

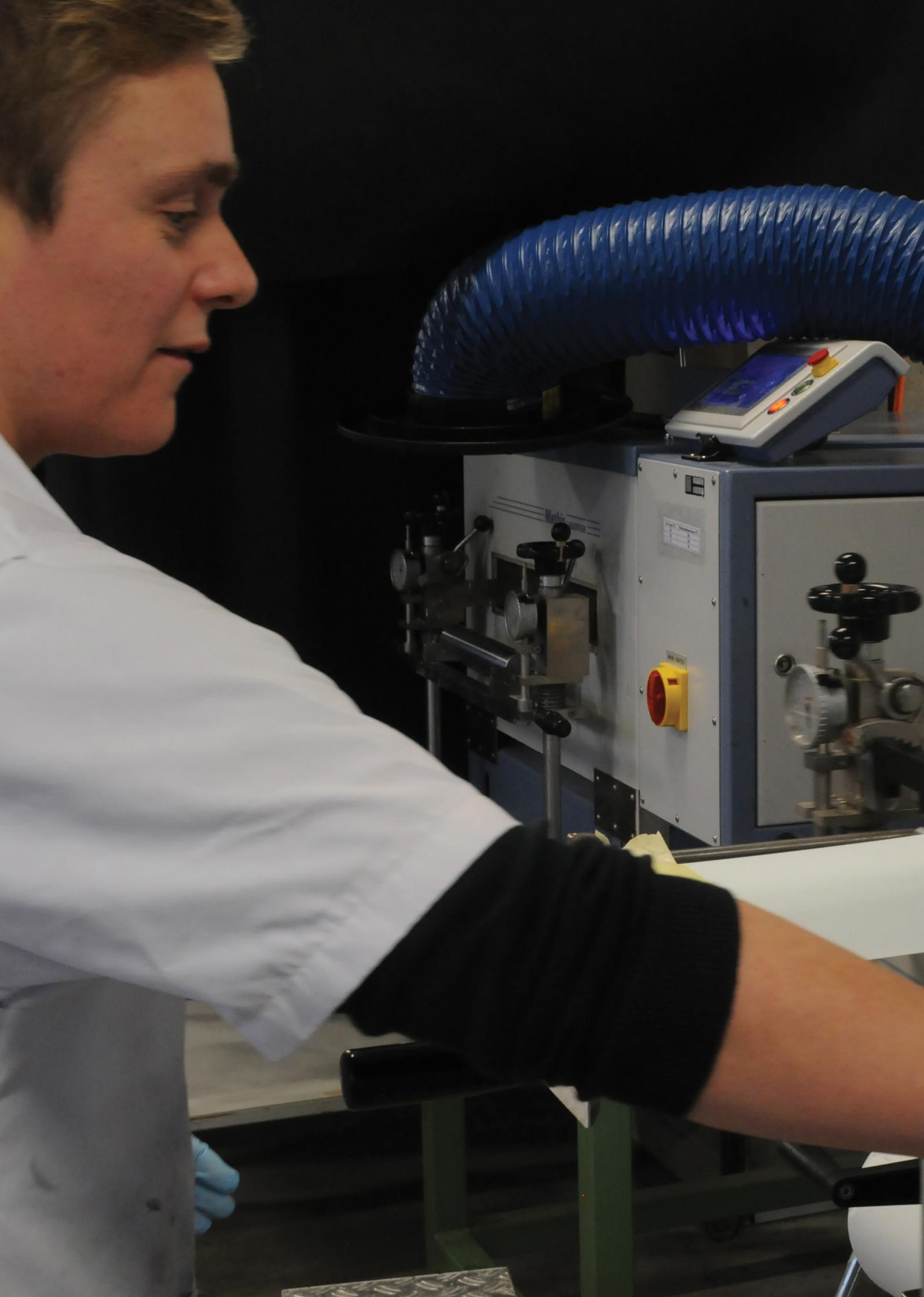


TEXTILE

COATING

Platform

FINISHING



# Textile functionalisation & surface modification

Textile functionalisation is the process of adding new functions, features or properties to a material by changing its surface chemistry to meet the requirements of the final application. These new functions, features or properties include amongst others: comfort, breathability, waterproofness, thermal regulation, antimicrobial properties, easy-care properties, longevity, flame retardancy, and the overall mechanical performances of textiles.

Surface modification adds physical, chemical or biological characteristics that differ from the ones originally found on the surface of a material. The modification can be done by different methods with the aim of altering certain surface characteristics, such as roughness, hydrophilicity, surface charge, surface energy, biocompatibility and reactivity. Surface modification is often performed in view of subsequent finishing, dyeing and/or coating processes.



# R&D

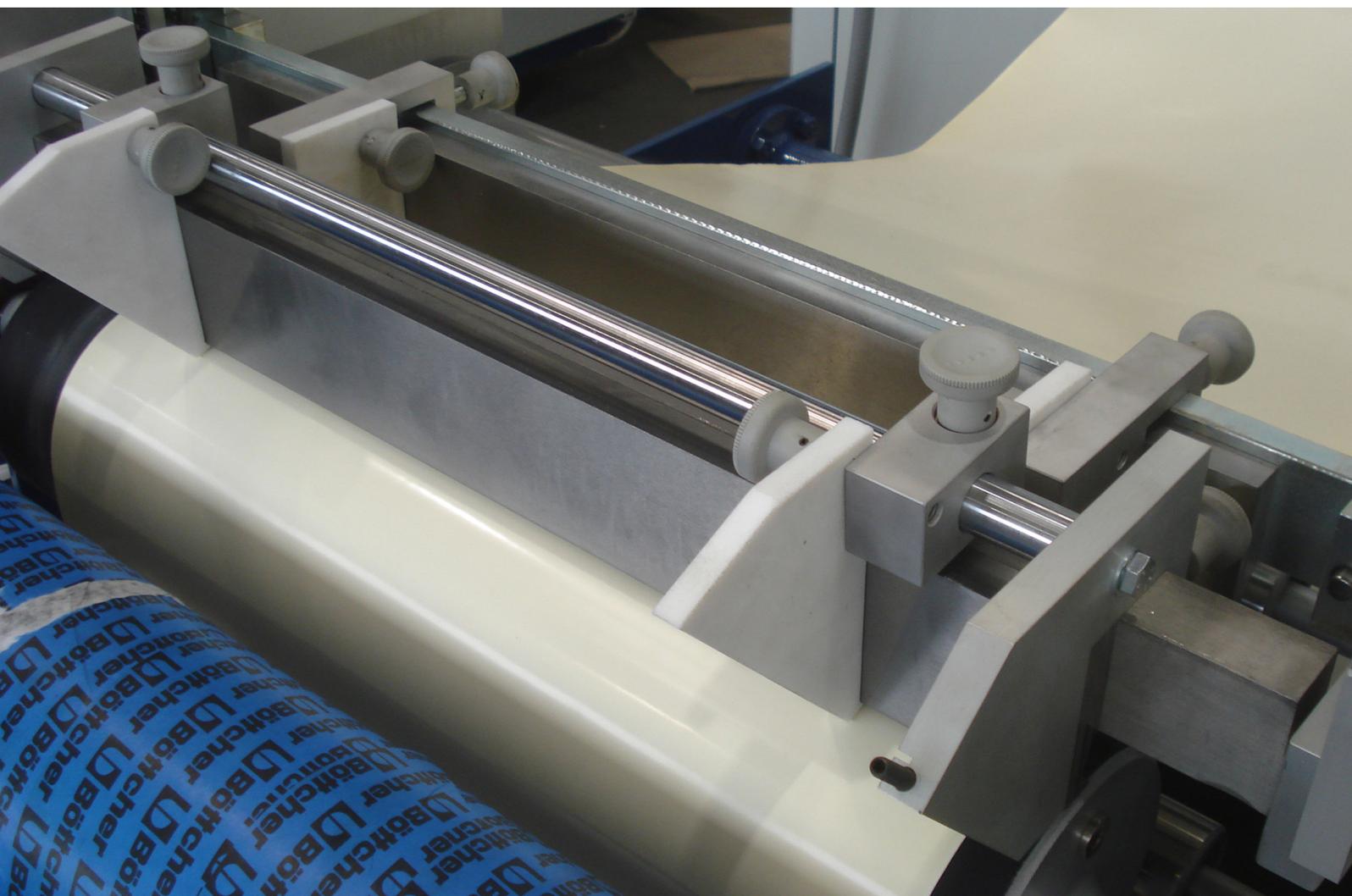
High-performance textiles are created by applying finishes or coatings to textile substrates or yarns to improve or alter their properties and performances.

