lightweight, they are barely noticeable. Fashioned into light wind-breakers, they shimmer in shades of copper, olive and polished steel, making the light dance. Semitransparent, the aluminum-colored reverse gleams through and is an eye-catching interior. The same airy lightness and silky sheen characterize the transparent, water-repellent voile jacket qualities in various shades of grey and a morning red.



## PURE ENERGY

Energy is effectively radiated back to the wearer by the schoeller®-spirit fabrics with the energear technology. Stone grey, salmon colored or deep blue, the matte jacket qualities, e.g. as an oversized parka or modern mackintosh, not only radiate elegant flair, but also protect the wearer from unexpected summer showers. Similarly energized, energear flatters in the bi-color schoeller®-shape cotton-polyester blend. As ultra-matte two-tone pant interpretations in sophisticated beige, henna or a light khaki, they perfectly match the exciting jacket qualities.



## CITY PARKOUR

Outstanding comfort is a primary feature of the diverse soft, bielastic schoeller®-WB-formula polyamide jacket qualities in matt shades like pine green, olive, stone grey, night blue, vibrant yellow, burnt henna or rosé. With either a velvety-smooth or structured reverse, always in a contrasting color, they create a technical 3D look or a cleaner, more sporty look, depending on the backing. For example, fashioned into light all-season jackets in an athleisure style, a c\_change®-climate membrane ensures a high level of breathability with reliable water proofing.



## BIO COMFORT

Sustainability also plays an important role in fashion. The two technologies based on renewable raw materials, 3XDRY® Bio and ecoprepel® Bio, refine a variety of elastic schoeller®-shape or schoeller®-WB-400 natural fiber blends and provide ecological water repellence. In pleasant pants weights with a blurred overall print on the outside and a denim look on the reverse, or in a canvas look for chinos, they are ideal for cycling in urban traffic, among other things. The two exciting jacket styles take the stage in a more feminine version with a silk and cotton front and a fine wool backing, or in a slightly masculine alternative with a matte, rustic canvas weave and a richly-contrasting merino wool reverse in a mélange look.

Source  
schoeller  
Switzerland



# Importance of Textiles in Protecting the Skin from Ultraviolet Radiation

## Ultraviolet radiation in nature

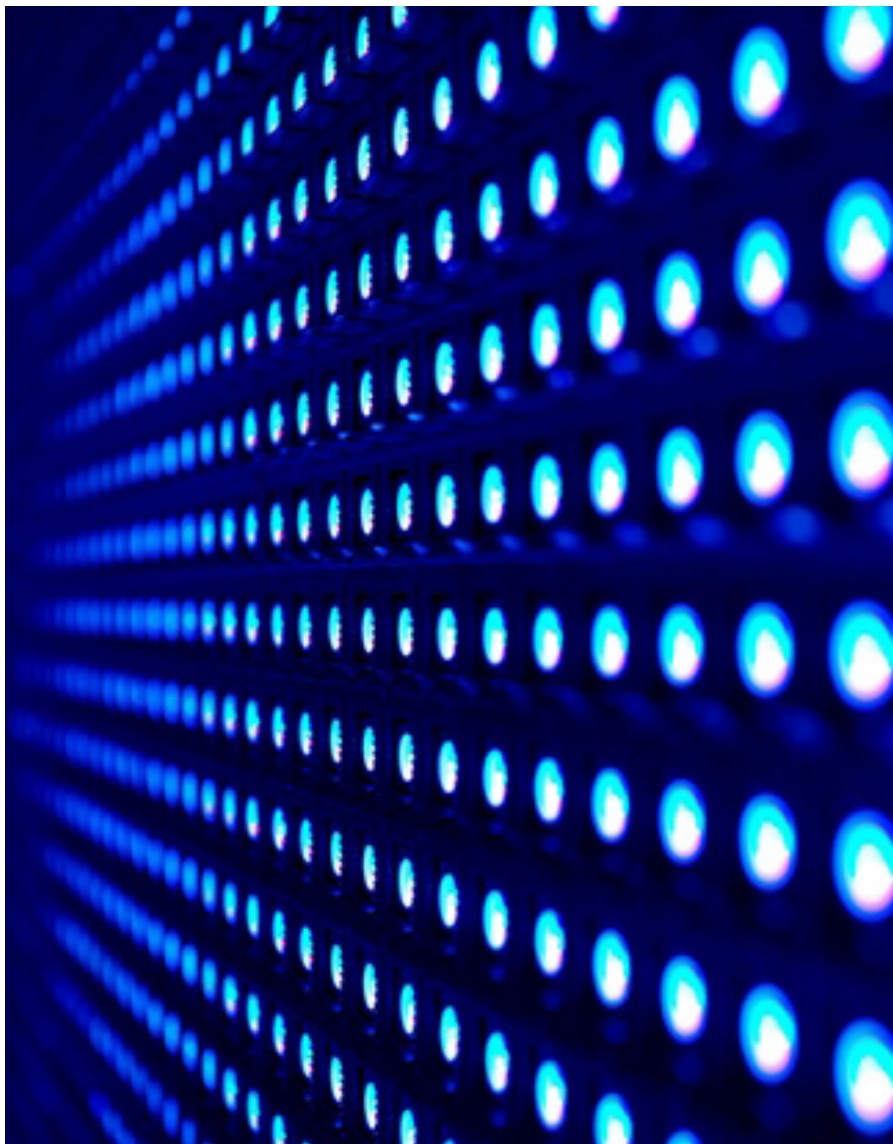
Ultraviolet radiation is an electromagnetic radiation with a wavelength from 10 to 400 nm. The so-called near ultraviolet radiation has three ranges: UV-C (200-290 nm), UV-B (290-320nm) and UV-A (320-400 nm).

