



# Techtera



## FRENCH EXCELLENCE IN TEXTILE INNOVATION

*Techtextil 2024*

*April 23-26 - Frankfurt  
Booth E78C hall 12.1*

*Press kit*



**La Région**  
Auvergne-Rhône-Alpes



## SUMMARY

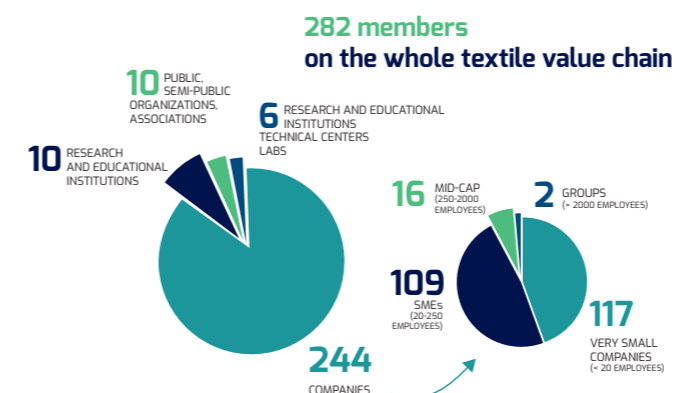
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## TECHTERA: SOURCE OF TEXTILE INNOVATION FOR OUR FUTURE

Techtera is the French innovation cluster dedicated to textiles. It animates a network of more than 282 members with the main objective of boosting competitiveness through collaborative innovation.

The cluster is also involved in structuring actions for the textile industry and related to other sectors, application markets, through interclustering partnerships or European projects.



Our members are supported on:

### QUANTIFIED FOCUS

**26**  
R&D PROJECTS  
FINANCED  
AND LABELLED  
IN 2023 INCLUDING

**6**  
EUROPEAN PROJECTS  
FOR AN AMOUNT OF

**72**  
MILLION EUROS

**44**  
PROJECTS SUBMITTED  
IN 2023

- innovation and collaborative R&D projects, from the idea to the dissemination of the results,
- increasing innovation levers with insights into the current technological and economic environment,
- the marketing of their innovation by individual or collectif support on trade shows, and international collective missions.

Under the presidency of Philippe Sanial, technical director of the chomar group, the cluster brings together the skills of 14 employees.

It relies on a wide network of partners:

- the innovation clusters,
- the collective of the Auvergne-Rhône-Alpes region for the industry of the future,
- the European textile platform Euratex,
- the network of fashion players (ESMOD, IFM, ENSAD...),
- the French Defence Procurement Agency (DGA),
- the main clusters and research centers.

At the international level, Japan is the historical partner of Techtera since 2005. In 2014, the French and Japanese ministries of economy have signed a memorandum of cooperation with associations like Techtera and JCFA (Japan Chemical Fibers Association). The latter was renewed in 2017, then in 2021, reinforcing the cooperation between the two countries, on both research and market.



## THE TEXTILE SECTOR IN FRANCE AND IN THE AUVERGNE-RHÔNE-ALPES REGION

The textile industry groups three types of activity: the manufacture of threads (spinning, miling, texturing...), the manufacture of textiles (weaving, knitting...) and their treatment (finishing, coating, impregnation...).

In the 1980s, this sector experienced a significant decline in the face of globalisation of markets, competition from low-cost countries, and pressure from the clothing industry. To ensure their survival, companies in the sector have reorganised and diversified to focus on activities with high added value.

The strategy is paying off and since 2010, the French textile industry has returned to growth in its turnover (€14 billion in 2022), exports (€9.94 billion in 2022) and recruitment (62,500 jobs in 2022).

The French textile industry currently comprises 2,164 companies, of which 85% are SMEs. One strong characteristic of the ecosystem is the absence of large enterprises, except for a few in which textiles represent only a part of their activity.

In this national context, the Auvergne-Rhône-Alpes regional ecosystem constitutes the largest pool of companies in the national sector, with 584 companies (accounting for 27%), generating a turnover of €3.5 billion (in 2022) and providing more than 17,000 jobs.

## THE TECHNICAL TEXTILES SECTOR

Technical textiles refer to textile products with specific technical properties that provide tailored functionalities for well-defined applications. In France, the technical textiles industry accounted for approximately 30% of the total textile production in 2022. It serves as the primary driver of the French textile sector, encompassing 511 companies with a combined revenue of €7.8 billion and employing 36,500 individuals.

Traditionally known for its expertise in silk weaving, the Auvergne-Rhône-Alpes region has emerged as the leading French hub for technical and industrial textiles, contributing to 70% of the national revenue in this sector in 2022.

### Transportation equipment (35-40%)

*Aerospace, automotive, railway, maritime*

Applications:

textile-reinforced rubber products, carpets, safety (belts, airbags, lifejackets, life rafts...)

### Health and hygiene (15-20%)

Applications:

cleaning, hospital linen, health devices, protection, biotextiles

### Building (10-15%)

*Construction in the building, civil engineering*

Applications:

building materials and components, stabilisation, separation, drainage, structural and soil reinforcement, erosion control

## MAIN APPLICATIONS OF TECNICAL TEXTILES (IN 2022)

### Sports and recreation (5-10%)

Applications:

canvases for paragliders, parachutes, sails, tents, sports equipment, camping equipment, sportswear...

### Protective gear and safety equipment (5-10%)

Applications:

chemical protection, anti-flame and anti-cut equipment, outdoor use (radiation protection...), other safety equipment (ropes, straps...)

### Other industrial applications (15-20%)

Applications:

filtration, insulation, belts, cleaning, draw, packaging...

## WHAT ARE THE CHALLENGES FOR THE TEXTILE SECTOR?

**The societal challenges that guide and determine the products of tomorrow:**

- increasing demand for transparency and ethics,
- the need to live better and longer,
- the necessity for ensuring the safety of all workers in their professions,
- the increasing development of mass customization,
- the desire for entertainment and self-care by individuals,
- The need to differentiate in a globalized market context.

**Beyond these societal challenges, the textile industry faces significant industrial imperatives:**

- demonstrate agility, ability to adapt and be responsive in a competitive environment,
- have a CSR strategy that is compatible with the increased requirements of end-users, regulation, and ecological transition,
- learn how to take advantage of the great versatility of textile potential applications, and anchor its ability to renew itself by identifying target markets with high added value,
- help workers grow and advance through lifelong training and the enhancement of the sector's appeal.

**To meet these challenges, Techtera supports its members on three major technological axes:**

- **high-performance smart materials:** additive manufacturing, smart textiles, textiles and composites, development of new high-performance textile materials...
- **circular economy:** encompassing bio-sourced and alternative materials, recycling, eco-efficient processes, and short supply chains,
- **industry 4.0 and new economic models:** involving vertical and horizontal integration of the industry, personalization, and servitization.





# EXCELLENCE COMES WITH INNOVATION

## TECHTERA, 1<sup>ST</sup> FRENCH DELEGATION ON TECHTEXTIL 2024 TRADE FAIR

For the 9<sup>th</sup> consecutive edition, Techtera will be present at Techtexsil (Frankfurt, April 23<sup>th</sup> to 26<sup>th</sup>), alongside 31 industrial companies on 400 sqm surface, dedicated to the innovations and know-how of its members. This is the most important French delegation at the trade show.

The Auvergne-Rhône-Alpes Region, which financially supports the participation of companies at the show, will be particularly well represented. 28 of the 31 participants are located in the region.



Endowed with a strong entrepreneurial and innovative spirit, our companies are great ambassadors for promoting French and regional excellence.

They present their latest innovations.



## TWO NEW ELASTIC FABRICS, OFFERING ENHANCED COMFORT AND FUNCTIONALITY

Since its establishment in 1929, Berthéas company has specialized in the manufacturing of technical elastic fabrics. Initially focused on orthopedic and medical uses, the company later expanded its products and components to various sectors. The expansion of its range to include jacquard elastic ribbons and the relocation to a new production site (St Chamond - Loire - France) of nearly 8 000 m<sup>2</sup> enabled Berthéas to become one of the leading European industrial weavers of customized or standard elastic ribbons. Devoting more than 4% of its turnover to research and development of new products and backed by a two-person R&D team, the company has been responsible for numerous patent filings. Its latest innovations include the stretch >CTRL< and a gripping elastic fabric designed for the medical sector.