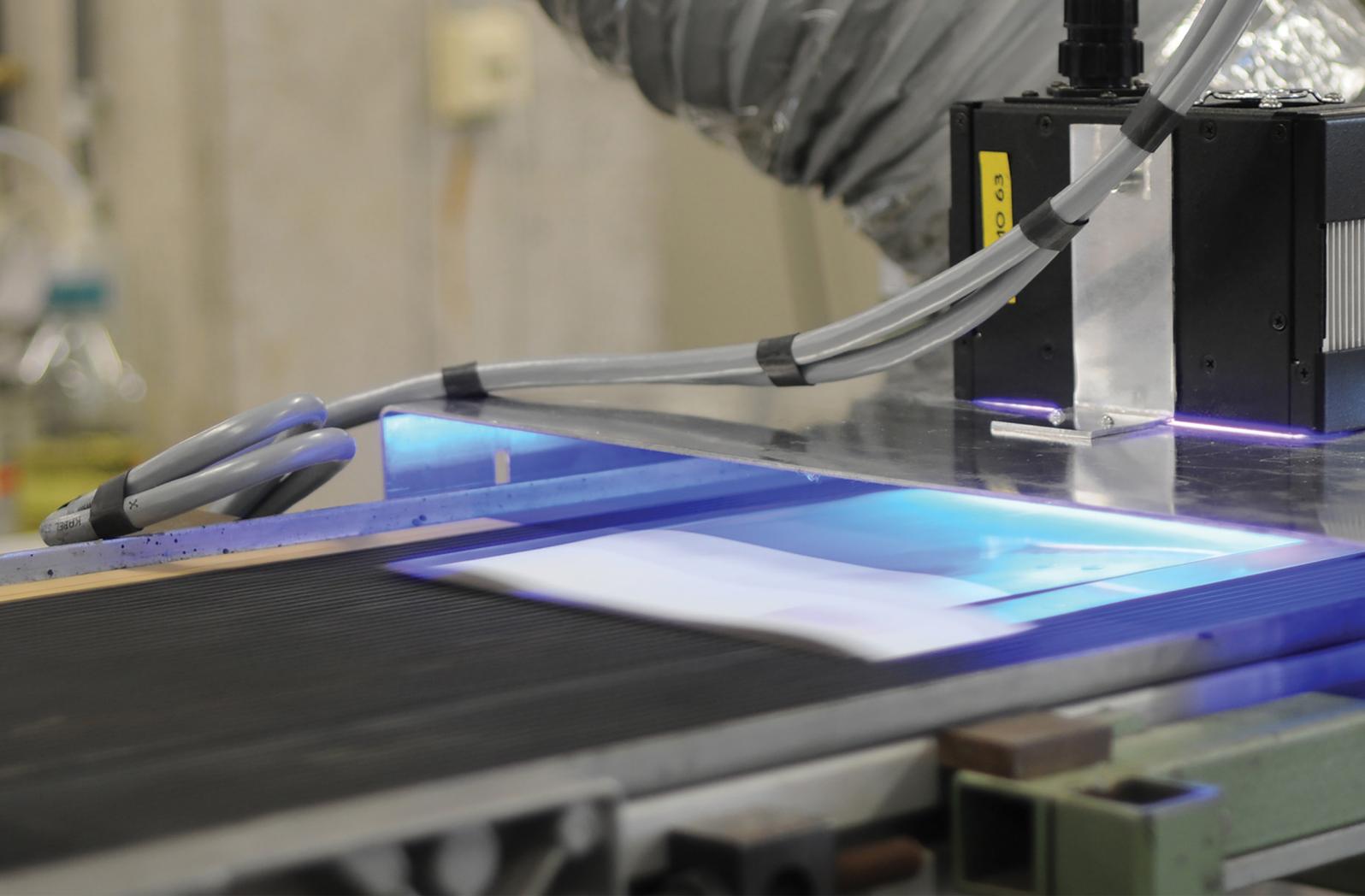
Sustainability includes the use of renewable materials and of non-hazardous chemicals and additives (in conformity with REACH, CLP), energy and water saving production methods, responsible working conditions, and last but not least: the product's longevity.

Centexbel is focused on harmonizing sustainability, high-performance and cost-efficiency in textile finishing, coating and laminating.

## Research projects

[www.centexbel.be/projects](http://www.centexbel.be/projects) lists all regional, national and European research projects that Centexbel is performing in close collaboration with industrial and research partners.





# Pilot platforms

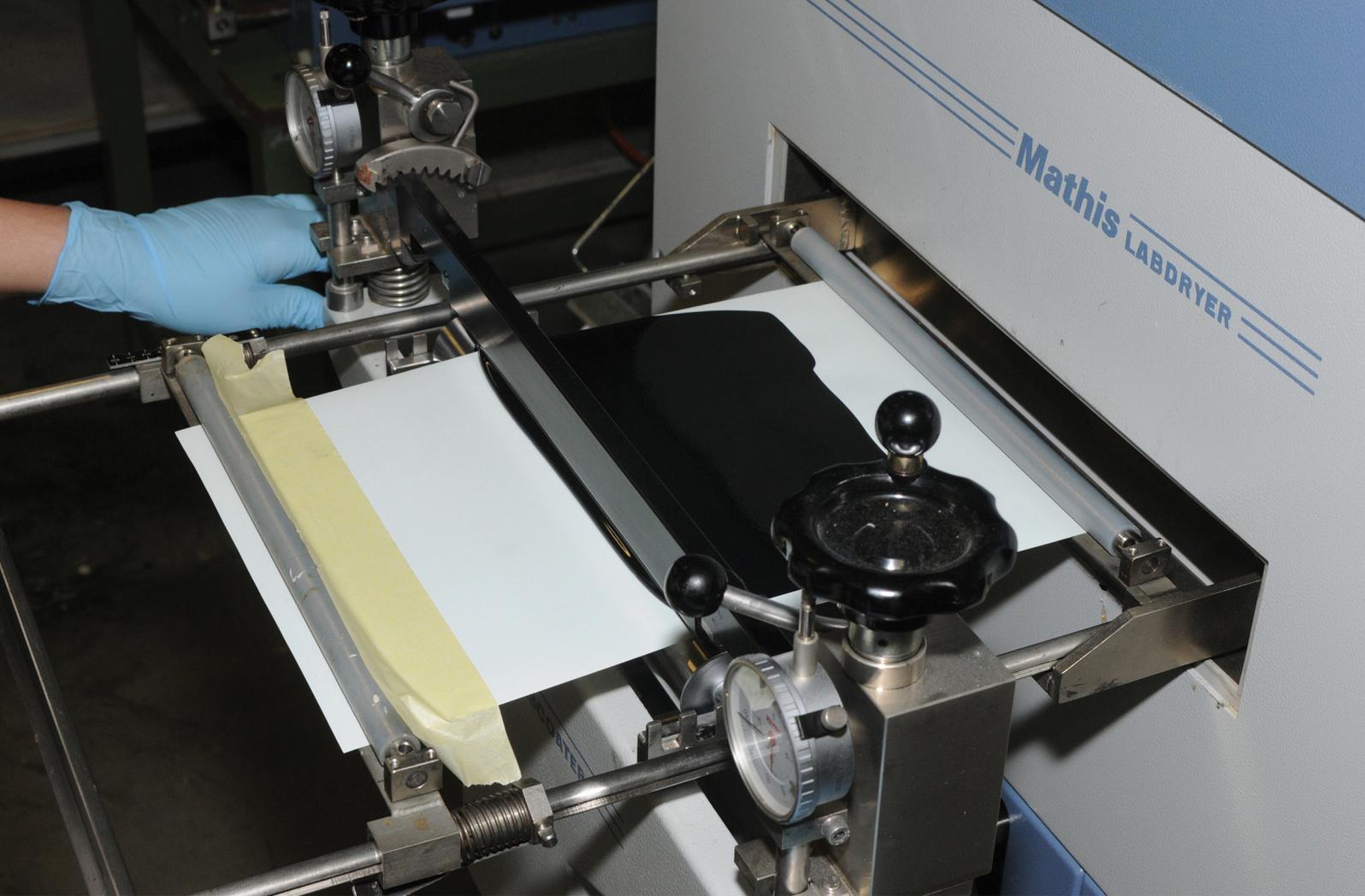
for scientific experiments and prototyping

