



From the fabric, to the finishing

The all-round approach to the sustainable
production of synthetic materials

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Highlights



**Less carbon
to carbon less**



**Biobased
polyurethane
dispersion**



**Industrial
cases**



Who we are



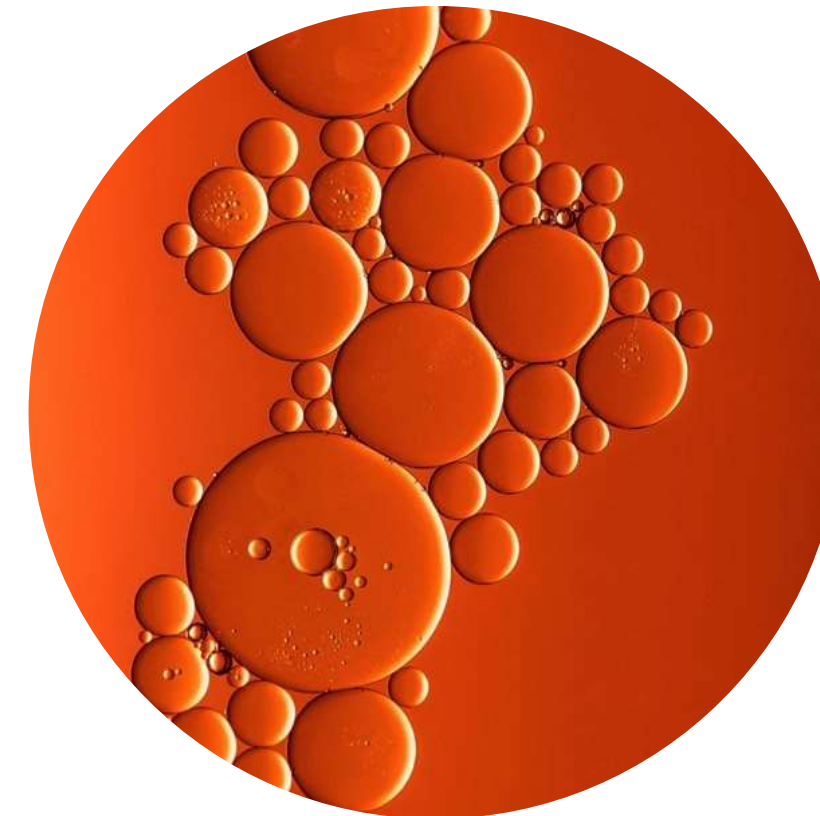
Technologies



**Natural
Polymers**



**Waterborne
Synthetic
Polymers**



**Surfactants
And Fatty
Derivatives**



**Waterborne
Synthetic
Beads**

What we care



1

The Individual,
Winning Spirit
and Integrity



2

Innovation and
Creativity



3

Working
Together



4

Sustainable
Industrial
Development



5

Economic
Stability and
Independence

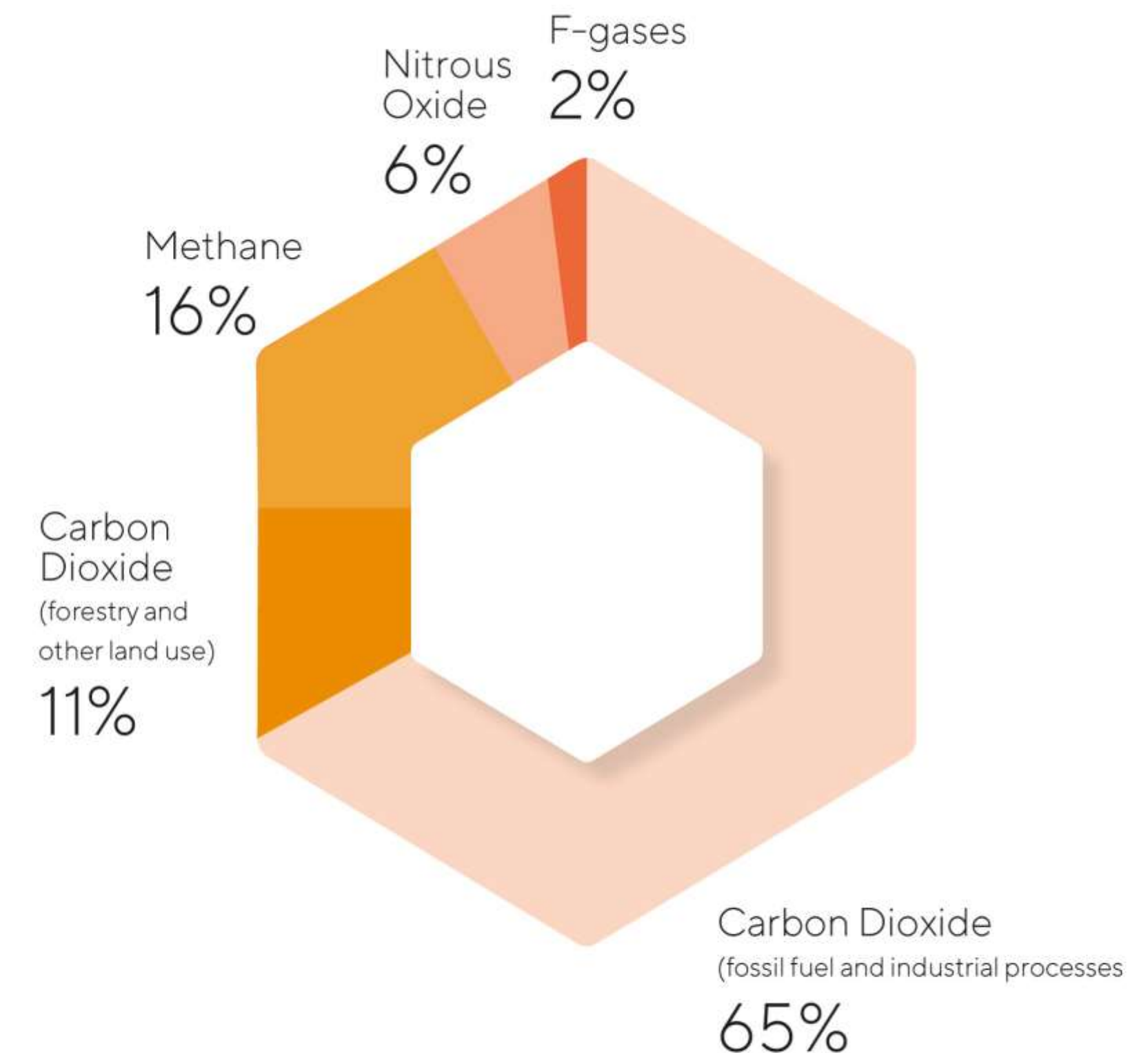
Major threats and challenges for our planet are:

- **Climate Changes**
- **Biodiversity Loss**

Key greenhouse Gases emitted by human activities

Percentage in relation to CO₂ equivalent in terms of Global Warming Potential – IPCC 2014

- **About 94% of GHG contains Carbon**
- **80-90% of the GHG'S Carbon comes from fossil sources**



<https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data>

The use of fossil carbon, is clearly the main cause of Green House Effect.

A European Green Deal

Striving to be the first climate-neutral continent

- 1. There are no net emissions of Greenhouse gases by 2050**
- 2. Economic growth is decoupled from resources use**
- 3. No person and no place is left behind**

Proposal on a European “Climate Law” enshrining the 2050 climate neutrality

Comprehensive plan to increase the EU 2030 climate target to at least 50% and towards 55% in a responsible way



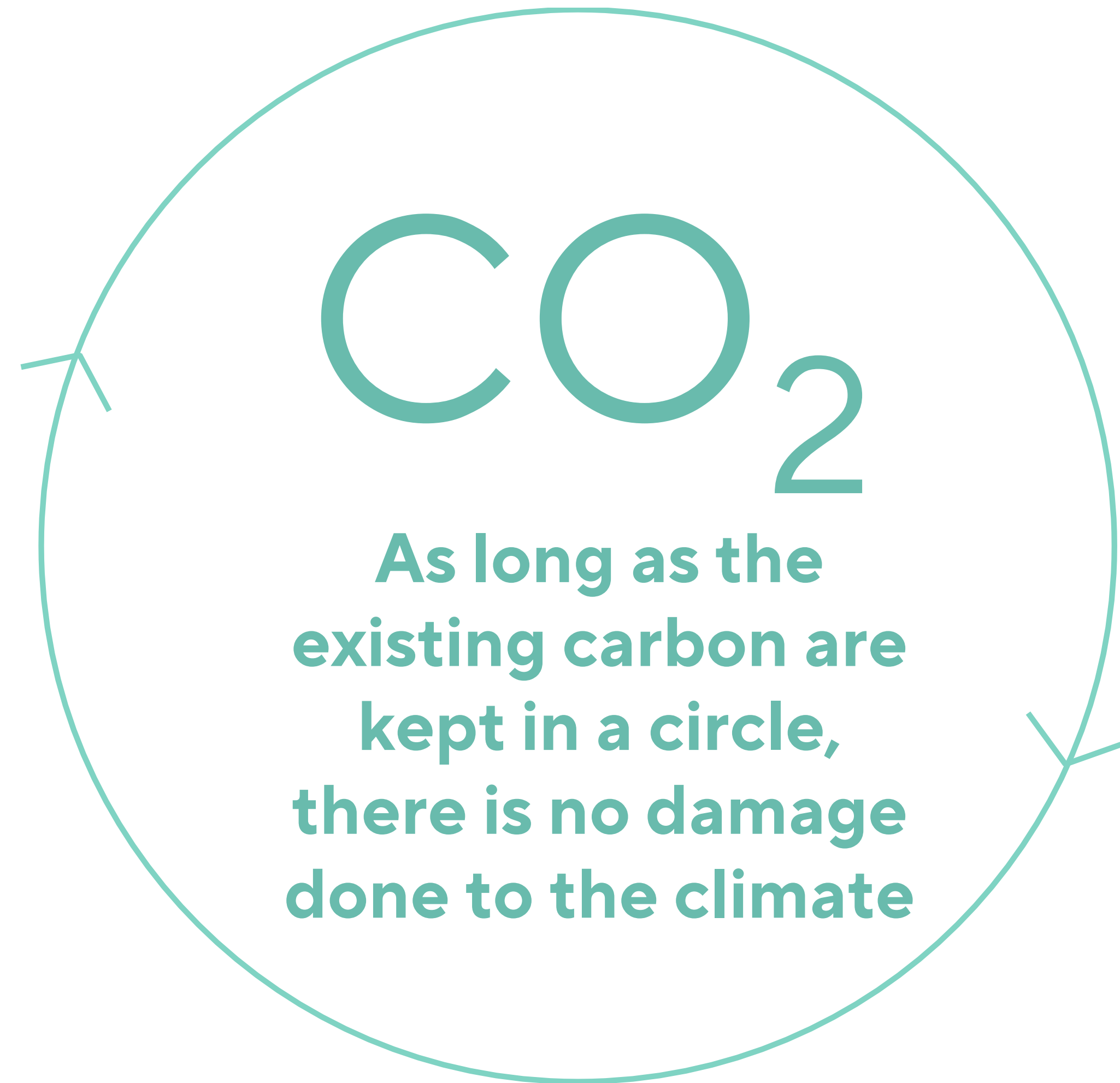
The key challenge is to replace the demand for fossil carbon by alternative sources:

- Sustainable Biomass
- CO₂
- Recycling of carbon in waste stream

So called renewable carbon

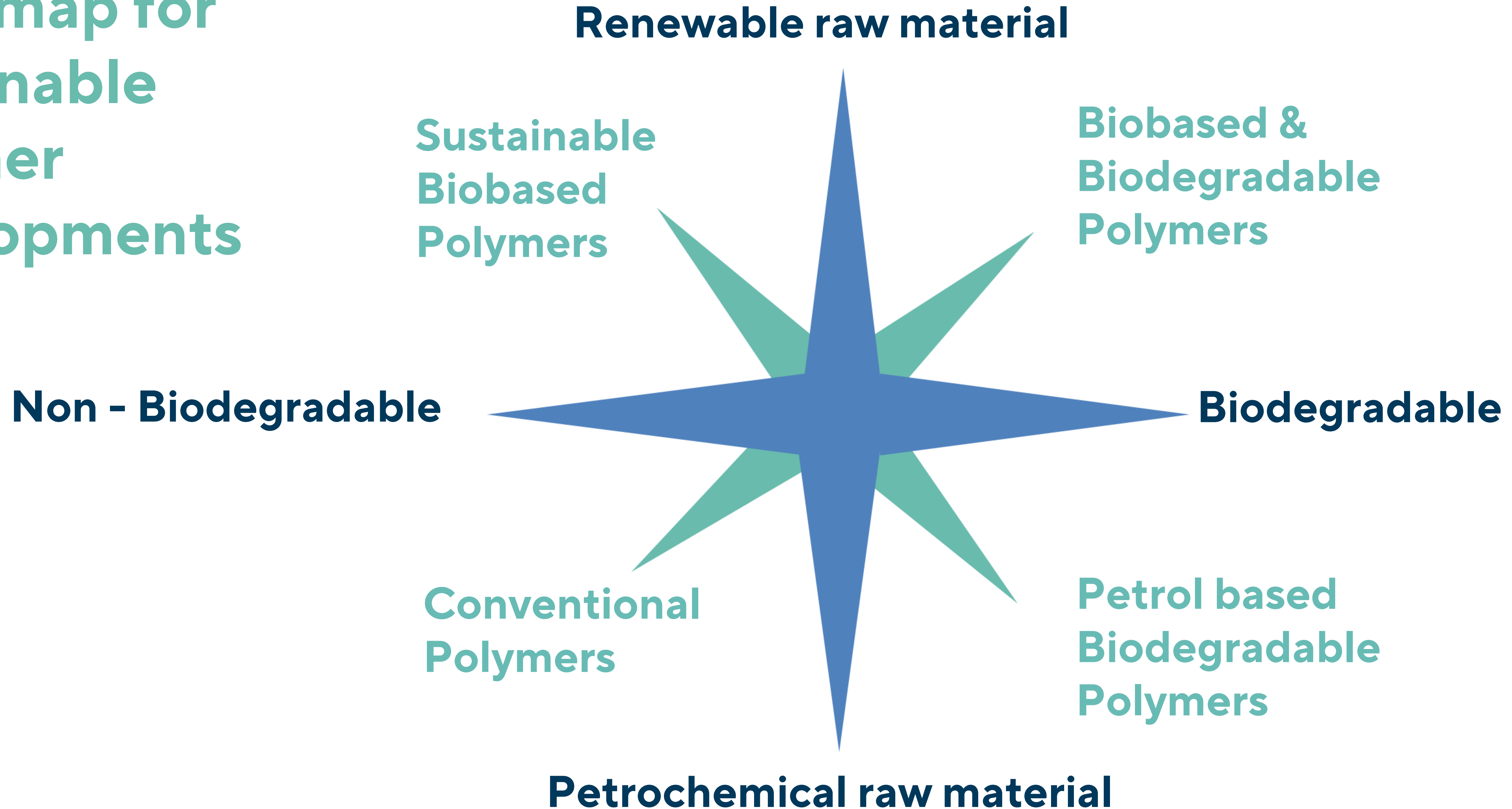
Tested and controlled by

- Radiocarbon analysis and elemental analysis by third party **ASTM D6866**
- By mass balance approach according to **EN16785-2: 2018 - PART 2**