The sources of this radiation are substances heated to temperatures exceeding 3000K. Starting from this temperature, bodies start to emit a noticeable amount of UV radiation in the form of a continuous spectrum.

In nature, a natural source of such radiation is the Sun. Artificial sources of UV radiation are arc welding equipment, germicidal mercury lamps, lasers, etc., where the UV radiation is generated by electric discharges in gases or metal vapour.

## Influence of UV radiation on materials and the human body. Ways of protecting the skin from adverse effects of ultraviolet radiation

The series of reactions occurring in nature under the influence of ultraviolet radiation, for example – photosynthesis, have a good influence on the environment. Reactions that occur in protein particles change the course of metabolic processes in organisms, contributing to their vitaminisation. UV-B radiation has antirachitic properties, with its absence associated with diseases such as rickets.

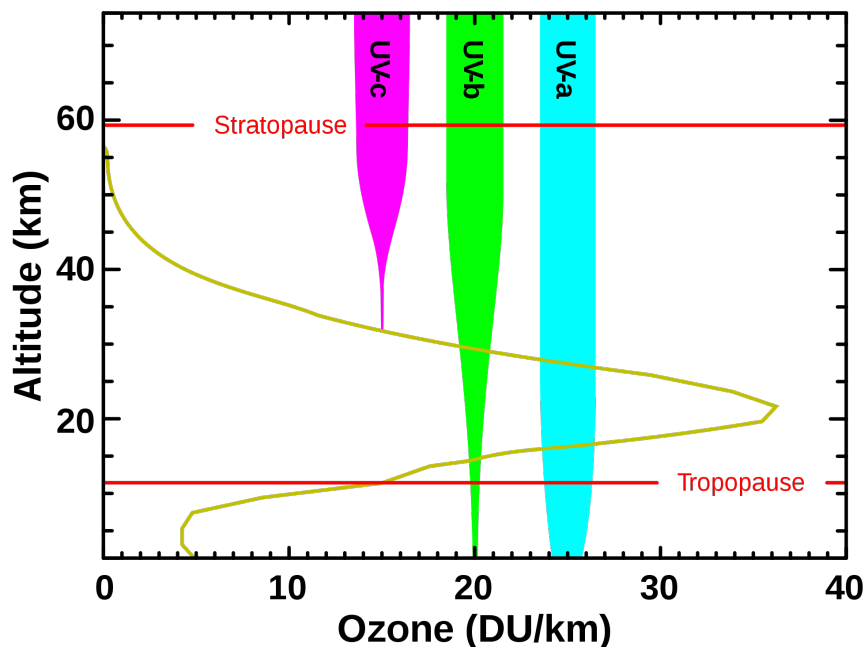
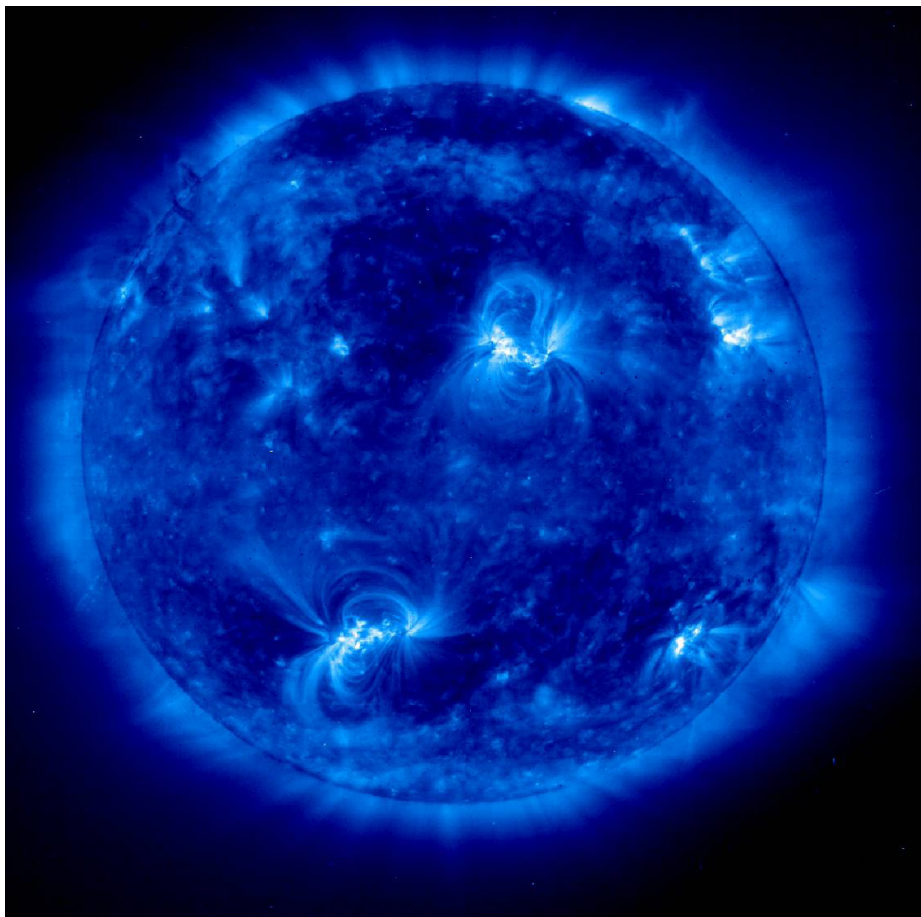


On the other hand, excessive exposure to this radiation leads to a number of adverse effects for both organic and inorganic matter. These include photodegradation of insulating materials used in electroinstallations exposed to sunlight, polymeric materials used in the textile, construction and food industry. People working in open spaces are exposed to the risk of skin burns, premature skin ageing or skin cancer.

Land organisms formed some protective mechanisms against UV radiation. These include physical barriers that block UV radiation, such as shells, carapaces, scales, feathers, hair. For humans, this protective barrier is the skin.

Depending on the geographical area and climate inhabited by humans, there are different types of skin. Farther south, people have darker skin. It protects the body from intensive solar light in such locations because it includes a black pigment (melanin) that absorbs ultraviolet radiation.

Exposing the skin to UV rays causes skin cells to produce a brown pigment responsible for natural tanning.



This effect is a protective mechanism against harmful effects of these rays. If the skin is sensitive and the amount of radiation is too large, it is necessary to protect it by artificial means. Creams with substances absorbing radiation and screens made of fabrics or knit as well as sunglasses may be used for this purpose.

Creams, however, are not very convenient to use as protective agents. After about two hours they are soaked into the skin and the protection is lost. Also, each swim or bath deprives the skin from this barrier against UV radiation. We also tend to use a cream layer that is too thin. People who are sensitive to specific components of creams (allergy sufferers) need to be careful in choosing the right cosmetic products.