The Centexbel platform includes both semi-industrial and lab-scale surface modification, coating and lamination lines that are used for prototyping and for carrying out experiments in the framework of collective and private research projects.

The scale of the different pilot lines is appropriate for the rapid production of prototypes and samples with a limited material use.

Because the platform is integrated in the entire Centexbel organisation, all samples can subsequently be submitted to relevant testing and be discussed with our researchers and technological experts for further improvements and fine-tuning.

Centexbel regularly invests in new energy-efficient machinery and equipment to be ahead of new evolutions in sustainable processing.



# Textile coating

Textile coating is a technique by which a formulation paste is applied onto a substrate by means of a knife; it is used to functionalise textiles and to create sophisticated and innovative textiles. The formulation paste usually consists of a binder and functional additives.

Textile coating is a simple and widely used process, capable of introducing additional barrier properties and/or novel functionalities to textiles. It also allows us to evaluate novel binder systems

## Available application techniques

Knife over roll, knife over air, transfer coating

Thermal or IR drying, UV curing

A4-size (Mathis labcoater): aqueous, solvent-based, 100% or high solid systems

Roll-to-roll system (0.5 m width, Matex): aqueous or 100% systems

# Textile lamination

A laminated textile is composed of two or more layers, at least one of which is a textile fabric, bonded closely together by means of an added adhesive, or by the adhesive properties of one or more of the component layers.

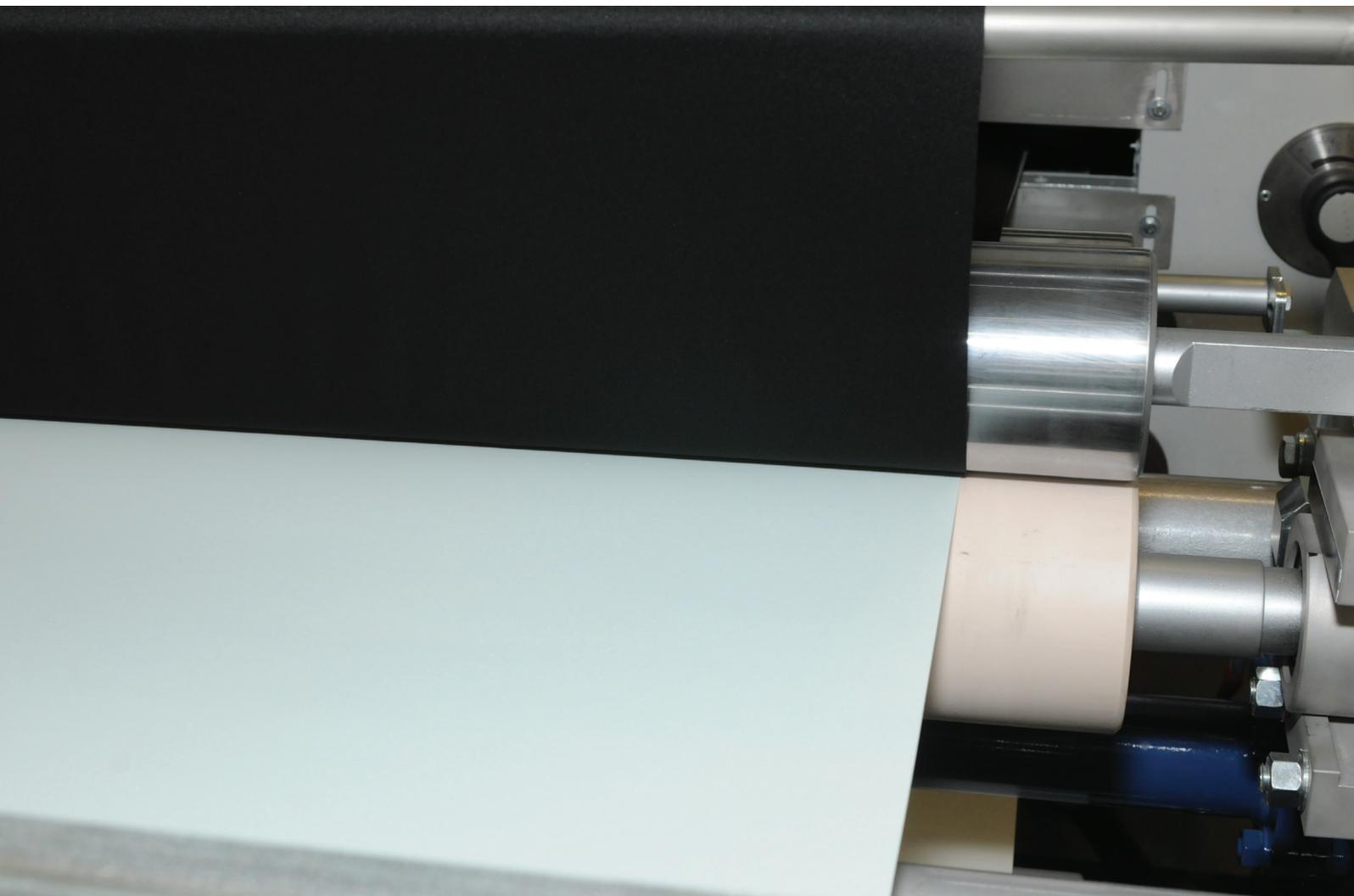
Textile lamination is an easy and widespread process and applicable to multiple types of substrates: textiles, films, membranes, and foils.

