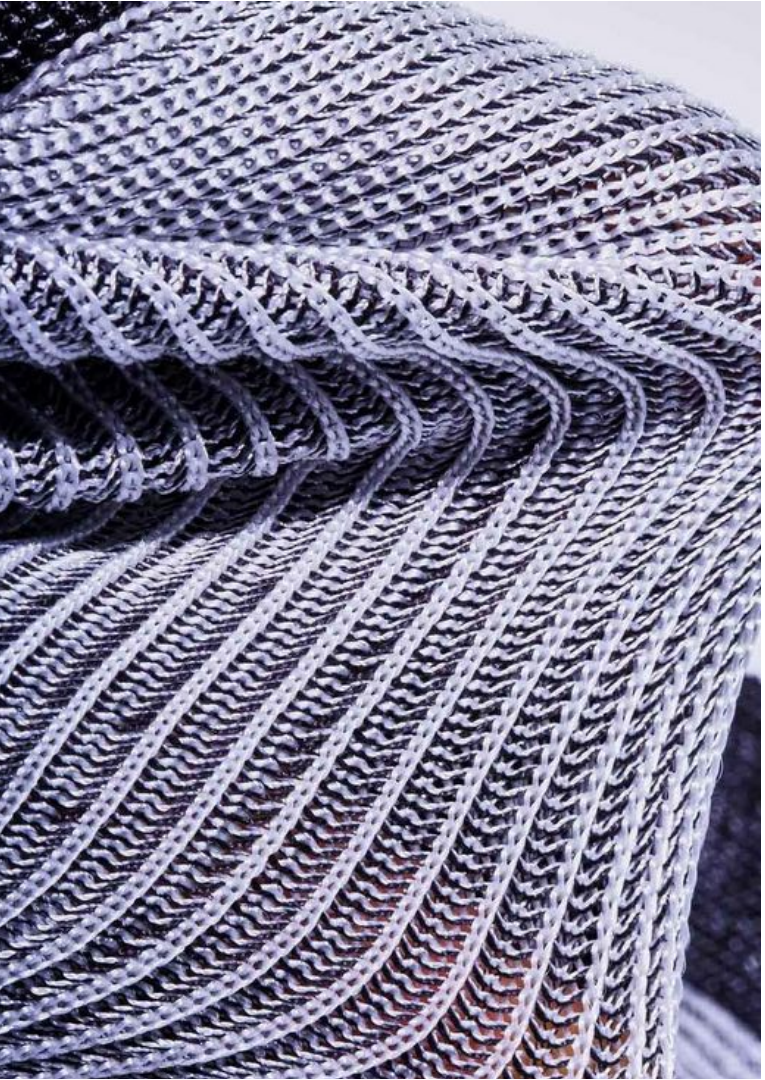
MATERIALLY

ICT - TEX

Smart Textile

Co-funded by the
Erasmus+ Programme
of the European Union

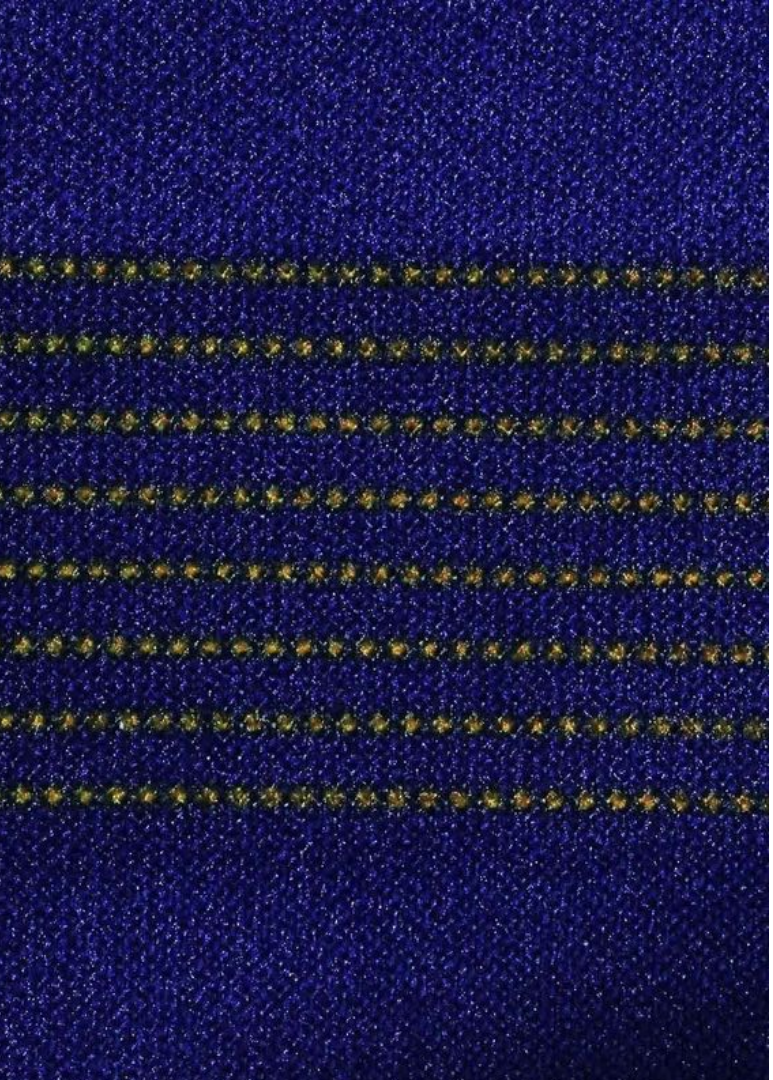
ICT-TEX



Active Textile Tailoring

A new system called Active Textile Tailoring developed in collaboration with the Self-Assembly Lab, MIT, the Mechanosynthesis group at MIT, Ministry of Supply, Hills Inc. and Iowa State with support from the federal non-profit Advanced Functional Fibers of America (AFFOA). This technology demonstrates a completely new system for smart textiles in which the fibers change shape and structure in response to heat and moisture, due to both the structure of the knit and the combination of materials used, unlocking a new wave of customization of fit and aesthetics. Unlike other smart garments that need electrical stimulation from a battery, or are knitted using metal thread or shape memory alloys, this system can knit garments that can be activated using robots in the store or at home and can self-transform to the person's body. Applications are for apparel. This research lab can work with companies interested in co-developing similar or new material and fabrication technologies.