### THE STRETCH >CTRL< FABRIC, DESIGNED NOT ONLY FOR WOMEN...



Recognizing that to ensure good support, sports bras were made from materials that heavily compressed the chest, Berthéas developed a revolutionary elastic fabric: the stretch >CTRL< intended for the manufacture of bra straps. The materials used, combined with a special weaving technique, reduce oscillations during rapid movements and cushion the rebound effect.

By using stretch >CTRL< for the straps, sportswear manufacturers can consider using a less restrictive and more comfortable fabric for the cups, allowing the wearer to breathe better during exertion while benefiting from a high-performance and comfortable product. *"Although Stretch >CTRL< was initially designed as a bra strap, its anti-vibration and cushioning properties will find various applications, both in the sports and leisure market and in other sectors such as medical,"* explains Eric Bahon, Sales Manager.

### A MULTIFUNCTIONAL GRIPPING FABRIC



To address the wide variety of body shapes, no less than eight sizes of back belts are currently required on the market, imposing significant stock requirements on pharmacists, and therefore, considerable costs. By developing a gripping elastic fabric through weaving, Berthéas offers a cost-effective solution. With

this system, the patient can adjust the belt to fit their measurements, thereby halving the number of sizes required to meet demand variety. Made of polyamide and elastane, this system also features tunnels allowing the insertion of reinforcement stays in chosen areas. This multifunctional product is thus fully adaptable with very few alterations required in garment making, thereby reducing manufacturing costs.

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## KARAPACE®, THE EXTREME TEXTILE PROTECTION BY CHAMATEX GROUP

The patented technology Karapace® is the result of an alliance between 2 textile innovations for sport shoes and for racing pilotes suits to meet the requirements of high-risk professions (firefighting, military, police):

- Matryx® : the high-performance textile for sports shoes combining breathability, lightness and resistance,
- Racing : flame-resistant fabric for racing suits ensuring fire resistance, safety and breathability.

The association of these two universes makes Karapace® a high-performance textile solution for extreme protection and resistance.

### KARAPACE®, INNOVATIVE TEXTILE TECHNOLOGY

Karapace® technology ensures high flame and heat resistance and extreme performance, thanks to a weave combining aramid fibers with coated para-aramid filaments.

Karapace® makes possible to do yarn zoning to adapt the textile properties to different zones of the garment to meet the requirements of protection and safety.

The individual coating of the para-aramid yarns increase the breathability of the textile, an essential element for the comfort and life of professionals.



### PROTECTION ET RESISTANCE, KARAPACE® IS DESIGNED TO BECOME A REAL BODYGUARD.

Protection: flash over, molotov cocktail or anti-personal mine, Karapace® protects people from fire and heat.

Resistance: Karapace® ensures very high mechanical resistances, many times higher than standards for fire fighters or police or military to guarantee your performances and safety in extreme situations. .

Breathability: Karapace® guarantees the breathability you need for your activity. Your body breathes, stays dry and resists heat.

Sustainability: equipment life is extended thanks to this durable textile to offer a long-lasting protection.



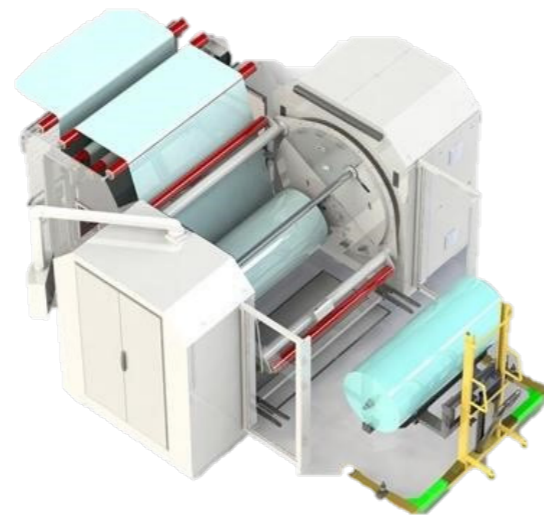
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## A BARREL UNWINDER TO SUPPLY PRODUCTION LINES

FOTIA DMT specializes in the design, manufacture, assembly, and commissioning of machines or complete production lines for processing materials in strips.

The company has developed a barrel unwinder for continuous feeding of production lines. While one coil of material is unwound, a second coil is loaded. When the first coil is empty, the barrel rotates half a turn to transition from empty to full, while maintaining controlled tension through the tension control device. This system offers an alternative to fixed unwinders that require coupling to an accumulator equipped with two rows of movable rollers. By eliminating the need for an accumulator, the barrel system saves on equipment costs and significantly reduces space requirements.



## SELF-POWERED CONNECTED TEXTILES THROUGH TRIBOELECTRICITY

The field of connected textiles is rapidly expanding, but one of the main challenges hindering the development of this promising market is the autonomy in energy of the products, which can include several energy-consuming features such as sensors, LEDs, wireless communication circuits, etc. The technological challenge lies in designing power solutions that are lightweight, compact, and durable while providing sufficient autonomy. Currently, system power is generally supplied by batteries or rigid modules that need regular replacement or recharging, making them impractical with environmental impact issues if not rechargeable.

Based on this observation, Pascal Weber, a textile engineer by training, conceived the idea of applying energy harvesting technologies to the textile world to make the next generation of connected textiles autonomous. In 2019, he founded GammaO, a company that develops and produces textiles capable of converting friction energy into electricity. This is the principle of static electricity. Thus, GammaO offers a solution to ensure the energy autonomy of connected textiles. This patented technology is called triboelectricity.

The core of GammaO's expertise lies in the production of triboelectric generators in the form of threads and their implementation as electrodes through digital embroidery. Thus, the design of the electrodes and their integration into textile articles can be optimized according to the desired applications: energy harvesting or sensor development, while maintaining the flexibility of the support ensuring a comfortable user experience.

To promote this innovative technology, Pascal Weber launched the Uppik brand, dedicated to running clothes. An illuminating jacket, 100% manufactured in the Auvergne-Rhône-Alpes region, is already on the market. Electrodes are integrated into the fabric under the sleeves. Thanks to the runner's arm movements, the electrodes rub against each other and produce enough electricity to power LEDs, ensuring good visibility for the runner. "This jacket is a showcase and a first victory for GammaO, Pascal Weber rejoices. It proves the relevance and viability of our technology. We will now focus our efforts on transposing our solutions to other applications." GammaO is currently developing instrumented insoles equipped with flexible and durable contact sensors that will characterize pressure and movement and is also interested in the markets of personal protection, health, and defense.





## FIBROLINE FILTER SOLUTIONS

Fibroline is an engineering company which developed and patented revolutionary dry impregnation technologies. These solutions enable us to impregnate various powders into porous structures homogeneously thanks to high intensity alternating electric fields. One main advantage of our technology is no need for water or solvents. This gives no polluting liquid waste or need for energy intensive drying.

Over the past months, strong partnerships have been made between Fibroline and leading filtration companies.

Dry impregnation can be used for both thin or relatively thick substrates. Filter media can be of various materials depending on the desired properties.