## Available application techniques:

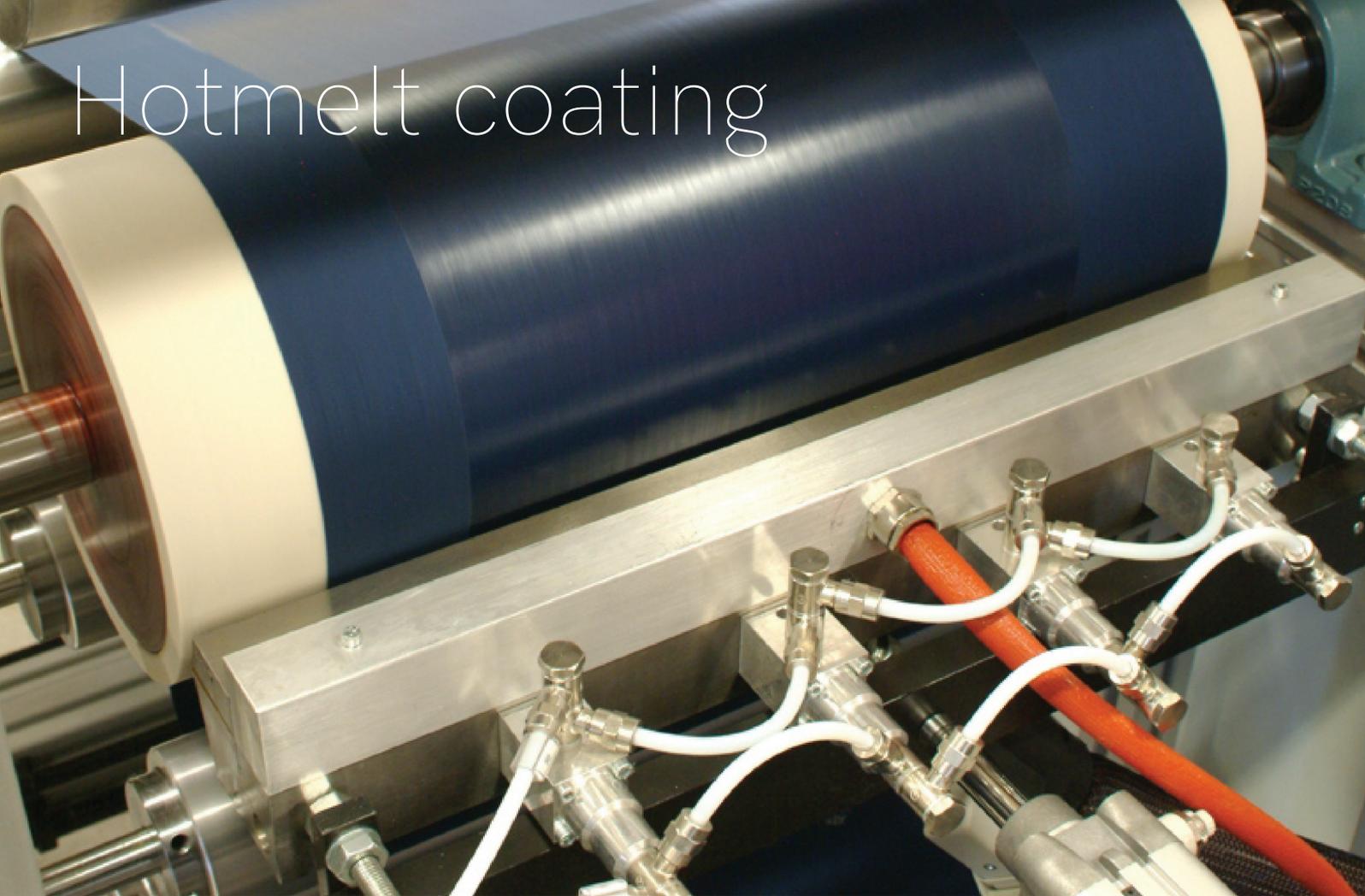
wet lamination

production of A4-samples on Mathis labcoater

roll-to-roll applications on Matex semi-industrial line (0.5 m)



# Hotmelt coating



Hotmelt coating is the application of a layer to a substrate by pre-melting the desired material and then allowing the material to cool, solidifying the layer.

## Thermoplastic (biobased) hotmelts

These polymers can be melted again and recycled: PO, PES, PA, EVA, PLA, PHBV, PHA

## Available application techniques

Roll-to-roll slot-die coater (width 0.5 m)

Hotmelt gun: perfect tool to perform a first screening of the hotmelt glue

Twin screw compounder to functionalise hotmelts: flame retardancy, antimicrobial properties, etc.

## Advantages

the system requires no water or solvents: less emission and no evaporation

recycling: thermoplastic hotmelts can be melted and reused

absence of residual baths reduces waste

no need for additional drying oven (space and energy savings)

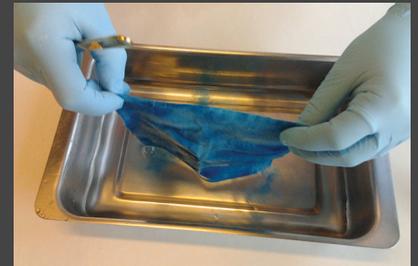
A coloured textile is the result of a highly specific and accurate dyeing process. Textile dyeing consists of multiple - often energy and water consuming - steps. Due to the impact of certain dyes on the environment, textile dyeing requires a dedicated waste water management.

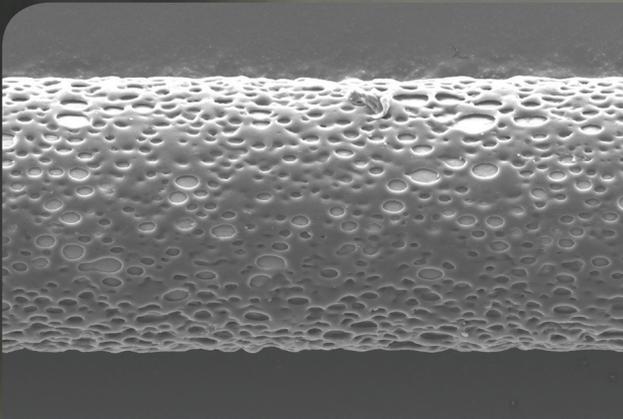
## Research themes

- novel (bio-based) dyestuffs
- eco-friendly dyeing
- reducing energy and water consumption
- dyeing of difficult substrates (e.g. polyolefins)

## Processes

- laboratory infrared dyeing machine with 16 dye pots to test several different formulations in one run
- reel dyeing machine (for textiles of 3m x 0.3m)
- accredited in-house testing of colour fastness (e.g. resistance to rubbing, washing, UV, perspiration)