Road map for sustainable polymer developments



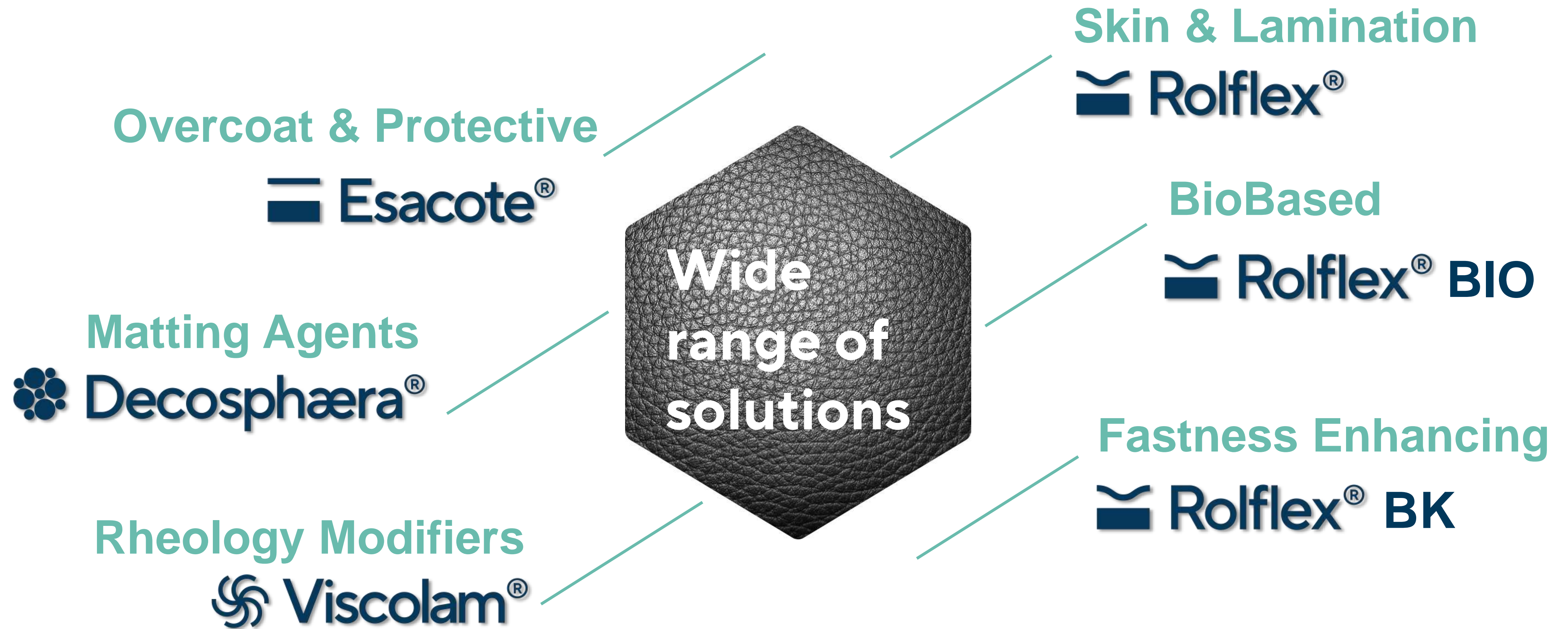
Water and Biobased PUD: A step forward in sustainability



- GHG emission reduction by renewable source.
- Up to 70 % of carbon content sourced from renewable source, to partially replace crude oil.
- Low volatile organic compounds, even free of solvents and hazardous chemicals.