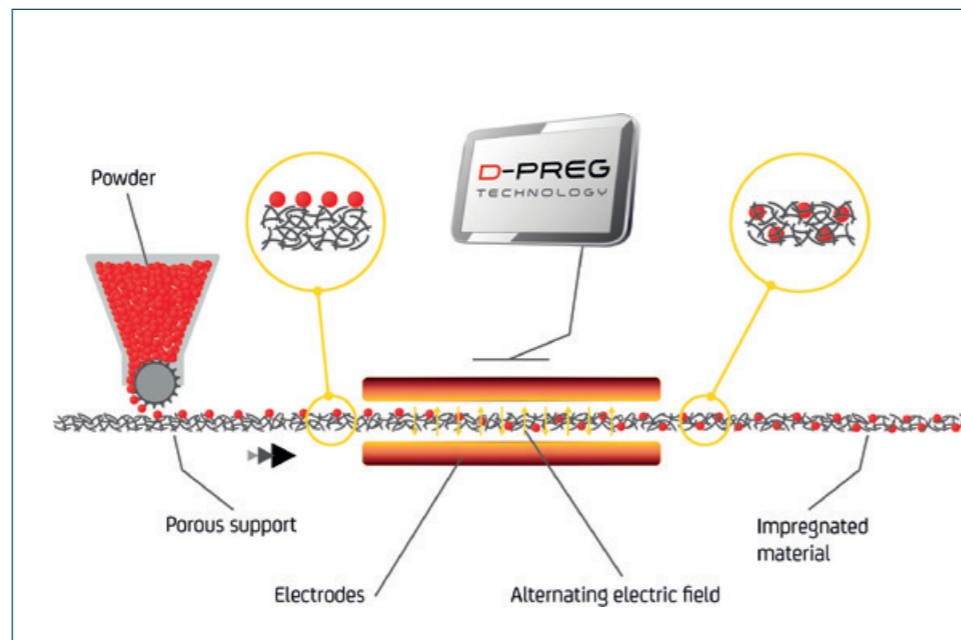
Many different powders can be impregnated to achieve the desired functions. Recently, we have made important improvements to capture/extract specific molecules from air or liquids thanks to active powders, for example: MOFs (Metal Organic Frameworks), zeolites and ion exchange resins. By using porous particles with controlled geometries, we trap the targeted molecules in a very selective way.

The Fibroline technologies give a homogeneous distribution of the particles throughout the porous media. The use of smaller particles will also increase the active area and give

higher adsorption capacity and faster adsorption/desorption kinetics.

Ensuring a good fixation is obviously important. Our R&D team has developed various solutions to obtain a good adhesion and retention of the powders into filter medias without clogging the pores of the particles.

Promising results have recently been obtained for water treatment (arsenic removal, ion extraction, etc.) as well as for air filtration (capture of hazardous gasses in CBRN applications, air dehumidification, CO2 capture or odor removal) and such applications will have a high priority for us going forward.



## "Y-PREG", FIBROLINE'S ECO-FRIENDLY SOLUTION DEDICATED TO DRY IMPREGNATION OF YARNS

Over the years, Fibroline developed a strong expertise in the impregnation of textiles and nonwovens thanks to its innovative dry powder impregnation solutions.

Fibroline's innovation team has developed and patented a new technological solution dedicated to yarns and rovings (Y-Preg technology). This innovation has broadened the scope of Fibroline's technologies and consolidated its position as leader in its field. The principle of the Y-Preg technology remains closely linked to the use of a high voltage alternating electric field charging and distributing particles homogeneously into the porosities of the multi-filaments.

Any type of binders or functional powders can be processed without any solvent and with extremely limited energy consumption, significantly reducing the overall manufacturing environmental footprint.

### UNIQUE EXPERTISE TO SUPPORT CUTTING-EDGE PROJECTS

Fibroline's innovation team supports its customers throughout the product development phase, until final technology transfer. "We work on identifying the economical, technical and environmental added values of the technology through studies carried out with our partners in various sectors of activity," says Sofien Bouzouita, Innovation Manager at Fibroline.

A semi-industrial pilot line has been installed at the Fibroline's innovation center (near Lyon), with flexible peripheral equipment in order to carry out semi-industrial runs with customers, prior to final technology transfer.

### STRATEGIC PARTNERSHIPS TO LAUNCH Y-PREG TECHNOLOGY

Fibroline has established strategic cooperation agreements by market segment, offering to innovation-driven companies a technological advance in their field with the introduction of more environmentally-friendly and unique products thanks to a breakthrough solution.

Several products have been developed in the fields of composite tapes, rubber reinforcements, ballistics, etc., and have led to successful technology transfers on an industrial scale to various French and international customers.





**MKM  
COUTURE**  
CONCEPTION & FABRICATION

## DRAGON, THE ONLY SELF-ADJUSTABLE HARNESS ON THE MARKET

Located in the heart of the Alps, in Annecy, MKM Couture has been specializing in the design and production of technical and safety articles since 1993.

In 2003, the company introduced the CiLAO brand and created the first ultralight harness (less than 80g), whose strength was guaranteed not by traditional straps but through edges. Building on this patented innovation, the company strengthened its collaboration with product users, mountain professionals, to advance its research and development, ultimately becoming a recognized specialist in Class 3 Personal Protective Equipment (PPE) (capable of preventing fatal or irreversible injuries).

With the dual objectives of preserving user safety and ensuring maximum comfort, MKM Couture, under its CiLAO brand, has designed the Dragon harness, a patented technology that eliminates buckles and adjustments. This harness, worn like shorts, eliminates the time-consuming and tedious process of adjustments. It is primarily intended for climbing schools or adventure parks, which appreciate the significant time savings it offers during group activities, as the harness automatically adjusts to the user's size through retractable elastic bands. Users can thus equip themselves safely.

Furthermore, the attachment point (pontet d'encordement) is located above the center of gravity to prevent any risk of inversion in case of a fall.

Certified CE EN 12277, the harness can withstand a load of 1,500 kilograms. To complete the equipment, MKM Couture is one of the few companies in the sector to offer customized lanyards manufactured in less than 10 days according to the client's specifications. This quick turnaround is made possible through the internalization of production, entirely carried out in its factory in Haute-Savoie, France.



**RENÉ  
HERAUD**  
Rubans et Accessoires  
pour l'ameublement  
et le packaging

## THERMOCHROMIC STRAPS TO ADDRESS SAFETY CHALLENGES

Established nearly 60 years ago, Héraud Rubans was originally specialized in manufacturing gathering ribbons used in curtain making.

Several years later, the company expanded its operations to weaving standard ribbons such as satins, grosgrains, and brass taffetas. More recently, the Héraud Rubans teams have ventured into the webbing market. *"Initially, our products were used in various garment industries: luggage, tents, shade sails..."* explains François Héraud, R&D Manager. *But innovation is in our DNA, and our teams remain attentive to sector needs and on the lookout for opportunities. During a maintenance operation on our dyeing machines, we noticed that there was no simple device available to alert operators and technicians to the high temperature of the pipes, potentially causing burns."*

Héraud Rubans' R&D teams then developed a webbing capable of changing color according to temperature. The webbing is coated with a reactive varnish. When the temperature reaches 47°C, it turns white and can display a pre-printed safety message or pictogram. The webbing can be tailored into bracelets according to customer specifications.



This new development finds its application in the industrial sector, and Héraud Rubans teams are currently working on refining and expanding the reactive temperature ranges.

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## IFTH INNOVATES TO REDUCE ENVIRONMENTAL IMPACT IN THE FASHION & TEXTILE INDUSTRY

Thanks to its collaborations with companies, research institutions, and academic partners, the IFTH plays a crucial role in upstream and downstream innovation and continuous improvement of industrial practices, actively contributing to enhancing the competitiveness and sustainability of the textile industry.

The IFTH's expertise, available at all stages of the transformation and lifecycle of textile, hybrid, or composite products, makes it a comprehensive and unique solution nationwide.

The IFTH thus develops solutions aimed at reducing the environmental impact throughout the value chain of the textile industry. Its commitment to eco-design is reflected in innovations such as new bio-based fibers, mono-material products favoring recycling, or alternatives to finishing treatments using hazardous substances such as PFAs, halogens, and formaldehyde resins. Furthermore, the IFTH focuses on product sustainability and end-of-life by developing advanced recycling technologies in partnership.

In recent months, the IFTH has strengthened its commitment to the social and environmental responsibility of the textile industry through a series of concrete initiatives. Among these, the DURHABI project stands out as a unique initiative globally, aiming to standardize the evaluation of the physical sustainability of textile products.