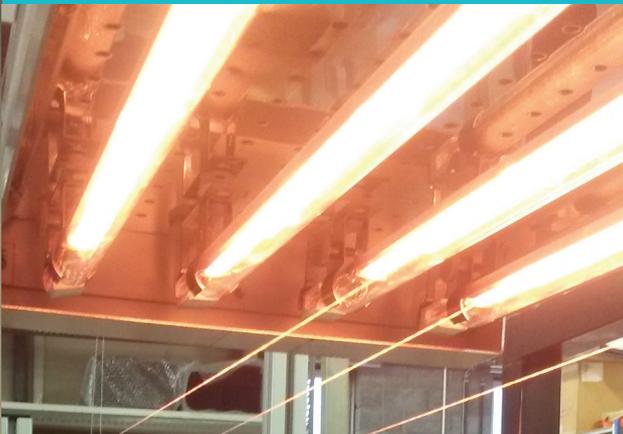




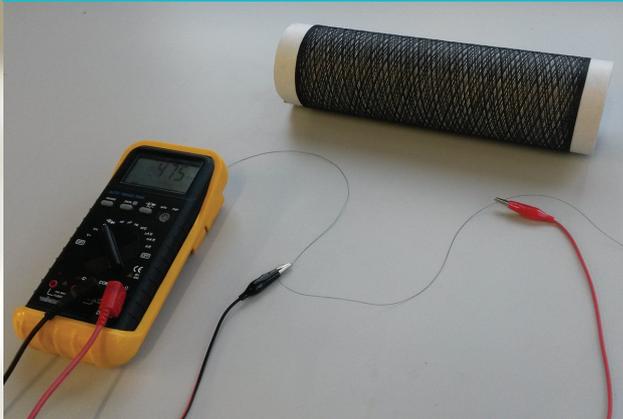
microporous coating layer



yarn winder



IR field to dry and cure coated yarn



multimeter to determine the electrical resistance of an antistatic coating

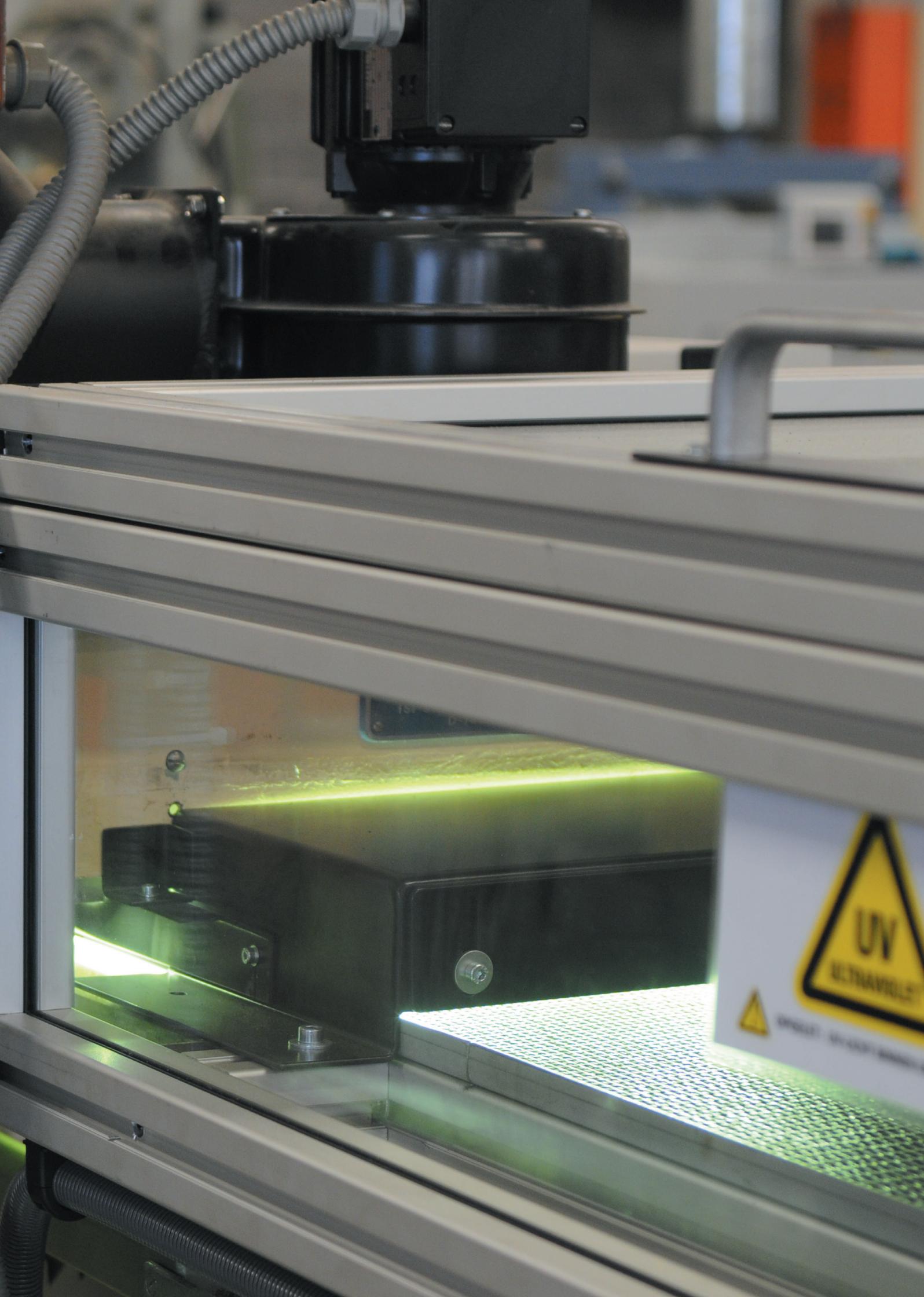


# Yarn coating

Different modules for yarn and multifilament coating can be dynamically combined:

- yarn winder
- corona treatment unit
- UV curing
- IR oven
- conventional ovens
- dipping appliance
- dynamic nozzle systems

Centexbel's extensive range of in-house test methods allows us to determine and optimize the morphological, physical and chemical characteristics and parameters of yarns and coating formulations.



# UV curing

UV curing is a rapid and eco-friendly curing process in which high intensity ultraviolet light is used to create a photochemical reaction that rapidly cures inks, adhesives and coatings.

## Applicability

on both hard and flexible substrates

appropriate technique for the preparation of prepregs and glass fibre reinforced polymers

## Advantages

waterbased or completely solvent-free (100% systems) formulations

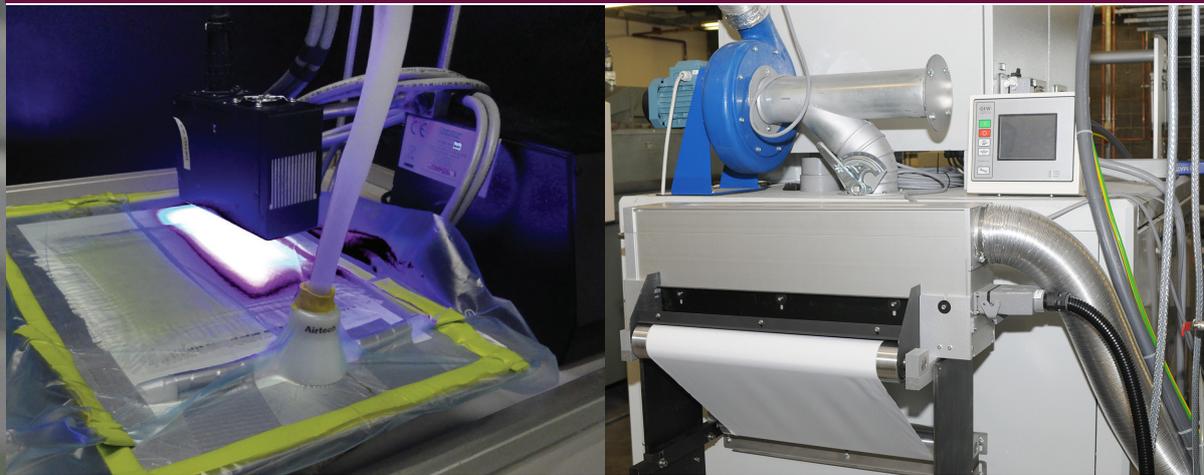
eco-friendly technology to cure functional coatings & finishes on textiles: low VOC emission and less waste

suitable for heat sensitive substrates

fast, low energy consumption

can be installed on existing coating lines

small dimensions



# UV-LED curing

UV-LED curing is a similar technology using monochromatic instead of broad spectrum UV-light to cure a coating layer.