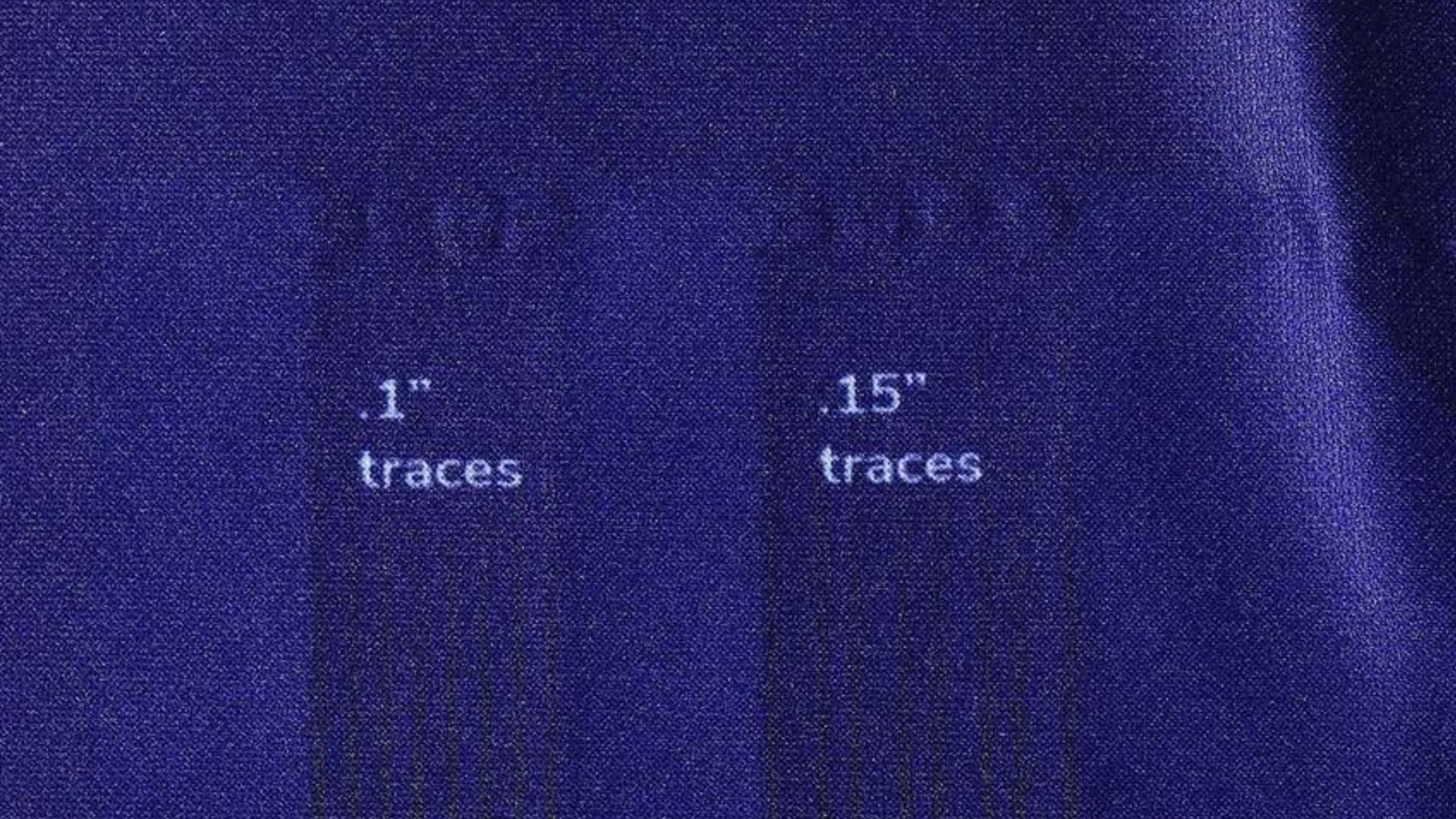
Self-Assembly Lab, MIT
265 Massachusetts Ave. MIT N52-394
www.selfassemblylab.net



LEL (LOOMIA Electronic Layer) 4 Wire Bus

An industry-specific customizable, scalable smart textile system that is developed for initial applications in medical and wellness wearables. This first testable sample demonstrates the type of power and data lines that can be embedded into a garment or soft good in this space using a patented electronic patterning method to create ultra-flexible circuits (specifically, e-textiles). It comprises a textile base, metal conductors, and TPU insulation with testing pads to work as a stretchable or non-stretchable cable for resistance or impedance measurements, supporting various applications. The LOOMIA Electronic Layer (LEL) is an enabling technology that is highly flexible, fabric-like, and easy to integrate into any product manufacturing process through sewing, heat bonding, or adhering. The process is scalable through the company's manufacturing partner, Eastprint Inc., which is ISO 13985, ISO 9001 and ITAR registered. The company provides a fully insulated, robust, and reliable circuit solution including hard-soft connections and embedded components that can be easily sewn or bonded to the product, and is machine washable. It offers customization services through LOOMIA Lab for the LEL to meet the customer's mechanical, electrical, aesthetic, and functionality needs. It can be used for wearable medical and wellness devices, car interior cabling, soft robotics, and other e-textile applications.