Synthetic Material product offer

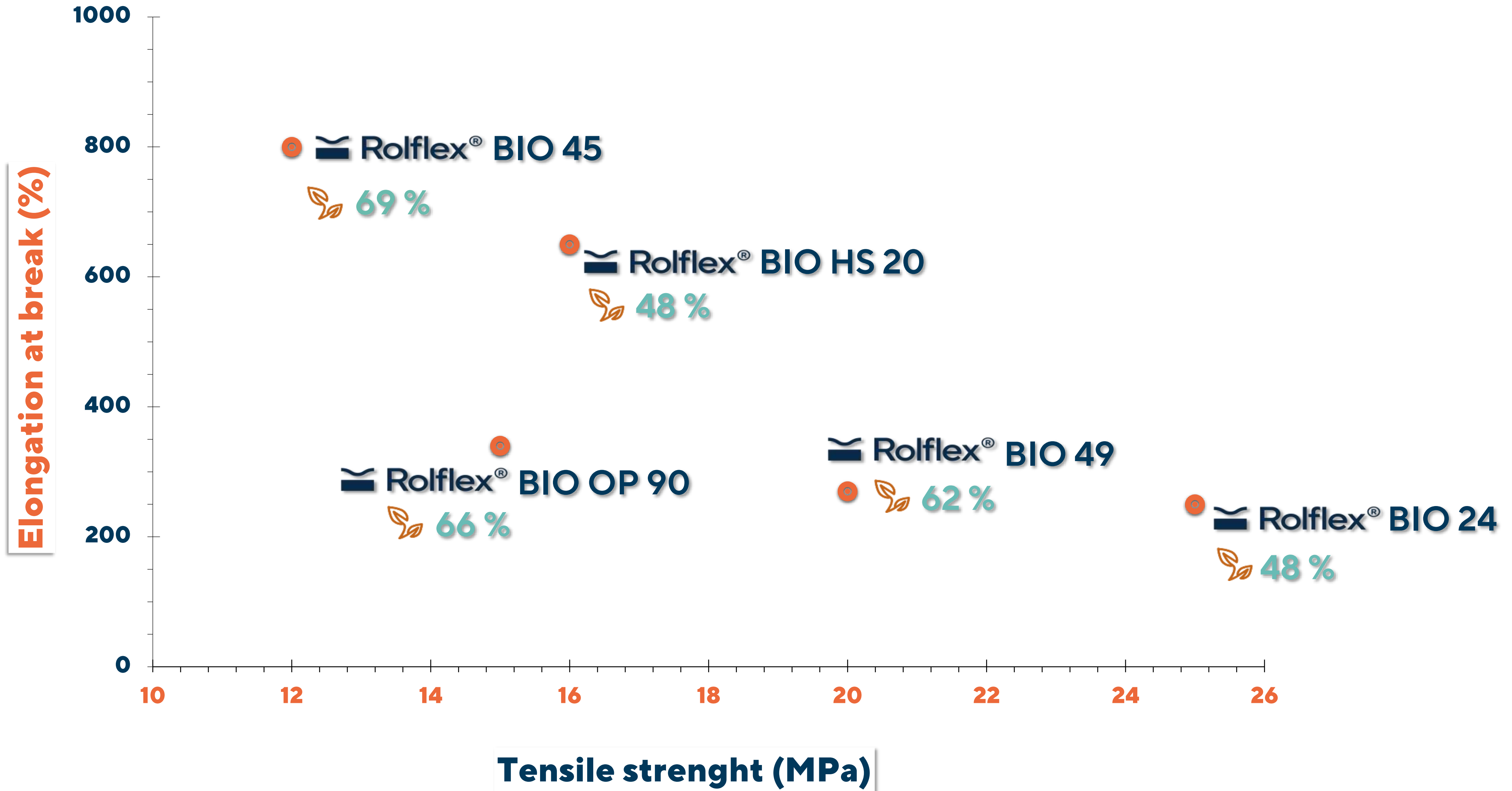




Our Film forming Waterborne Polyurethane Biobased

 **Rolflex[®] BIO**

 **Biobased Content (%)**





The full commercial offer for Biobased Polyurethane

Product	Bio content*	Properties**	Applicative Methods	Foam Coating	Coagulation	Lamination	Low Gloss coating	Overcoat	Additives
BIO HS 20	48%	60 % solid - PE	Coating, foaming, padding	x				x	
BIO 45	69%	30 % solid - PE	Coating, padding, coagulation		x			x	
BIO 24	48%	35 % solid - PE	Coating, padding, coagulation		x			x	
BIO 4820	61%	40 % solid - PE	Coating			x			
BIO OP 90	66%	32 % solid - PE	Coating				x	x	
BIO 49	62%	35 % solid - PES	Coating, padding					x	
BIO 118	33%	33 % solid - PES	Coating, padding					x	
BIO 81	68%	32 % solid - PAC	Coating					x	x
BIO 8 TR	51%	100 % solid - PE	Coating, padding				x		x

* ACCORDING TO ASTM D 6866, ** PE – POLYETHER BASED . PES – POLYESTER BASED

Our Biobased Matting agents.