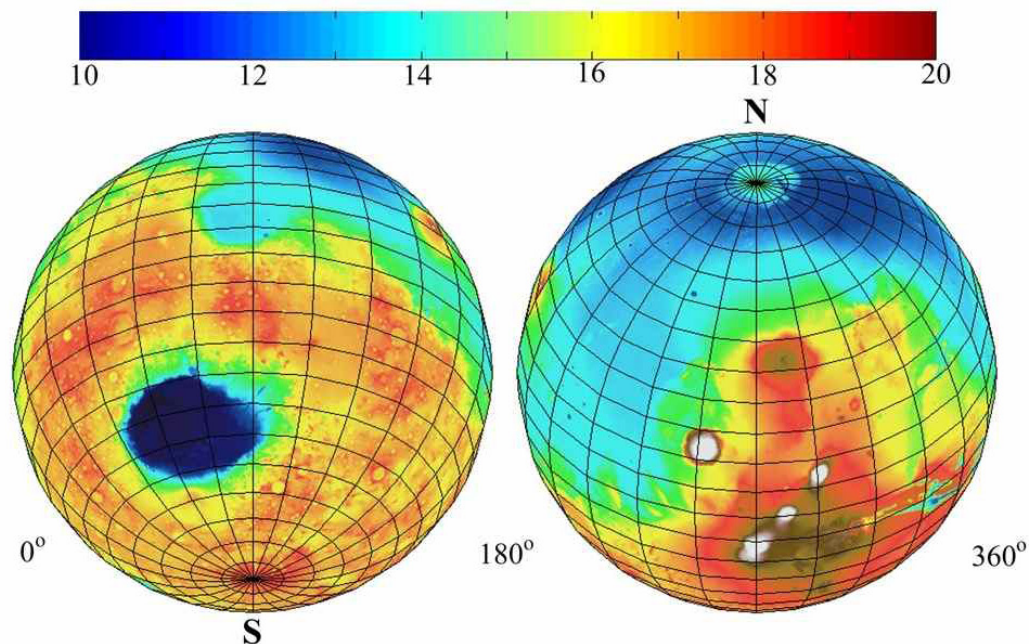
It seems to be much easier to use appropriate clothing.

There is a widespread belief that summer clothing is in this respect a great barrier. Research on summer clothes available on the market indicates that about a third of them is not classified as clothing that protects against UV radiation from the point of view of proper barrier parameters.



## Cosmic Ray Environment

Dose Equivalent Values (rem/yr)



### Indicators and parameters characterising the protective properties of investigated materials

For the objective evaluation of the protective properties of applied protection solutions, the so-called Sun Protection Factor (SPF) was introduced to provide means of comparing protective abilities of various materials. SPF is defined as the ratio of Maximum Erythema Dose – MED for skin protected by the product or other barrier and MED values for unprotected skin under the same conditions. Similar to the above indicator for the protective means (for example, textile) but determined in vitro is the UPF (Ultraviolet Protection Factor).

If the textile product achieves the UPF value of more than 40, it may be classified according to

the standard PN EN 13758

as suitable for production of protective clothing. Many factors impact the barrier properties of textiles. The following are seen as the most important:

- yarn structure
- product architecture
- product weight
- physical conditions of the product (tensioning, humidity)
- impact of processes associated with the processing of fibre (pre-treatment, finishing processes)

There is a common conviction that the more thick, heavy and dense the product, the better a protective barrier against harmful radiation it can be. This observation seems valid, but clothing based on such product characteristics is not suitable for lightweight, breathable summer clothing.



Research conducted by the author shows that surface weight of the fabric is of significant value for barrier properties.

In addition, improving the protective parameters of fabrics can be obtained by appropriate finishing procedures. For finishing process, the used additives, especially UV absorbers, are essential. Individual stages of the finishing process, in particular dyeing and printing, influence barrier properties of a textile.

The raw material from which the product was manufactured is also crucial. Protective clothing made of cellulose and polyester-cellulose fabrics is characterised by low values of protection against radiation, as often the SPF is lower than 15.

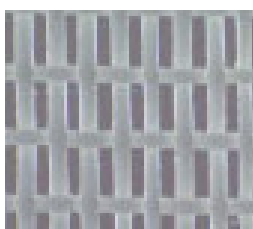
A significant influence on the level of protection is found in the exploitation of clothing. Studies on 250 materials showed that as a result of solar operation they lost their ability to protect from the sun by approximately 15 SPF units.

In relation to the huge number of used dyes, it makes sense to pose such questions - which dyes highly improve the barrier properties of textiles and how important is the colour? The most widespread belief is that dark and intense colours are the best. The author's original research performed for coloured cotton fabrics (in the same percentage) dyed using various dye groups shows that the chemical structure of the dye, not its colour, is of a greater importance.