Loomia
45 East Broadway, USA
www.loomia.com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FOYSE

An anagram for Fiber on Yarn Surface Entanglement, this is the first alternative to knit and woven materials using yarn, unlike traditional woven or knitted materials which are made by the interloping or interfacing of yarn. The company only uses 100% natural fibers, and the material maintains the flexibility of a knit or woven fabric. The entanglement is made by the connecting the outer fiber of the yarn to a parallel yarn which then creates the fabric surface. The company considers this new process an additive textile due to the production method of placing yarn upon yarn, layer upon layer. Every channel and layer consequently have space to seamlessly embed elements for high fashion or highly technical applications. This not only changes the fabric appearance but also the functionality of the material. For the first time, it's possible to create a nonwoven with stretch as the actual fibers used and the connecting surface of the fibers allows for elasticity. The innovative construction also lends itself well to being embedded with microcapsules or semi-conductors for smart textiles. The material also has lower linting performance because the finer fibers that cause pilling in standard fabrics due to wear and tear are actually entangled to create the fabric surface preventing pilling. This new process is compatible with natural yarns like wool, alpaca, silk or mohair. It is also compatible with synthetic fibers that have surface fibers like acrylic. Smooth filaments such as Lycra would need to be embedded between fibers. Applications include accessories, apparel, home goods, decoration and smart textiles.

ZEPHLINEAR

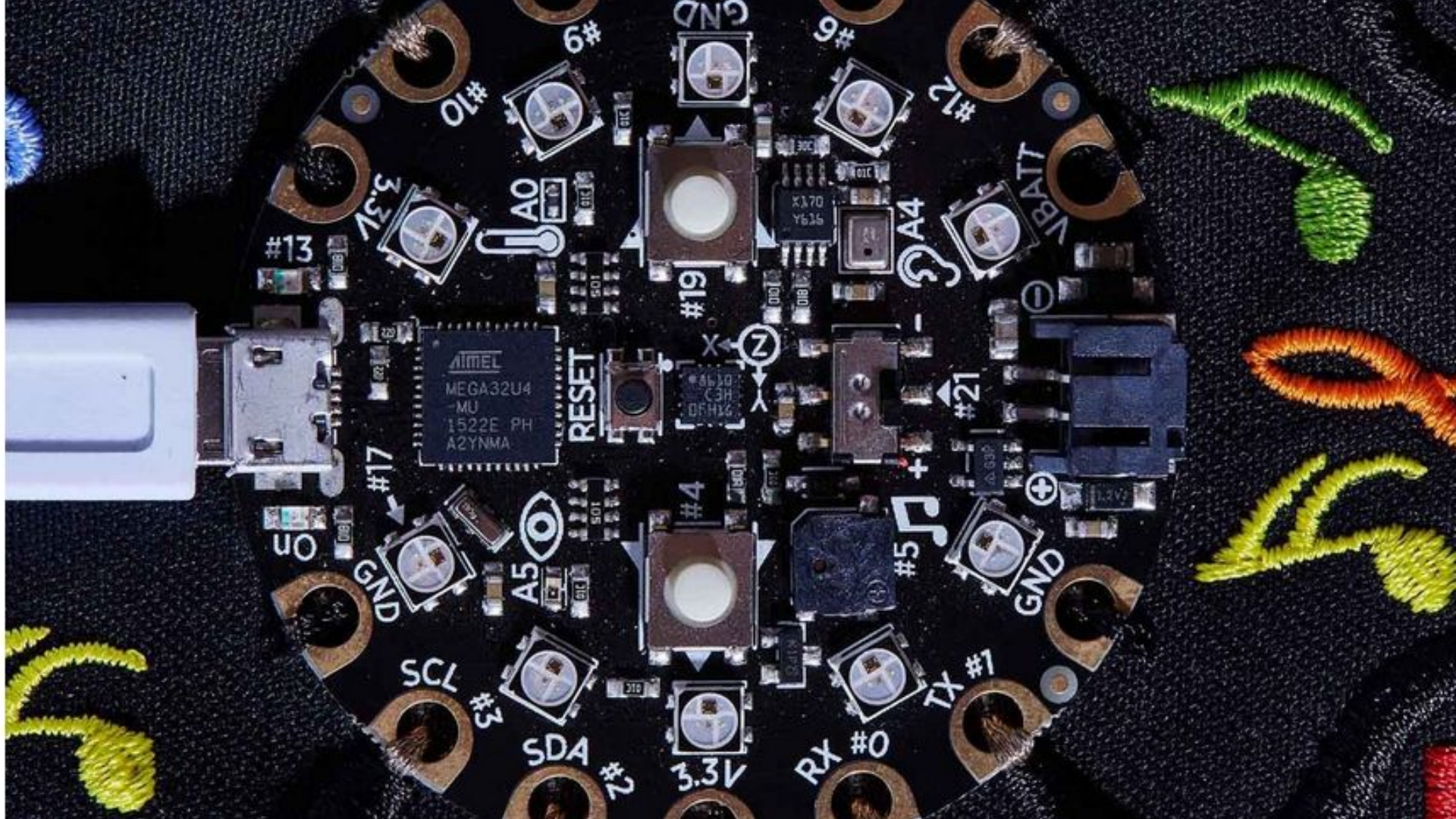
Sherwood Enterprise Centre, 486 Mansfield Rd, Sherwood