 **Decosphæra[®] BIO**

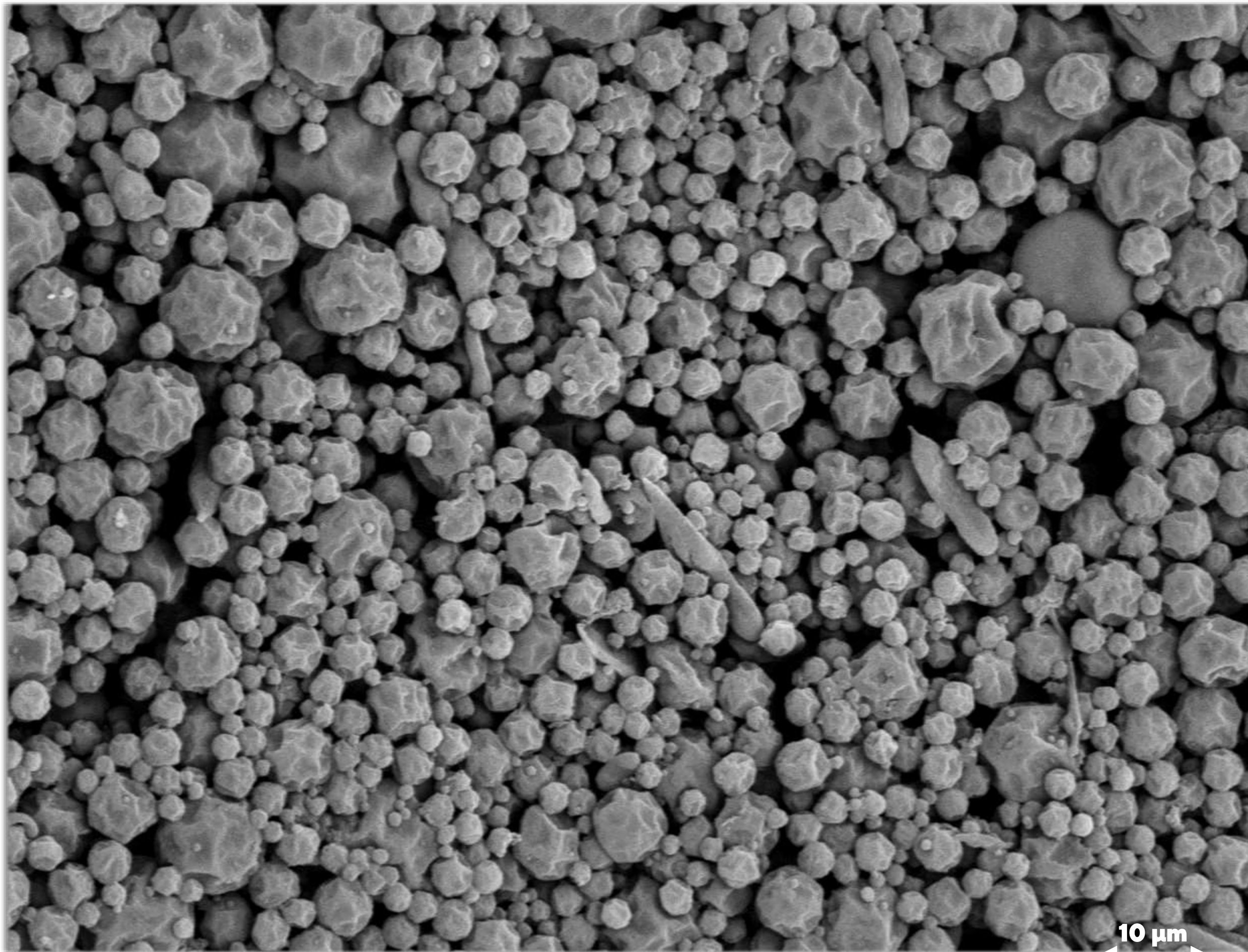