## Additional advantages to conventional UV curing

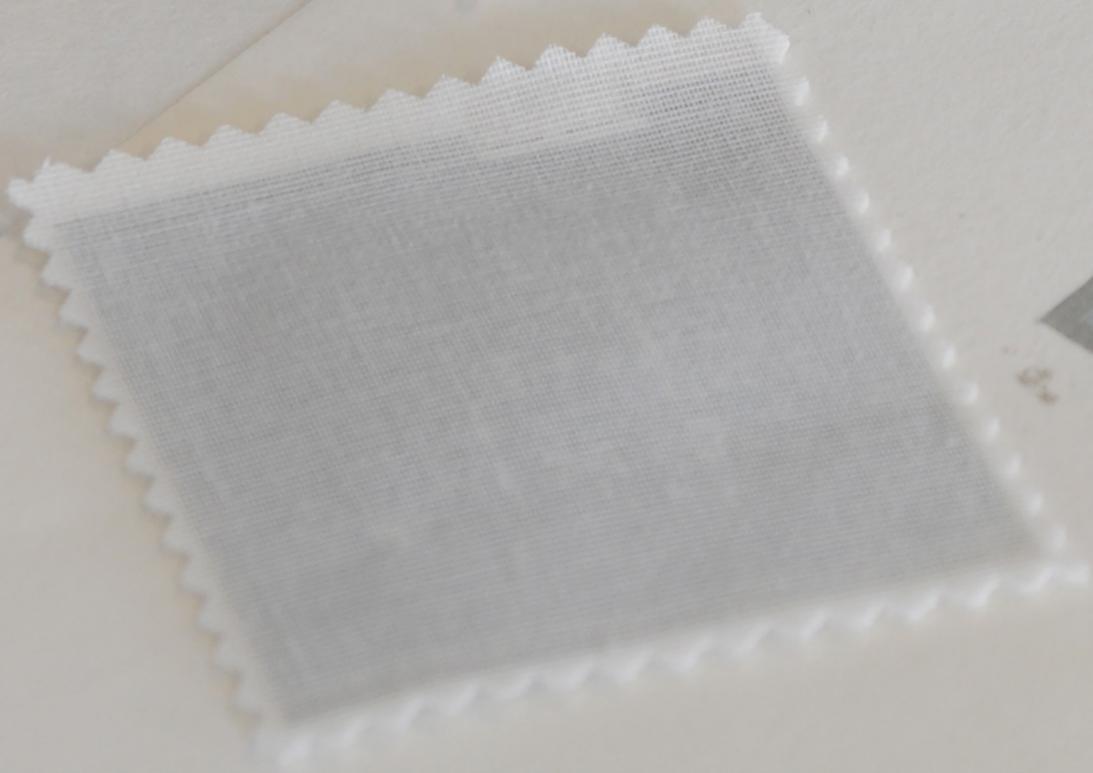
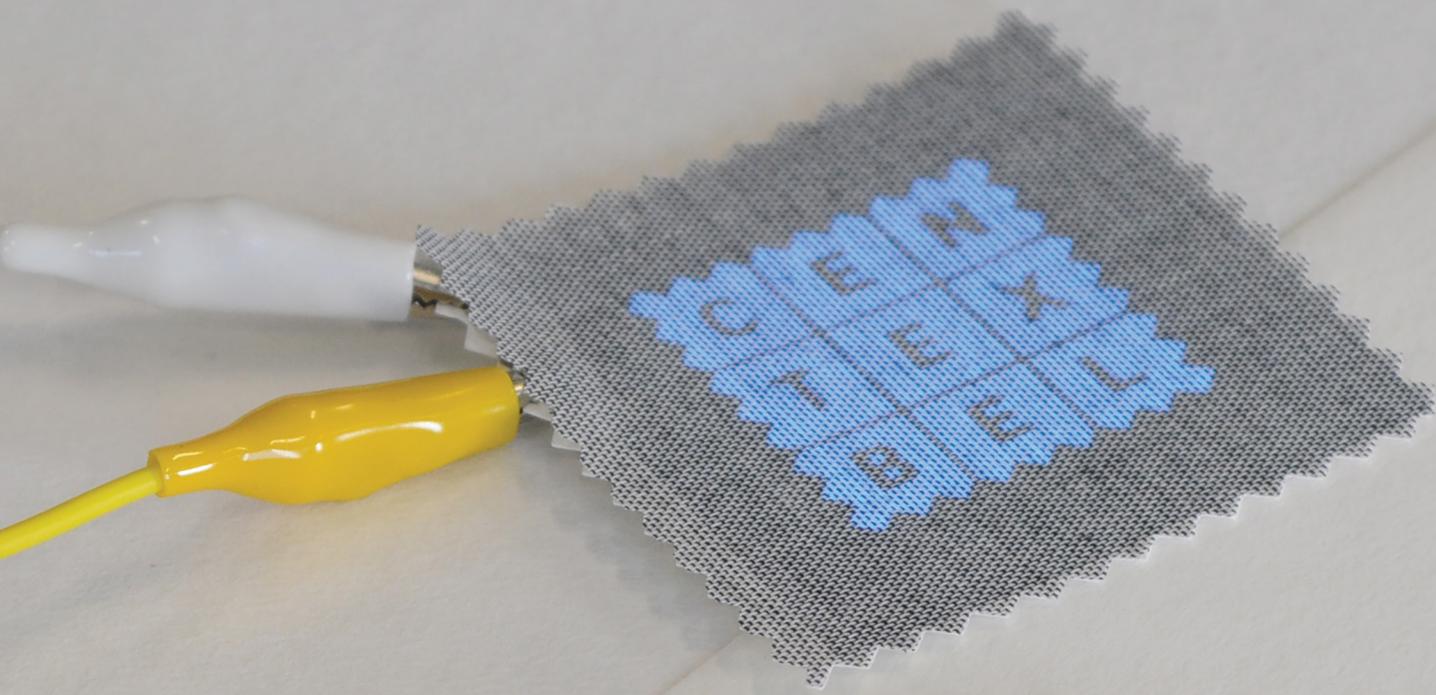
no preheating of lamp (easy ON/OFF)

no harmful UV-C and UV-B radiation

mercury-free lamp

no ozone generation

no infrared radiation (important for highly heat-sensitive textiles)



# Screen printing

Although screen printing is a commonly used technique to print decorative and functional patterns on textiles, Centexbel deploys the flatbed auto-magnetic screen printing technique to create smart textiles and other high-end products based on conductive inks or specialty formulations.

maximum dimensions: 50 cm x 80 cm

creating decorative prints and conductive printed tracks for smart textiles

direct/indirect printing

ink development for the creation of conductive, functional textiles

encapsulation and integration of prints on textiles





# Padding

Padding is a processing technique by which a textile is first immersed in a solution and then squeezed between two rolls to remove the excess solution. Padding is used to functionalise textiles and to create high-added value and innovative products.

## Advantages

- breathability and textile look are maintained
- simple and widely used process
- suitable process to prepare prepregs for composites

# Spray technology

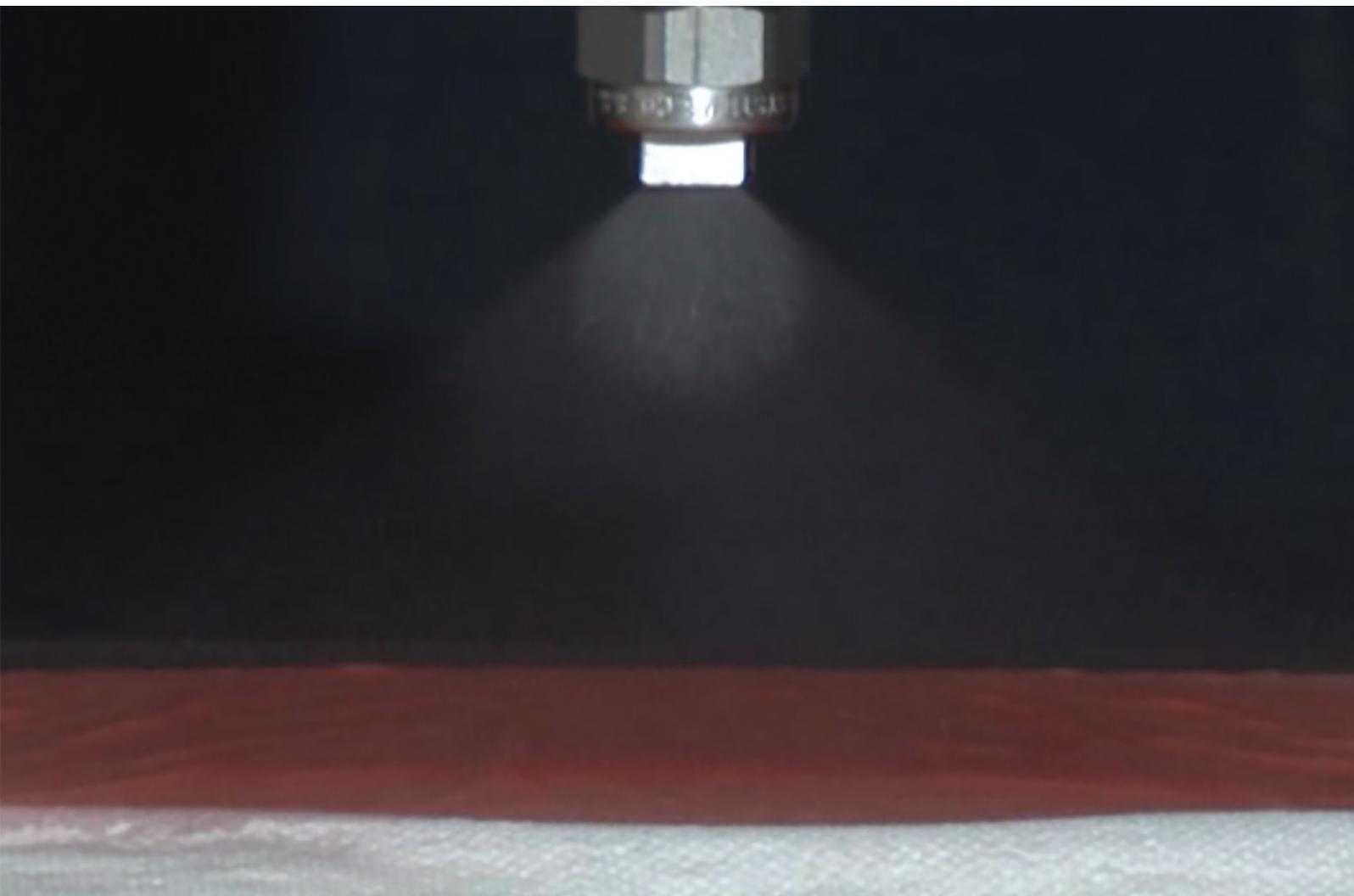
As a non-contact application method, the spray technology is highly suited to treat strongly absorbent substrates.