www.zephlinear.com

Automatically processed smart textile keyboard

A keyboard produced by this company's technical embroidery machine to automatically connect a circuit board to a piece of fabric and to use that same conductive thread to create capacitive touch sensors. The keyboard is made on black twill cotton cloth with colored polyester thread, and special silver coated nylon conductive thread. The company's technical embroidery machine stitches the circuit board directly to the carrier cloth using conductive thread. This thread not only serves to connect the board to the cloth but is also used to create the capacitive touch sensors functionalizing the embroidery. The embroidery equipment used creates a highly reliable and autonomous process that can quickly be scaled according to design needs. As technical embroidery is a finishing process, it is extremely easy and cost efficient to customize from batch to batch. Base materials can easily be changed from cotton twill to many other fabrics, plastics, dissolvable carriers, and leathers. Thread types and colors are also easy to change. Custom circuit boards can easily be digitized and included. Special functionalized electronic sequins can be used to further add LED's or sensors in the embroidery process. Visual and technical design possibilities are endless. The machines are able to be converted from running one design to another in a matter of seconds, further opening design and sizing possibilities. Applications include functionalized automotive fabrics, upholstery fabrics, wearables, smart textiles, and clothing.

ZSK Stickmaschinen GmbH
990 Industry Drive, USA
www.technical-embroidery.com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GND
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A0
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A4
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RESET
MEGA32U4
-MU
1522E PH
A2YNMA
#21
On
#17
#4
#5
GND
A5
GND
SCL
#3
SDA
#2
3.3V
RX #0
TX #1

NFC Enabled Web

Smart webbing embedded with an NFC chip to provide a seamless digital experience. It is specially designed and woven to hold and protect the chip against twisting and humidity for long-lasting performance. The webbing is typically made of 100% nylon but can be woven from other materials. The integration of the chip into the web using a proprietary technique is imperceptible to the touch. The use of high-density Jacquard weaving allows custom colors, designs, and logos to be woven into the textile to enhance aesthetics and/or provide branding/promotion opportunities while protecting the NFC chip without interfering with its functionality. This a custom product in which the product configuration and dimensions are determined by the end-user. It is REACH compliant and is available in a wide range of colors, patterns, and textures. Colors, weave patterns, textures, and dimensions are all customizable. The NFC card can be programmed to provide different levels of information to the reader for promotional, educational, and financial case studies. Applications are for fashion, wearables, and accessories.