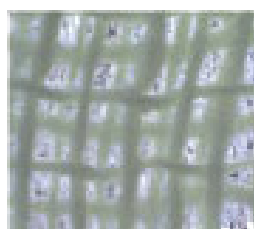
Further, more accurate research conducted by the author for only one group of dyes and fabrics produced from the same raw materials, confirmed the importance of chemical structure of dyes used to enhance the barrier properties of these textiles. Properly selected dyes proved to be good absorbers of harmful ultraviolet radiation.



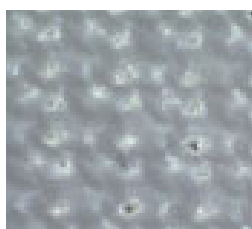
By dr inż. Krzysztof Krysiak  
Article courtesy of



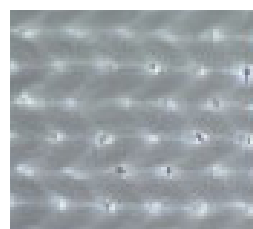
UPF : 3



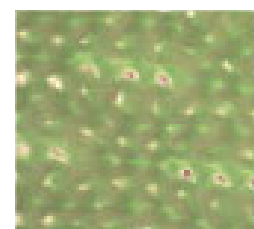
UPF : 9



UPF : 30



UPF : 60



UPF : 115



# DON'T MISS THIS!

THE MOST IMPORTANT EVENTS FROM THE TECHNICAL TEXTILE INDUSTRY



## TEXWORLD AVANTEX 18-21 SEPTEMBER 2017 PARIS, FRANCE

Launched in 2015 by Messe Frankfurt France, AVANTEX is more than just a simple professional trade fair, it is truly a gathering that brings together experts and well-known players in the industry, covers the fashion industry from fibers to finished products, answers the needs of the entire gamut of "Fashion Tech".



## BELTEXINDUSTRY 3-6 OCTOBER 2017 MINSK, BELARUS

Wholesale of goods of light and textile industry. Specialized seminars, round-table discussions in which heads of the leading branch enterprises as well as Trade and Mass Media representatives will take part, presentations of companies-participants of the fair, fashion clothes and footwear shows will be held within the business program of the exhibition.



## INTERNATIONAL APPAREL & TEXTILE FAIR 1-3 NOVEMBER 2017 DUBAI, UAE

Each year, the fair attracts leading textile manufacturers and designers from around the world including China, India, Pakistan, Turkey, Indonesia and Italy. With the world's textile and apparel trade reaching approximately USD 13.2b (AED 48.5b), and recording an annual cumulative growth of 9.9%, an event like the IATF is both vital and relevant.



## FAST TEXTILE 16-18 NOVEMBER 2017 WARSAW, POLAND

The Fast Textile International Textile Fair is the most important event in the Polish world of fabrics and accessories. It was created in response to the market's need for such events and it quickly became the largest endeavour of that rank in Central Europe. The major goal of the Textile Fair is to create space enabling manufacturers and exhibitors to establish trade relations. Location in the capital of Poland makes it a perfect place for manufacturers from whole Poland and from abroad.



## TECHNICAL TEXTILE MEETINGS 22-23 NOVEMBER 2017 CASABLANCA, MOROCCO

Technical Textile Meetings Morocco is a business convention that brings together international professionals, users or suppliers of technical textiles and soft functional materials. Above 100 companies are expected to take advantage of multiple opportunities offered by 2 days of intensive business to business meetings with 30 minutes pre-arranged and qualified meetings. Technical Textile Meetings Morocco is your tool to prospect new clients and market, identify suppliers, solutions and potential partners.



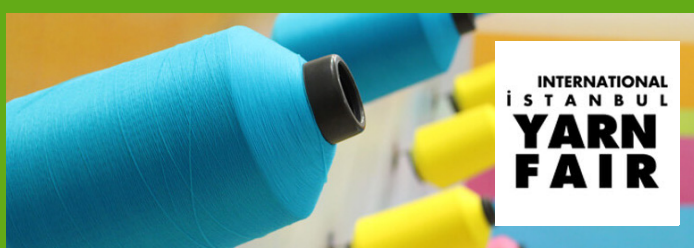
**VDMA CONFERENCE**  
**"GERMAN TECHNOLOGY**  
**MEETS US TEXTILE"**  
**6 AND 8-9**  
**NOVEMBER 2017**  
**CHARLOTTE, MEXICO**

The VDMA Textile Machinery Association has just published demanding and comprehensive programmes of its B2B Forums & Conferences, which will be held in Charlotte (NC) and Mexico City in November. Industry experts from the VDMA member companies will present practice-oriented technology topics to decision makers from the local textile industries.