## Advantages

low add-on allowing for smaller quantities of finishing product

treatment of one side only

suitable for a variety of (textile) materials



# Research topics

## Product development

### Functional textiles

Antibacterial, antifungal, flame retardant, waterproof, breathable, antifouling, antistatic, biobased, etc.

Evaluation of novel (bio)binder systems

### Conductive ink & coatings

Development of electrically conductive coatings to be used for capacitive sensors and heating elements, electroluminescence, supercapacitor cells or for other smart applications

### E-textiles

Development of pressure, temperature, vibration, overload or impact sensors

### Thermoregulating textile

Fabrics which are capable of storing and releasing energy via the use of Phase Change Materials (PCM)

Passive heating or cooling of textile via e.g. the use of IR-reflective or absorbing pigments

### Composites

Fiber reinforced materials for lightweight materials where high strength is required

### Medical applications

Development of novel medical or cosmetic adhesives

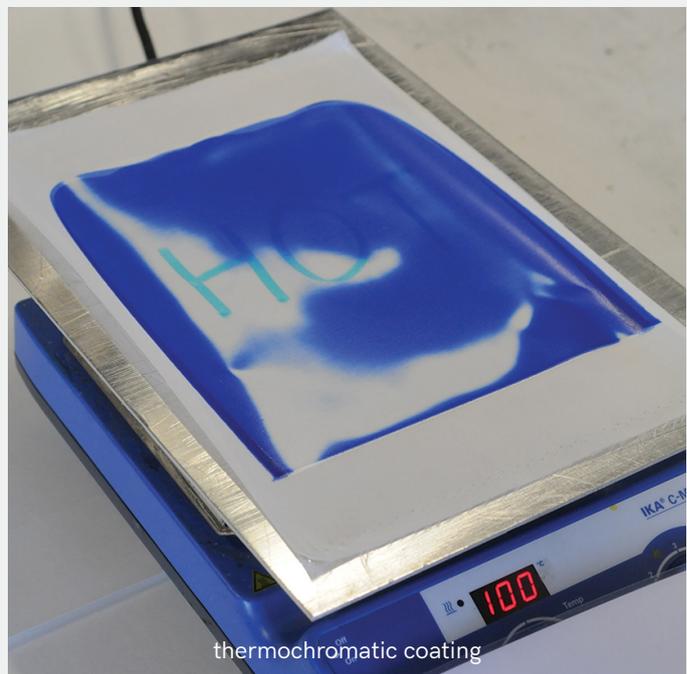
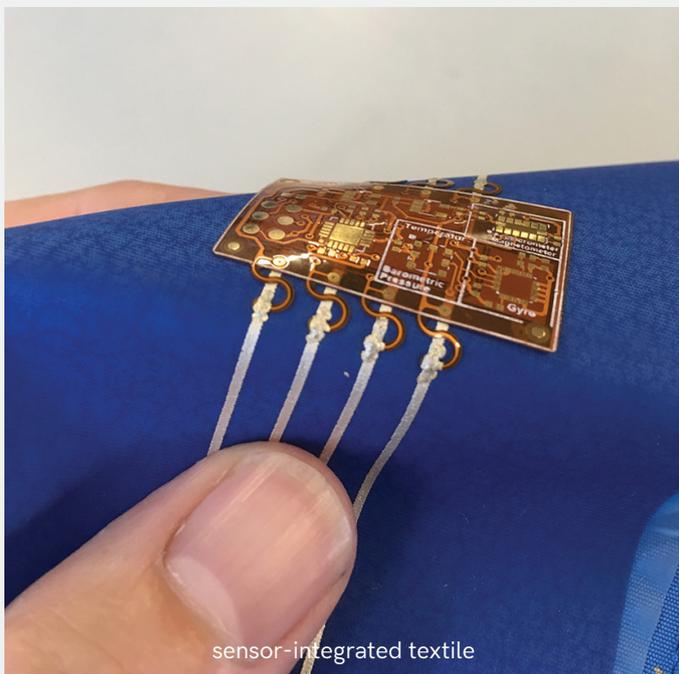
Research on barrier properties

Development of disinfecting textile wipes

### Chromatic coatings

Variations in temperature or pH can be detected via a colour change of the coating

Reversible or irreversible monitoring of UV radiation or specific gases



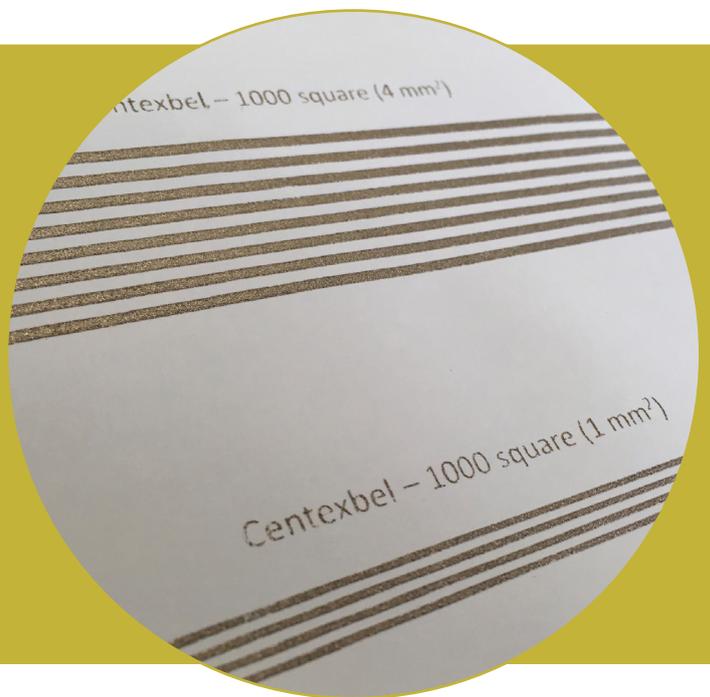
## Reduced water, chemical and energy consumption

Development of water-free coating technologies (hotmelt, 100% UV-curable)