Janisset SAS (JTTI)
ZI de La Chaud, France
www.jtti.com


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AMOTAPES CONDUCT

Woven tape made from polyester yarn and seven tin-plated copper strands. The copper strands “float” in wavy lines along the tape to allow for small amounts of elasticity. The tape contains hot-melt material on the backing that can be heat pressed or ironed onto any textile and other surfaces. Standard size width is 16 mm (0.6 in) with a 0.45 mm (0.02 in) thickness. The width and the number of copper strands can be customized for minimum quantities of 2 m (79 in). The electrical resistance per sq/m is applied 0.03 Ohm. Applications include flat and flexible conductors for automotive, building industry and smart textiles.

AMOHR TechTex GmbH
Hüenefeldstrasse 57a, Germany
www.amohr.com

Deskfruit Knitted AR Marker

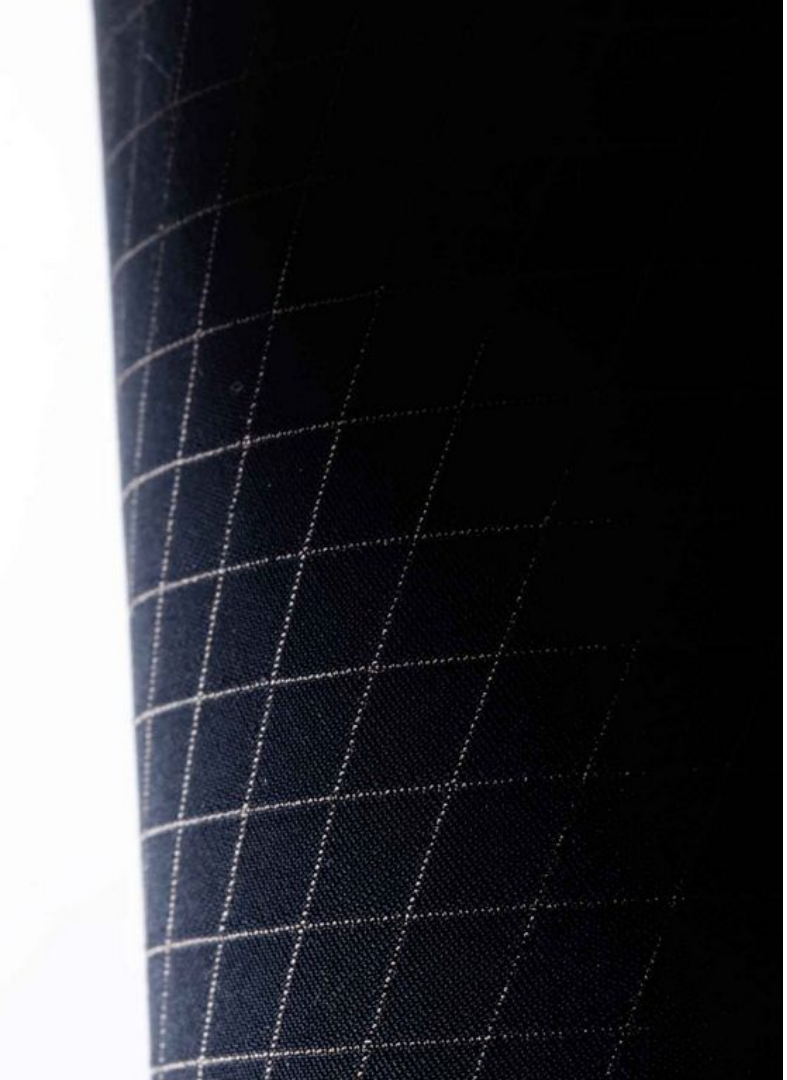
High-performance, smart textile that can launch an AR application by seamlessly embedding a unique marker in a knit environment for easy recyclability. It uses two carriers to create a 2-color birds-eye jacquard pattern. The base (turquoise) fabric is made of 100% cashmere (2/26 Nm) embedded with a marker in a pattern (cream) using merino wool (2/28 Nm). The final product is washable, dyeable, and exhibits good thermal regulation, moisture wicking, and odor resistant behavior. This is a new way to easily integrate AR into a smart garment via knitting an activation marker for a seamless, highly personalized experience using the Deskfruit App (www.deskfruit.io). Unlike traditional markers or tags used for the identification of garments, this embedded tag is almost hidden in a custom pattern design without limiting the recyclability of the base fabric. The product can be made in various gauges with a variety of colors, yarns, and pattern designs. However, a certain amount of contrast is required between the colors. Due to the nature of this innovation, the material is not being currently produced at a large volume scale and is available by the yard or as a custom-made garment using the client's unique marker. It can be used for the identification of garments and for the use and interaction of different AR applications