**HEIMTEXTIL**  
**9-12 JANUARY 2018**  
**FRANKFURT AM MAIN,**  
**GERMANY**

Heimtextil is the industry's most important global event for interior textiles, interior design and interior trends. With its new products and trends, it kicks off the upcoming season and gives important impulses to both exhibiting companies as professional visitors from all over the world.



**ISTANBUL YARN FAIR**  
**14-17 APRIL 2018**  
**ISTANBUL, TURKEY**

The fairs, which were joined by 215 companies and company representatives from 18 countries, hosted a total of 8755 visitors with 1955 of foreigners and 6800 from home. Yarn & Knitting Tech Fairs bringing technology and functionality together, took its success to the highest level, thanks to the high visitor rate throughout the four days.



**TECHTEXTIL RUSSIA**  
**20-23 MARCH 2018**  
**MOSKOW, RUSSIA**

"For more than 10 years, Techtextil Russia has been proving its value for international specialists of the industry and improving its quality factors. Techtextil Russia includes 12 areas of application for all modern technical textiles and textile technologies. This is why industry professionals choose Techtextil Russia. Techtextil Russia is more than a trade fair – it's a tailor-made business solution for the entire industry."



**MTEX+**  
**29-30 MAY 2018**  
**CHEMNITZ, GERMANY**

Textiles with additional functions make products lighter, more robust and more attractive and manufacturing processes more effective. Developers, designers, users and managers discover HOW at the 2018 mtex+. The exhibition, where everything is on the spot, provides in-depth contacts – across all sectors



# 3M Applies Its Adhesive Know How to Improve Wearable Medical Devices



When Joe's heart-rate monitor kept falling off, he asked his doctor, *"Isn't there a better way to make it stick?"* Thanks to 3M, there is. The company that makes everything from Post-it® Notes to structural adhesives that hold airplanes together, also makes advanced medical adhesives that can hold for up to two weeks.

When considering adhesive science and the challenges of a substrate like skin, design engineers know sticking-to-skin is trickier than you would think. With the addition of 3M™ 4076 Extended Wear Medical Tape to its extensive portfolio, 3M's Medical Materials and Technologies business has given medical device manufacturers and engineers a long-term wear, acrylic-based adhesive solution designed to increase patient comfort and provide a strong and reliable bond in challenging applications.

The non-sensitizing, conformable adhesive was developed for long-term wear, providing a bond that is firm yet comfortable so patients may not even realize they are wearing a device. This allows engineers and manufacturers to focus solely on their device's design and application, spurring innovation while ensuring their timeline and budget requirements are met.

*"Sticking to skin presents a major challenge to the medical device industry,"* said Diana Eitzman, Ph.D., director of agile commercialization, 3M Critical and Chronic Care Solutions Division. *"By equipping our customers with the latest adhesive technology, we're giving them the power to solve their toughest design challenges and positively impact patients' lives globally."*

Compliant with ISO:10993 and ISO:10993-10, medical industry regulations assessing a product's potential to produce irritation and skin sensitization, 4076 Extended Wear Medical Tape is approved for use on intact skin. The tape is part of the extensive adhesives product line 3M offers the medical device manufacturing, design and supply industries. Through the company's diversity of technologies – paired with its 55 years of experience in the medical adhesive business and team of experts – 3M provides medical device professionals with the tools they need to satisfy their project requirements and confidently navigate their way to market.



Source





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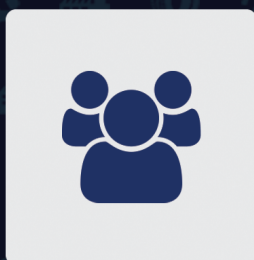




EUROPE'S LEADING TECHNICAL TEXTILE WEBSITE

# UNITING THE TECHNICAL TEXTILES INDUSTRY

- ▶ daily dose of industry knowledge
- ▶ comprehensive promotion of your product
- ▶ innovative approach to marketing
- ▶ thematic database of recipients of your ad campaign
- ▶ quarterly publication dedicated to the textile industry



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