Additionally, the IFTH actively invests in the research and development of alternative materials and environmentally friendly solutions. Among the flagship projects it participates in are BIO-SUSHY, which explores the search for coatings solutions based on bio-

based materials for omniphobic surface protection, and AFTER (Eco-Responsible Textile Functional Finishes), which aims to develop environmentally friendly finishing treatments adapted to regulatory evolution.

The IFTH participates in the research of alternative materials and the promotion of green chemistry, while being involved in collaborative recycling projects. Spinning, weaving, knitting, nonwovens: the numerous platforms of the IFTH are equipped to prototype products through thermomechanical and mechanical recycling. The IFTH notably owns the European Nonwovens Centre (CENT), a unique platform dedicated to dry process nonwoven technologies. Finally, projects concerning chemical or enzymatic recycling of textiles are underway with partners, such as the European WhiteCycle project focusing on improving innovative recycling processes of PET from various waste deposits. This large-scale project, coordinated by Michelin, aims primarily to develop a circular solution to transform complex textile and plastic waste into high-value-added products. It brings together 16 partners including Carbios and Inditex.

IFTH also participates in the French CASTTOR project, aiming to demonstrate the pre-industrial scale viability of an innovative chemical technology to selectively isolate polyester from multi-material used textiles with the goal of drastically reducing greenhouse gas emissions compared to waste management and landfilling.

Upstream of the fashion and luxury sector, digital technologies, especially 3D CAD, offer an exceptional opportunity to innovate and evolve design and sales



*ifth* Institut Français du  
Textile et de l'Habillement

models integrating waste reduction in prototyping or production. They challenge traditional clothing development and manufacturing processes at all stages, from pattern creation to sampling, prototyping, and merchandizing. These solutions enable time and money savings, reduce environmental footprint, and improve coordination among industry stakeholders.

In summary, the IFTH asserts itself as a key player in promoting sustainability and responsibility within the French textile industry, thanks to its expertise, innovative initiatives, and continuous commitment to a circular and environmentally respectful economy.



### ABOUT IFTH

The IFTH is the Technical Institute for Textiles and Clothing (CTI) in France, established with a mission of general interest: the scientific and technical development of fashion and textile sectors, including technical aspects. It is the only technological center with a dual purpose: providing technical, technological, and specific solutions to companies' challenges, and feed the textile ecosystem to promote growth, sustainable development, and the relocation of activities within the territory.

IFTH operates throughout the lifecycle and transformation of fashion and textile products, supporting French textile brands and industries through about ten research laboratories and technical platforms, with 145 employees leveraging multidisciplinary expertise and know-how in materials, textiles, chemistry, digital technologies, and more.



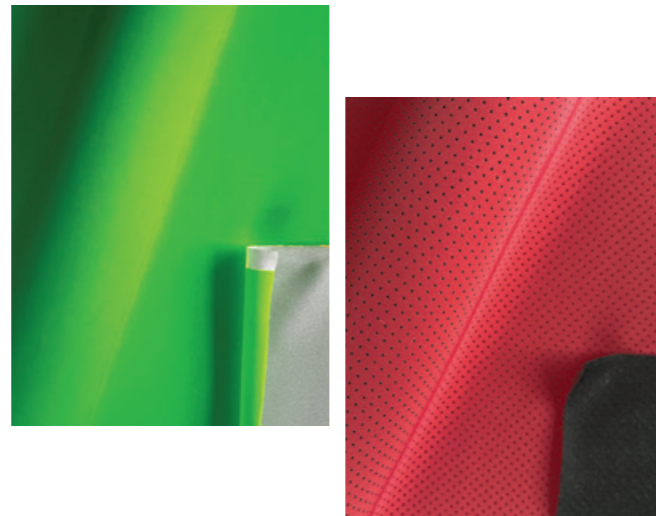
## BIO-REFLECTIVE, THE NEW ECO-RESPONSIBLE PRODUCT DEVELOPED BY JRC REFLEX

Since 1988, JRC REFLEX has been manufacturing fabrics and trimmings that reflect light back to its source using microbeads integrated into a high-quality coating designed to provide lasting performance. To meet the increasingly prevalent demand for eco-friendly and recyclable materials, particularly in the sports and fashion sectors, JRC REFLEX has developed an innovative, low-impact environmental solution: Bio-Reflective.

For many years, the retro-reflective fabrics and trimmings offered by JRC REFLEX have been made from recycled polyesters and glass beads. By developing a new bio-resin derived from renewable plant-based raw materials, the company further reduces the environmental impact of its products and meets the current trend towards a more environmentally friendly textile industry.

The fabrics manufactured by JRC REFLEX incorporate cutting-edge technologies and high-tech raw materials to offer safety, elasticity, and durability. Thus, each new component or raw material used is meticulously tested and refined to maintain the high level of

performance and quality that has made the company successful. With Bio-Reflective, JRC REFLEX provides brands with a reliable alternative to fossil fuels. It is a spontaneous progression for the company in terms of limiting the environmental footprint of its products.



### ABOUT JRC REFLEX

JRC REFLEX is a manufacturer of high-quality retroreflective fabrics and trimmings. Established in 1988, the company is based in Romans, France. Its state-of-the-art production facility is located in Bergamo, Italy. JRC REFLEX primarily serves the fashion, luxury, and sports and leisure industries. It offers rigid or stretch products, in 3D, perforated, or on various materials including merino wool and microfleece.



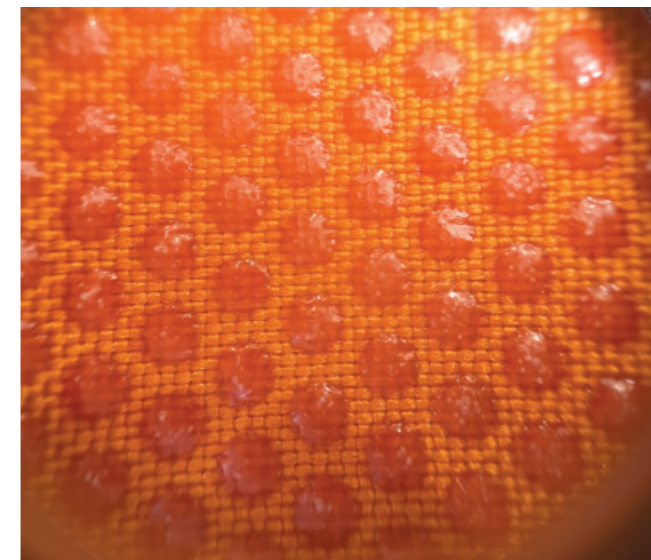
## DOT PRINT, A COMPETITIVE TECHNOLOGY FOR FUNCTIONALIZING TEXTILES

Since 1985, the Montdor Group has specialized in the transformation of flexible materials through various processes such as embossing, continuous thermoforming, lamination, and transfer printing.

The company has developed and recently patented the DOT print technology. This process involves depositing a polymer dot onto the surface of a substrate (woven, non-woven, knitted, etc.) to provide it with new functionalities or reinforce its original properties: abrasion resistance, anti-slip characteristics, conductivity, decoration. The genuine innovation lies in the fact that the polymer application is done in a rotary and continuous manner, and the deposited material

is based on polyurethane rather than ceramic, which is traditionally used. "Offering continuous production optimizes machine efficiency, avoids handling, and makes us more competitive for our clients," explains Etienne Guéret, commercial director. This competitiveness is enhanced by the abandonment of ceramic, which is more expensive than the polyurethane developed by Montdor to ensure equivalent performance.

With its excellent mastery of fire-resistant and anti-abrasive properties, Montdor's R&D engineering team is currently working on optimizing its DOT Print technology for aesthetic properties (color, matting) and thus conquering new markets.





## A PATENTED TECHNOLOGY FOR RECYCLING POLYESTER-BASED TEXTILES

Current recycling methods (thermomechanical and mechanical) do not enable to recycle all types of textiles, especially complex textiles (multi-material or with certain finishes), which therefore end up landfilled or incinerated when they reach the end of their life. The development of new recycling technologies, particularly chemical, is thus essential to enable more circularity in the textile sector.