Pratt Institute, Brooklyn Fashion Design Accelerator
630 Flushing Ave, Suite 704 , USA
www.bkaccelerator.com/

Tones of Cool

A patented cooling technology that stimulates the textile to dissipate redundant heat from the body and to instantly reduce the body temperature for maximum comfort. It creates a long-lasting thermal balance to keep the body in its comfort zone while providing an instant cooling sensation because of the high thermal effusivity, which quickly draws heat away from the skin on initial contact. The smart heat exchange is realized by microencapsulated phase-change materials (PCMs), which provide thermal comfort and better sleep quality with fewer awakenings and by reaching deep sleep phase more quickly. The very small microcapsules can penetrate very deeply inside the textile structure, leaving the surface almost unaffected. The treated fabric is wash-resistant and offers robust thermoregulation while maintaining its breathability and without compromising the hand feel. This treatment can be applied via padding, printing, foam coating, or spray coating in case of foams or latex and can be easily adopted in fabric mills all around the world. Applications are for bed accessories, clothing, sportswear, workwear, and shoes.

Devan Chemicals
Klein Frankrijkstraat 8, Belgium
devan.net



E-soft-shell

A heating technology integrated into 2-way stretch textiles with a diamond shaped knitted pattern. The heatable textile is based on conductive yarns, making it possible for the material to be evenly heated at standard voltages. Designed to be sold by the roll, the material can be cut to size without affecting the embedded technology. The textile can also be dyed and washed. When dyed, the fabric can be custom colored, but the metal yarns will maintain their metallic appearance. Fabric widths vary from 55 in to 57 in (140 cm to 145 cm). A separate power pack is needed to activate the technology. A smart battery system can be applied to a product by attaching it through a conductive tape, which is then connected to the textile. Applications include outdoor activities or motorcycling, but applications in the fashion or wellness industries are also applicable.

Schoeller Textil AG
Bahnhofstrasse 17, Switzerland
www.schoeller-textiles.com

Luminous Tex

Flexible, stretchable and washable woven textiles embedded with optical fibers that do not heat up and consume little power, for creating unique luminous designs. It uses a patented technology that allows weaving of the plastic optical fibers (POF) along the direction of weave of the other synthetic or natural fibers in the fabric. The optical fibers are typically gathered at one end of the textile and connected to a light source. The light is distributed evenly across the entire surface of the material, resulting in a self-illuminating textile. Both conventional and silicon-based fiber optics can be woven into this textile, which can be powered by low voltage rechargeable batteries or smart phones, and can emit red, green, or blue light for up to 12 hours. It is also possible to combine the optical fibers with other fibers in a knitted process. With only one layer of the material, the textile remains lighter, thinner, cheaper, and more flexible than other available solutions. The technology can be applied using completely standard weaving, sewing, printing, lamination and impregnation techniques that maintain the original feel, look and properties of the textile, making it suitable for mass production due to the shorter processing times and reduced cost. It can be cut in the direction of the optical fibers and manipulated like any other fabric. Available by the meter with a standard width of 150 cm (59 in) in multiple fabric colors, types, and textures along with electronic accessories for the lighting, as well as a design and development service for new products. Applications include decorative textiles, fashion and accessories, and home design.

Sensing Tex
Abra i Puig 474, Local 2, Spain
sensingtex.com