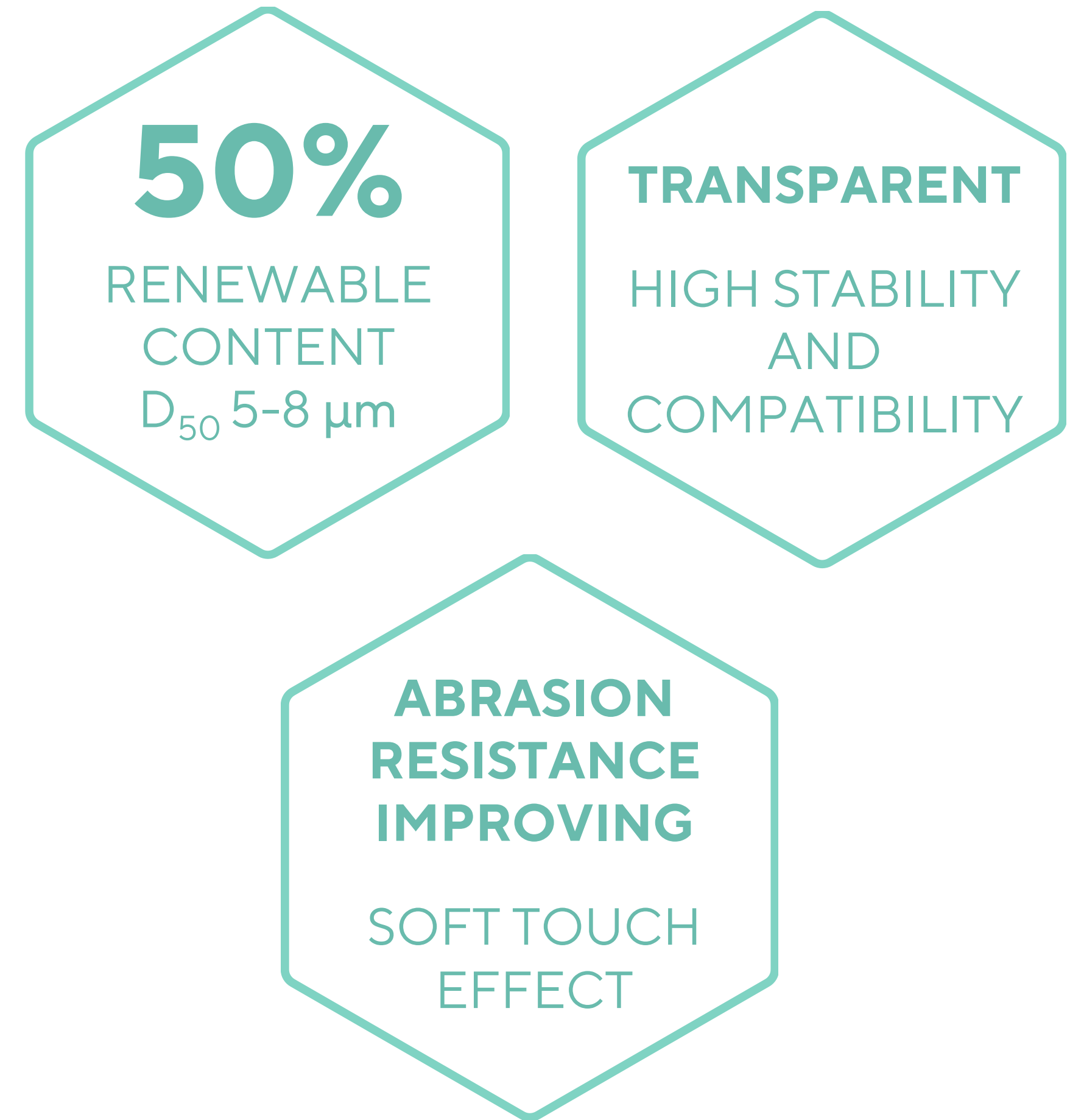
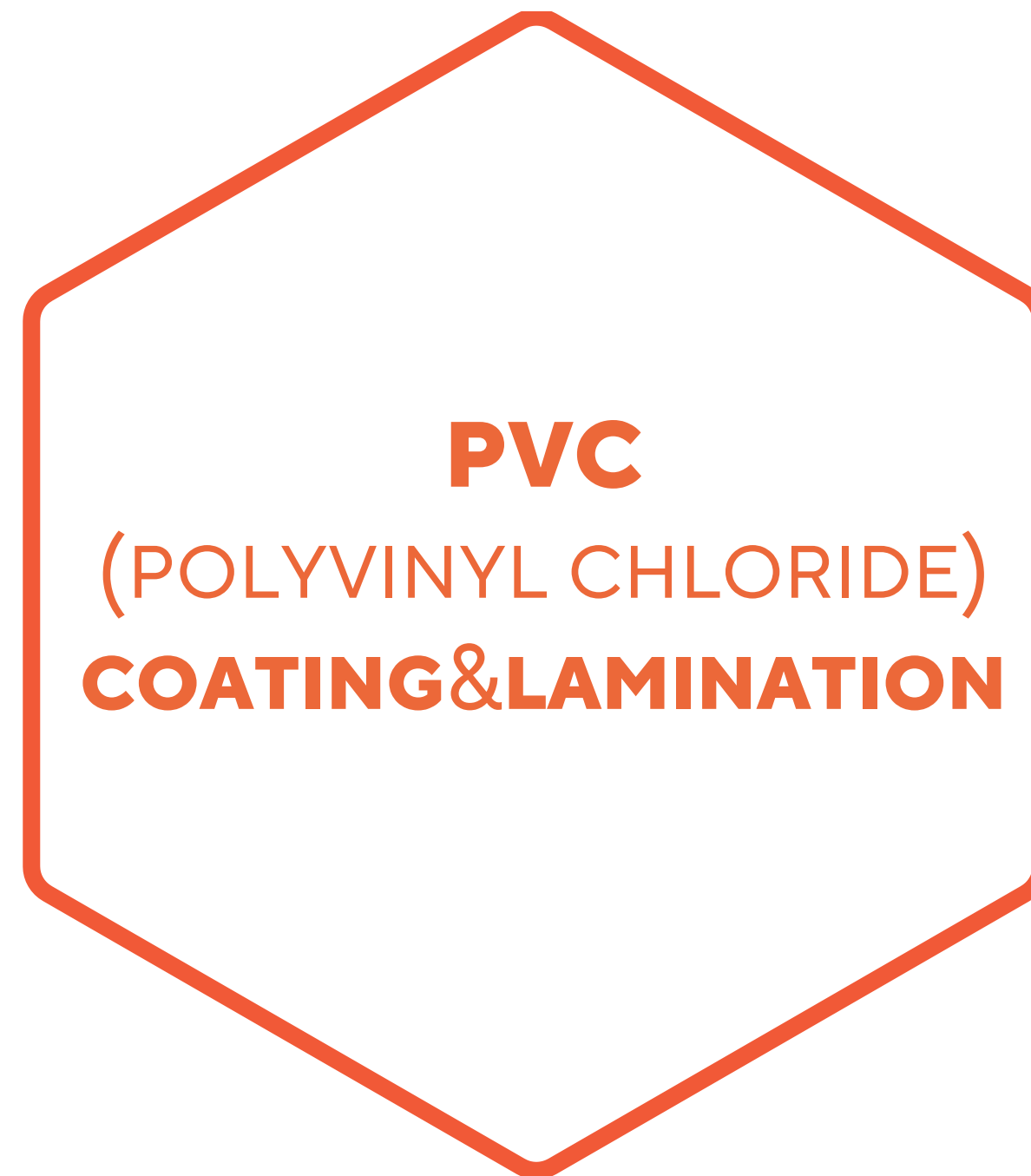