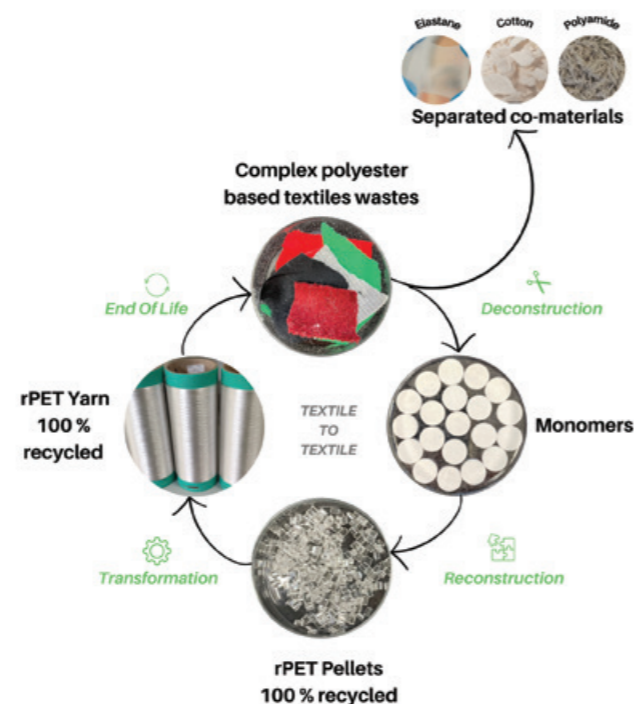
Recyc'Elit, a French start-up based near Lyon, has developed and patented a chemical recycling technology providing a solution to the issues encountered by the textile industry regarding the recovery of end-of-life products. This is a process based on the selective depolymerization of polyester (PET) present in textiles, even blended. This depolymerization makes it possible to recover, on the one hand, a monomer: DMT, which, once purified, can be directly reused to obtain a recycled PET resin of virgin quality, compatible with an application in the textile sector, and, on the other hand, the co-materials (polyamide, elastane, cotton, etc.) separated and isolated in pure and undegraded form.

Also note, the Recyc'Elit's process takes place under mild temperature and at atmospheric pressure, which would significantly reduce GHG emissions compared to landfilling.

This process has already proved itself on a laboratory scale and in a pilot of several tens of liters. Indeed, in the framework of AURAreFIL, project co-funded by Refashion, several reels of 100% rPET threads were made from post-consumer textiles.

Through a project co-funded by the European Commission, called RegioGreenTex, Recyc'Elit will acquire, during summer 2024, a pilot of around a hundred liters.

But the scaling up of the Recyc'Elit's process will not stop there. The CASTTOR project - Chemical And Selective Treatment To Obtain R-PET - was also launched with the aim to create by early 2025, in the Auvergne Rhône-Alpes region, a pre-industrial demonstrator, 10 times larger, capable of processing a minimum of 10 tons of waste per year. This project should make it possible to remove the technical obstacles induced by the change of scale and thus demonstrate the viability of this process on a pre-industrial scale. This is a project co-financed by the French Government, as part of the "France 2030" plan operated by ADEME.



## FIREFIGHTER SAFETY: 30 YEARS IN THE MAKING

Nearly 30 years ago, OTEGO (formerly Dickson PTL) was developing aluminised fabrics for personal protective equipment that would protect against lengthy exposure to radiant heat and to molten metal splashes, mostly for steel makers. Within the time, OTEGO developed another technology suitable for firefighters' proximity suits, especially in airports.

Last year, OTEGO launched the FIRESHIELD: a four-layer complex unique on the market, for fire entry and proximity suits. Our aramid material is laminated with aluminium to provide a highly reflective surface that shields firefighters from deadly radiant heat (C4 level – ISO 11612) but also against extreme heat and intensive use. Indeed, FIRESHIELD is meeting strict standards such as EN 1486, GA 634 (China) and KFI (Korea).

Furthermore, it is the lightest solution on the market with a weight under 1000 g/m<sup>2</sup>! This allows firefighters to gain in mobility and reduce the risks of heat exhaustion.

Finally, it is odourless, chemical and abrasion resistant.

Even after 30 years, the innovation never stops at OTEGO! Our FIRESHIELD complex is now in the world's top five in terms of quality and performance, and we will continue our mission to make firefighting safer.





## PRONEEM CREATES THE CHEMISTRY OF TOMORROW

Founded in 2003 in Marseille by Nathalie Hagege, doctor in biochemistry, PRONEEM is a world leader in bio-based treatments of textiles to make them intelligent. A pioneer in its sector and leader on the French market, PRONEEM has developed a wide range of treatments intended for numerous sectors such as bedding, clothing, and even personal protective equipment.

PRONEEM's know-how is based on impregnating fabrics with bio-based active ingredients, whatever the material. These 360° eco-technologies protect against dust mites, eliminate microbes, repel insects, soothe, refresh, and perfume.

PRONEEM is committed to French production and know-how. Each solution proposed by PRONEEM represents a sustainable choice, guaranteeing responsible and resistant products, adapted to the conditions and requirements of use and washing of the treated items..

### OPENING OF THE NEW 4.0 FACTORY

In 2023, PRONEEM reached a major milestone in its development with the inauguration in May of its new 1,700 m<sup>2</sup> plant in the south of Marseille. This new strategic location in the heart of the metropolis represents a significant turning point for the company.

The new plant includes a vast space dedicated to research and development, equipped with a state-of-the-art laboratory. This research space offers an atmosphere conducive to exploration and innovation, enabling us to offer ever more effective solutions, in line with growing consumer expectations. Innovation, which has always been at the heart of PRONEEM's DNA, is thus fully enhanced in this environment. By continuing to invest in innovative research initiatives, PRONEEM is committed to constantly improving its

solutions, providing textile finishes that are both responsible and maintain its commitment to sustainability.

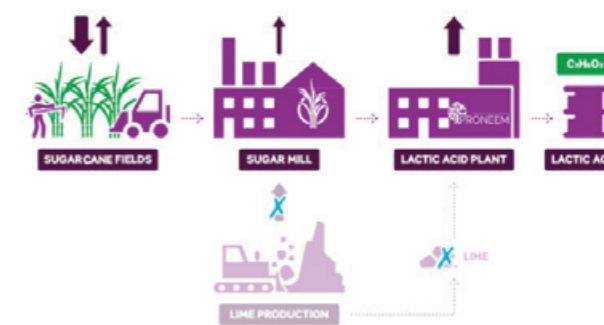


The first innovation to emerge from this device is LACTIC<sup>®</sup>, specially designed to effectively inhibit the growth of odor-causing bacteria. This unique finish uses lactic acid to ensure prolonged fiber disinfection.

By guaranteeing prolonged sanitization, LACTIC<sup>®</sup> technology promotes the durable appearance of textiles,

considerably reducing the need for frequent washing. This approach actively contributes to reducing the environmental impact of textiles and promotes more eco-responsible linen management.

Lactic acid, derived from a natural fermentation process, is the preferred choice for manufacturers seeking bio-based, sustainable ingredients as an alternative to traditional synthetic products often based on CMR (carcinogenic, mutagenic, reprotoxic) products, making it an essential option in terms of social and environmental responsibility.



### PARTNERSHIP WITH THE POLYGIENE GROUP

PRONEEM signed an exclusive partnership with the Polygiene group in November 2023 for the launch of a revolutionary antimicrobial technology of plant origin on the textile market.

This technology is based on an active ingredient entirely of natural origin, extracted from bio sourced ingredients. It represents a major advancement in the field of antimicrobial solutions and meets the growing demand for environmentally friendly products in the textile industry.

Thanks to this collaboration with Polygiene, Proneem has found a competent and innovative partner. Polygiene, as a market leader, shares the same vision and values.