Replacing conventional drying and curing with IR, UV, LED technologies

Replacing solvent-based by water-based formulations

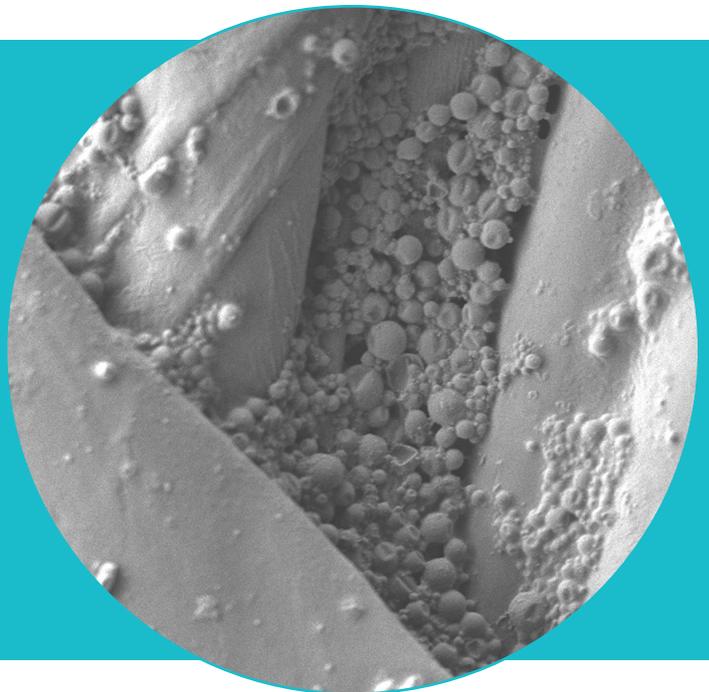
screen printing with silver conductive ink



## Substitution of hazardous components

Investigating alternatives for SVHC-listed components (flame retardants, foaming agents, plasticisers, etc.)

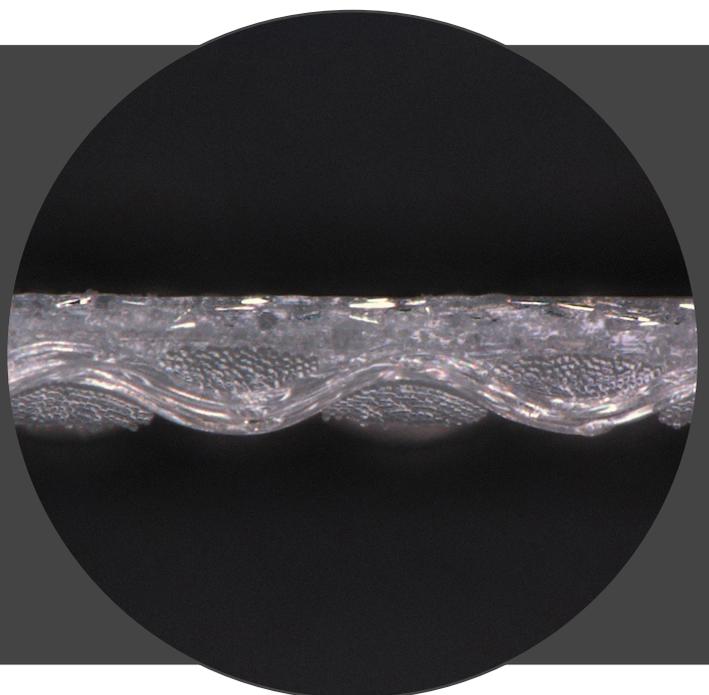
textile finished with PCM for thermoregulating comfort



## Improved adhesion

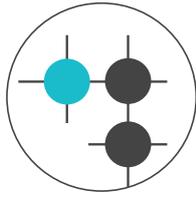
Developing sizings suitable for high-end applications made from hybrid textiles, such as e-textiles or composites

coating with IR reflective flakes





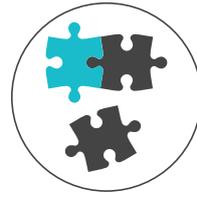
CREATE



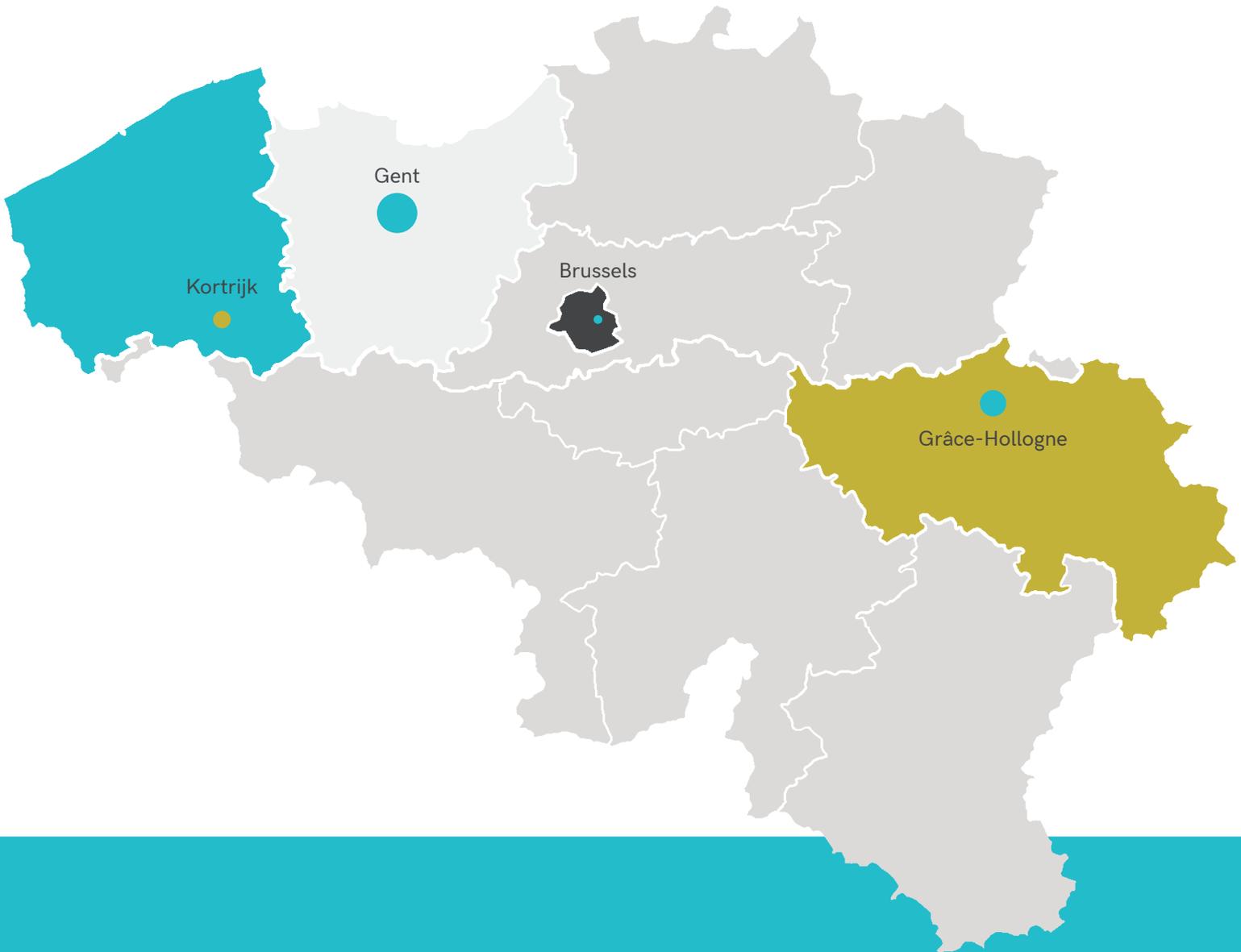
CONNECT



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