This partnership gives Polygiene privileged access to this unique technology on the market, with global exclusivity in the sports, outdoor leisure and fashion segments. "The collaboration with the Polygiene Group offers us a very competent and innovative partner. As a market leader in its field, we are convinced that the Polygiene Group is the right partner for us. The product is revolutionary, 100% bio-based and very effective." rejoices Nathalie Hage, Founder and CEO of Proneem.



## AQ-TECH AND SATAB FORM AN ALLIANCE TO PROPEL EWEAVE TO THE FOREFRONT OF SMART TEXTILES

AQ-Tech, a specialist in multidisciplinary engineering in the fields of mechanics, electronics, and smart textiles, partners with Satlab, a European reference in the narrow textile market, to enable Eweave, a smart textile brand already present on the market for 2 years, to accelerate its development and consolidate its position as a pioneer in the world of smart textiles.



The objective is to combine AQ-Tech's expertise in development, prototyping, and assembly, that becomes the integrator of Eweave solutions, with Satlab's textile know-how and its ability to ensure complete industrialization.

Thanks to the alliance between Satlab and AQ-Tech, Eweave establishes an R&D center, the EweaveLab, its

internal innovation hub that allows it to stay at the forefront of technology, to create the smart textile solutions of tomorrow, and to bring them to the level of industrial maturity for its clients' applications in many industrial sectors (construction, automotive, aerospace, industry, PPE, architecture, etc.).

EweaveLab pushes the technical boundaries of smart textiles by exploring a multitude of technologies.

With deep expertise in smart textiles, including textronics and microelectronics, mechanics and connectivity, as well as textile and technical fibers, EweaveLab is able to develop solutions for various uses:

- Detection: smart textiles detecting temperature, tension, humidity, etc.
- Actuation and activation: electrostimulation, haptic, etc.
- Lighting: smart textiles for visibility, decoration, protection, etc.
- Inflatable: inflatable structures, airbags, etc.

Eweave offers support at every stage of product development, integrating a manufacturing workshop for prototyping and providing precise expertise in the industrialization phase. Eweave transforms smart textile solutions into reliable and industrializable products.

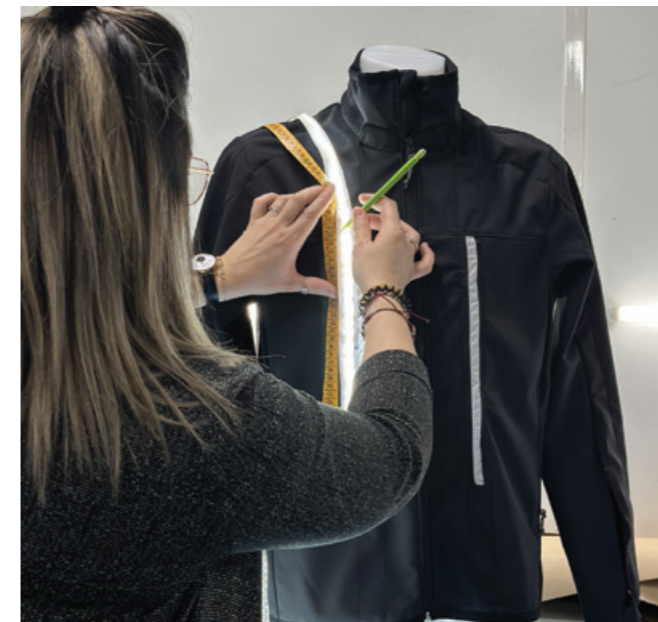
The alliance of AQ-Tech and Satlab demonstrates Eweave's commitment to staying at the forefront of technology and meeting the evolving needs of its clients, while strengthening its position as a leader in the smart textiles market.

### EWEAVELAB' SHOWCASES ITS LATEST DEVELOPMENTS AT TECHTEXTIL

The EweaveLab' team will be present at Techtextil, on booth 12.1 E58D.

Among these innovations, we have a professional multizone lighting vest, offering customizable visibility and lighting features as well as Bluetooth and Wi-Fi connectivity.

This vest, without compromise, washable and repairable, combines safety and work facilitation features for the user, with 7 individually controllable lighting zones and a tactile control button.



#### ABOUT AQ-TECH

AQ-Tech is an agency of multidisciplinary engineers dedicated to innovation projects.

AQ-Tech has positioned itself as a genuine outsourced innovation unit for its customers. Its passionate team of experts in mechanics, electronics and intelligent textiles is dedicated to product design, prototyping and industrialisation.

Based near Annecy, France, AQ-Tech is a group of 15 passionate engineers. In addition to its smart textiles division, which is now dedicated to Eweave, AQ-Tech continues its multidisciplinary engineering activities in mechanics, electronics, software and inflatable products.



## WEAVE ACCELERATES ITS DEVELOPMENT AND CONSOLIDATES ITS POSITION AS A PIONEER IN THE WORLD OF SMART TEXTILES THANKS TO THE ALLIANCE BETWEEN SATAB

Satab, recognised as one of Europe's leaders in narrow textiles, is teaming up with AQ-Tech, a multidisciplinary engineering agency with expertise in mechanics, electronics and smart textiles. By integrating AQ-Tech's development, prototyping and assembly skills, Satab is accelerating the development of Eweave, its brand of smart textiles, made in France, with the ambition of becoming the leader in smart textile solutions!

Eweave's linear sensors combine textile know-how and IOT (Internet of Things) skills to offer an unlimited range of solutions.

Depending on requirements, Eweave offers electrical connectivity, data transfer, on/off switch integration, dimming, detection and location of leaks, pressure, shocks, cuts, mechanical stress, pressure, water level measurement and a new lighting function.

Thanks to the alliance between Satab and AQ-Tech, Eweave solutions now have an R&D centre dedicated to accelerating their development and time-to-market. This new 'EweaveLab' is working on turnkey solutions ready to meet the needs of a wide range of industrial sectors (construction, automotive, aeronautics, industry, PPE, architecture).

### WEAVE, SMART CONNECTED TEXTILES

Depending on requirements, Eweave takes on different functions.

For detection, Eweave becomes a connected linear sensor capable of geolocating leaks, cuts, pressure and impacts. Thanks to a control interface called MyEweave, you can monitor your installations 24/7. As soon as an anomaly is detected and located, MyEweave triggers the chosen alert system (email, message, call) and tracks and logs any action taken.

For on-board functions, Eweave functions as an electrical conductor, a data transfer device or acts as an on/off switch or dimmer.

Finally, the integration of LED lighting solutions gives Eweave expertise in lighting, ambient lighting and signage.

Featuring a revolutionary textile connector system, Eweave solutions can be plugged into any connector, making them easy to install.

Developed in lengths from 10 cm to 5 kilometres, Eweave's solutions combine robustness, thinness, lightness and flexibility, capable of adapting to all surfaces and environments.

### WEAVE, LES SOLUTIONS SMART TEXTILES MULTI-SECTOR



Eweave provides tailor-made solutions for a wide range of industrial sectors.

To give just a few examples of applications, the leak detection solution is perfectly suited to fixed and flexible roofs, swimming pool liners, outdoor equipment, tents, flexible structures, data centres and piping, while the level measurement solution is ideal for monitoring tanks and industrial vats.

Detection of mechanical stress, pressure or shock



can be perfectly integrated into avalanche protection systems or other protective nets.

Presence detection can be incorporated into vehicle seats, or developed on-street for traffic and parking management.

By also detecting cuts, Eweave can be used to monitor stretched canvas, ducts and cables, lorry tarpaulins and PPE clothing.

Lastly, sensors, on/off switches and dimmers may be of interest to the automotive, rail and PPE markets for textile integration of certain functions previously performed by buttons.

The lighting functions are simply controlled using a remote control or a smartphone app. Depending on the LEDs used, Eweave lighting can be used for lighting, ambience or signage. Designed and printed to order, Eweave lighting is aimed at architects and designers in a wide range of fields, including decoration, transport and construction.



### WEAVE EXHIBITS AT TECHTEXTIL

Potential customers will be able to discover the technical solutions offered by Eweave, thanks in particular to demonstrators displaying each solution.

A prototype PPE jacket combining electrical conductors, an on/off switch and a lighting solution will also be presented.

The range of applications, uses and services associated with Eweave's smart textile solutions can also be found on the dedicated eweave.fr website.

### À PROPOS DE SATAB

Since 1905, Satab, an independent family business, has been creating, weaving, braiding and knitting ribbons, braids, straps, cords...

A European benchmark in the narrow textiles market, Satab combines high-tech production facilities with modern automated looms and the world's largest active workshop of wooden shuttle looms, which has been awarded the Entreprise du Patrimoine Vivant (Living Heritage Company) label.

Its production is 100% integrated and «made in France» (Haute-Loire):

- Yarn preparation (warping),
- Manufacturing (weaving, braiding, knitting),
- Finishing (dyeing, printing)
- Finishing (rolling, heat setting, coating, cutting, making up).

For more than a century, Satab has been shaping and transmitting trends by transposing them onto its ribbons. Today, Satab applies its expertise across 6 divisions: fashion, packaging, home, haberdashery, industry and health.

The company has a production capacity of over 10 million metres per week and manages a stock of over 40,000 references.

It spans all 5 continents.

Certifications: ISO 9001, ISO 50 001, Ecovadis, GOTS, OEKO-TEX® STANDARD 100, FSC®, GRS and Masters of Linen.



## SPOOLEX UNVEILS ITS LATEST INNOVATIVE SOLUTIONS AT TECHTEXTIL

Spoollex and its 3 well-known brands, Calemard, Decoup+ and Roll Concept, are involved in textiles market since the foundation of this French company in 1955. The company unveils its latest innovations at the Leading International Trade Fair for Technical Textiles and Nonwovens.

### **Calemard, the experienced Machine manufacturer**

With the development of "technical" textiles and nonwovens, the French company, through its Calemard brand has decided to continuously strengthen its leading position on applications where quality slitting and/or winding are difficult to achieve, by developing its expertise in multi slitting technologies and increasing its web tension control skills. Thus, Calemard offers a wide range of standard slitter-rewinders for stable products but also a technical range for tension sensitive materials or heavy duty production.

All these equipment are offered with different assistance and automation levels depending on customers' needs and organization. Christian Montusclat, Sales Director, to precise "Calemard's range is not limited to slitter-rewinders but also includes other reliable and efficient types of equipment such as spooling lines, in-line winder, in-line slitter, turret winder, etc.



*For example, answering a specific customer need, we engineered around our cutting-edge unwinding / slitting / rewinding technologies, a 3 axles non-stop turret winder with loading from floor, printing, slitting and cross cutting, coreless rewinding, labelling and automatic unloading". This development has been made possible thanks to the support of Calemard's integrated engineering department and its well-equipped testing shop.*

### **Decoup+ makes ultrasonic technology accessible to all**

For almost 50 years, Decoup+ offers a wide range of proven industrial equipment to perform ultrasonic cutting/sealing operations. Sylvie Montagne, Sales Manager of Decoup+ explains "Are you familiar with the possibilities offered by the ultrasonic technology? This technology is safe for the operator and the environment, without smoke, noise nor smells! It also avoids using any additional material such as thread, staple, glue or rivet... Then, it has another major advantage: Cutting and sealing in ONE operation with only one device, direct fabric use on the final product without any downstream operation. This technology could be used on thermo-fusible products such as polyester, acrylic, polypropylene and blended fabrics, used for example in sun protection, garments, ribbons, home furnishings, geotextile, etc." With the launch of its first range in 1975, Decoup+ is now recognized as a worldwide expert in ultrasounds, offering a wide range of handheld devices or equipment to be installed on existing machines, at each step of textile manufacturing process : edge cutting on weaving looms, edge cutting and/or centre slitting on stenters and inspection machines, manual devices for small or medium size series, unit for table XY implementation... Sylvie to add: "come to visit our stand D03 to discuss our

*upgrade of existing equipment and especially, discover our latest development, an innovative and compact solution to help weavers to save time, money and energy costs."*



### **Roll Concept, designer and manufacturer of low inertia rollers**

Roll Concept is the Industrial Rollers division of the Spoollex. Since 1991, the company designs and manufactures industrial idler rollers, chill rollers and winding cores, specially engineered to increase line speed and improve process performance, by reducing web tension on the process and/or to help to save energy. "Indeed, thanks to Spoollex global activity, Roll Concept's engineers are used to understand converting needs and know that the process defines the needs" explains Patrick Mercier, Sales Manager of Roll Concept. Thus, the company can carry out all

type of projects, from standard need to customized solution, from designing to assembling. Its expertise allows Roll Concept to offer the best profile, coating and assembly, to engineer the most adapted roll to improve process performance. Roll Concept is also the European exclusive distributor of DFE. Dover Flexo Electronics is a recognized leader in tension control solutions, with 49 years' experience designing and manufacturing load cells, amplifiers, display indicators and closed-loop controllers.





## DUCHESS PROJECT: GIVING A SECOND LIFE TO CARBON FIBERS SOURCED FROM COMPOSITE MATERIALS

In 2018, global demand for carbon fiber reinforced polymers (CFRPs) showed predominant use of this material in the aerospace, automotive, sports and leisure, and wind turbine blade sectors.

For the wind and aerospace sectors, some studies have estimated that CFRP waste deposits will grow rapidly, reaching nearly 1 million tons generated worldwide by 2050.

Recycling processes for recycled carbon fibers are beginning to emerge on an industrial scale, including vapothermolysis<sup>1</sup>, but given the increasing amount of materials reaching the end of their life, it becomes essential to create an industrial ecosystem capable of valorizing these wastes and creating added value.

To address these challenges, Sulitec, in partnership with IFTH (Institut Français du Textile et de l'Habillement), Alpha Composite Recycling, ENSAIT (École Nationale Supérieure des Arts et Industries Textiles) and IMT Mines Albi-Carmaux, initiated the collaborative DUCHESS project in February 2024. The ultimate goal of the project is to produce yarns and mats from recycled carbon fibers (rCFs) that have comparable performance to virgin carbon fiber composites (vCFs).

### Project Objectives

- Define the technical characteristics of rCF yarn and mat coils to be produced for perfect compatibility with existing transformation processes and machinery in France, to preserve and valorize the tools of industry stakeholders.
- Use waste deposits to produce rCFs through vapothermolysis. Since rCFs come from end-of-life composite parts waste, the material acquisition cost

will be reduced. Additionally, the DUCHESS technology will reduce transportation costs for virgin carbon fibers, which are mostly produced outside the national territory.

- Optimize and produce semi-finished products (non-wovens, tapes, rovings) and oriented rCF yarn coils.
- Demonstrate the high level of competitiveness of rCF products.
- Reduce CO<sub>2</sub> emissions with an estimated 2.1 million tons avoided over eight years of operation.
- Support employment with the creation of 165 FTEs (full-time equivalents) over ten years at Sulitec and Alpha Composite Recycling.

The partners plan to sign contracts for the transfer of knowledge acquired through the DUCHESS project with textile sector companies wishing to produce high-performance rCF yarns and mats for the manufacture of their technical parts. To successfully carry out this project, €3.7 million is invested over four years, including €2.5 million in funding as part of the France 2023 program led by ADEME.

<sup>1</sup> Vapothermolysis allows the separation of carbon fiber and resin using steam at ambient pressure, without degradation and without the use of chemical solvents.

Financed by



## TECHNISANGLES TACKLES THE CHALLENGE OF DESIGNING SUSTAINABLE PRODUCTS

Technisangles, a family-owned company founded in 1926 in Saint Chamond (Loire - France), has been actively engaged in sustainable development for many years, making it a genuine corporate culture today. "Faced with the significant challenge of preserving the environment, it is our responsibility as business leaders and economic actors to produce with a focus on resource efficiency and reduced environmental impact", explains Dolorès Relave-Puig, the company's director, assisted in this role by her two children, Victoria and Antoine.

The initial step for the company was, in 2023, to implement ISO 14001 standards with a proactive and well-defined environmental policy, emphasizing upcycling and recycling. This includes recycling all production waste through dedicated channels and even innovative revalorization, as the company utilizes some of its material scraps to create cushions.

In line with this, Technisangles' research and development unit has been working on developing more environmentally friendly materials and manufacturing processes. These efforts have led to the creation of high-tenacity polyester straps containing 100% recycled materials.

Today, Technisangles is the sole company offering a range of polyester straps made from 100% recycled materials. Highly durable, these straps can be used not only in the traditional luggage market but also in outdoor sports, personal protective equipment, and defense sectors. Technisangles offers a range with widths from 15 to 50 mm, labeled as GRS (Global Recycled Standard). "According to customer needs, we could even consider a variable-width strap made from this new material," details Dolorès Relave-Puig. Variable-width straps are a patented product by Technisangles, notably used in the manufacture of

safety harnesses. A single strap can have two to three different widths to facilitate buckling. This requires specific weaving machines and, most importantly, finely tuned skills and expertise in adjustments. While it may sound simple in theory, in practice, Technisangles is the only European company that has mastered the process for widths of 20/44 mm.



### ENVIRONMENTAL CONSCIOUSNESS AT THE HEART OF SPONSORSHIP EFFORTS

The strong environmental commitment of Technisangles is also reflected in its sponsorship activities. The company has chosen to support environmentally neutral sports: funambulism and slackline. In August 2022, it sponsored French funambulist Nathan Paulin, who broke the world record for the longest distance walked at Mont Saint Michel (Normandy). For this 2,200-meter crossing, Technisangles provided a 20mm technical strap made from Vectran and HPME, known for its resistance to stretching and high strength. Indeed, HPME, a high-density polyethylene, and Vectran exhibit exceptionally high breaking strength, which can be 5 to 10 times greater than that of steel cables.



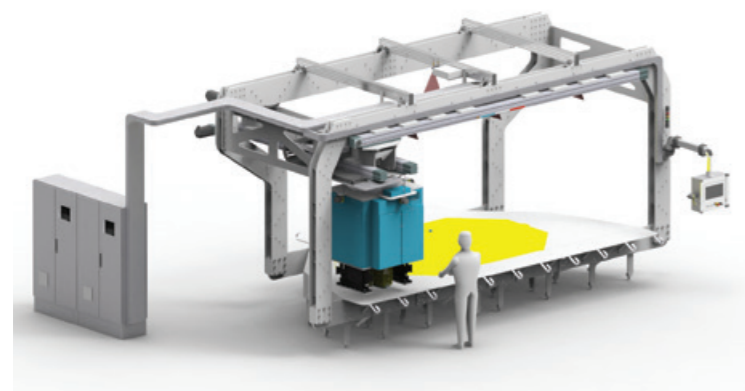


**Thimonnier**  
RADIO FREQUENCY WELDING PARTNER

## THIMONNIER INNOVATES WITH OPTICAL VISION

Thimonnier, specialist in welding flexible materials for over 70 years, designs and manufactures its presses and generators. The company has distincte and renowned expertise in high-frequency welding (power ranging from 400W to 30kW), enabling the assembly of plastic materials. *"Our added value lies in our ability to adapt our machines to customer needs and anticipate industry demands aligned with technological advancements,"* says Romain Christophe, sales manager. Thus, Thimonnier is the first industrial company to develop a large-format automatic gantry with optical vision, designed to weld flexible plastic materials using high frequency. This system incorporates a generator with an integrated welding head and, most importantly, a camera that scans the materials placed on the table and detects the areas to be welded.

This automation of operations allows, beyond an obvious time saving, to gain in reliability and therefore in quality, by limiting the interventions of operators. Furthermore, the system has no size limitations and can be adapted and customized according to the piece to be welded, up to several tens of meters if necessary.



### HIGH-FREQUENCY WELDING

Also known as radio-frequency welding, is a process that requires specific equipment including a welding press equipped with electrodes and a high-frequency generator. The generator converts standard power electricity into high-frequency electrical current, which is directed to electrodes positioned on each side of the thermoplastic materials to be welded. The welding press electrodes apply pressure to the surfaces while the current passes through them, generating a magnetic field that rapidly and uniformly heats the areas in contact with the electrodes until they reach their melting point. This process is commonly employed in the manufacture of products such as packaging, bags, cases, and inflatable plastic items.

## LATEST PROJECTS SUPPORTED BY TECHTERA

**Innovation is a strategic priority for companies evolving in the textile industry. It aims to address competition and diversify opportunities by promoting the use of textiles in new application areas.**

**However, when it comes to research and development, it also involves significant financial, human, and material investments, which can be a challenging venture for SMEs.**

**Techtera supports the development of industries in the sector through collaborative research around three technological axes:**

- the circular economy and resource efficiency,
- the smart and high-performance materials,
- the industry 4.0 and new economic models.

PRESS CONTACT THIMONNIER  
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## CIRCULAR ECONOMY AND RESSOURCE EFFICIENCY

**PATENTH**  
*Transition support platform for environmental change in the textile and apparel industry*

Support platform for environmental transition in the textile and apparel industry. Comprehensive tool to help eco-design textile products, based on data collection and analysis system aiming to characterize the environmental value of textile products.

**PLAIRE\*\*\***  
 Develop high-performance plastics from 100% recycled materials.

**ECOFLEX\*\*\***  
 Develop eco-designed coated textile solutions for the luggage and protective wear sectors.

**CASTTOR\*\*\***  
 Develop an industrial demonstrator for depolymerising polyester in complex blends, aimed at valorisation and recycling of polyester-based textiles.

**TEXTILE WASTE MAPPING**  
 Identify and assess the potential for valorising textile production waste and dormant stock, and establish a transformation support framework.

**OZOCELL\*\*\***  
 Transform linseed joint products into low-impact cellulose artificial fibers, benefiting farmers and industries, with ozone-based innovation process.

**REGIOGREENTEX\*\***  
 Promote the collaboration in research and development for the textile industry to establish a systematic circular economy business model across the European Union.



**CALIMERO\***  
 Create a new framework for the Life Cycle Assessment of bio-based industries, including new impacts such as biodiversity, carbon capture or CAPEX.

**BIOSTRUCT\*\***  
 Develop advanced technical solutions for the precise design and manufacturing of composite parts using bio-materials. The project aims to improve the application of bio-composites in structural applications.

**MC4\***  
 Establish circular process approaches for carbon and glass fibres composites to make the European carbon and glass fibres value chains more sustainable, independent and competitive.

## SMART AND HIGH PERFORMANCE MATERIALS

**AII-COAT\*\*\***  
 Implement a new multi-scale eco-design strategy enabling the complete redesign of the composition of a high-performance flame-retardant flexible composite membrane.

**ARMETISS\*\***  
 Develop a set of smart clothes and equipment integrating complementary functions based on EU end-users' needs and textile-based advanced technologies. The project output will provide the necessary functionality to enhance soldiers' capacity to perform their demanding tasks while increasing their safety and well-being during military operations.

**SWEETHEART**  
 Develop and fabricate integrated flexible textile-based biosensors (textrodes) aimed at measuring multi-lead ECG and respiratory motion during CMR (Cardiac Magnetic Resonance).

**FOMOF**  
 Functionalize military and civil absorbent membranes using Metal Organic Frameworks (MOFs).

## INDUSTRY 4.0 AND NEW ECONOMIC MODELS

**ABC4I\*\*\***  
 Develop innovative online digital and numerical analysis solutions based on machine learning and automation, for real-time monitoring of production processes.

**TERATEX\*\*\***  
 Initiate a feasibility study of using terahertz radiation for identifying hard points in textile sorting processes.

**EUROBOOSTEX\*\***  
 Accelerate green and digital transition, build resilience and boost recovery in textile industry providing SMEs a set of tools to improve their innovation potential, technological uptake, skills, and internationalisation capacity.



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