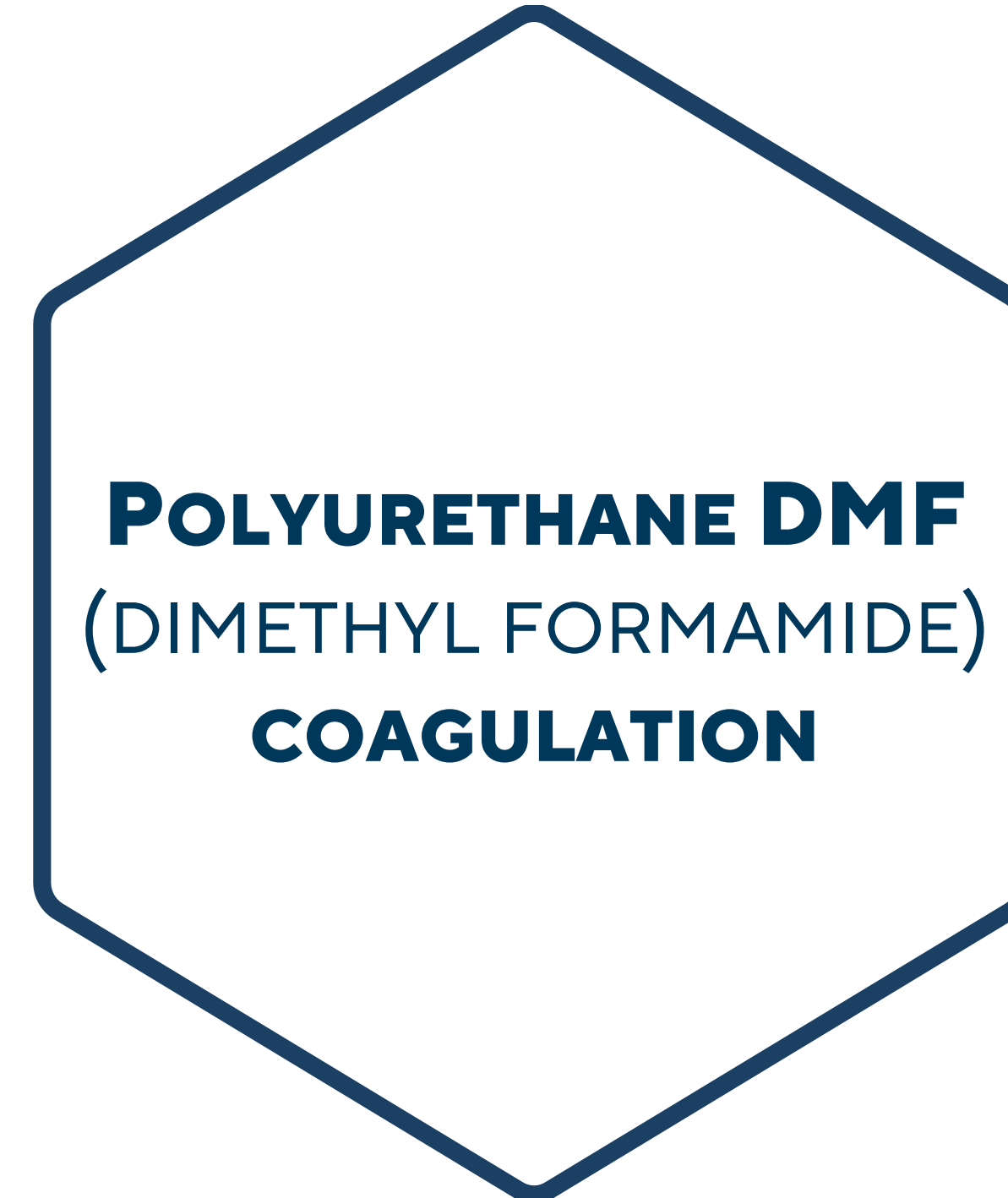
FIGURE 1. SEM PICTURE OF DECOSPHERA BIO 8 TR



The standard way of manufacturing synthetic materials



Or



- High levels of harmful chemicals
 - Carcinogen additives
 - Low renewability rate

And the sustainable way

Waterborne, low VOC and Bio Based Polyurethane Dispersions



Foam Coating



Transfer coating



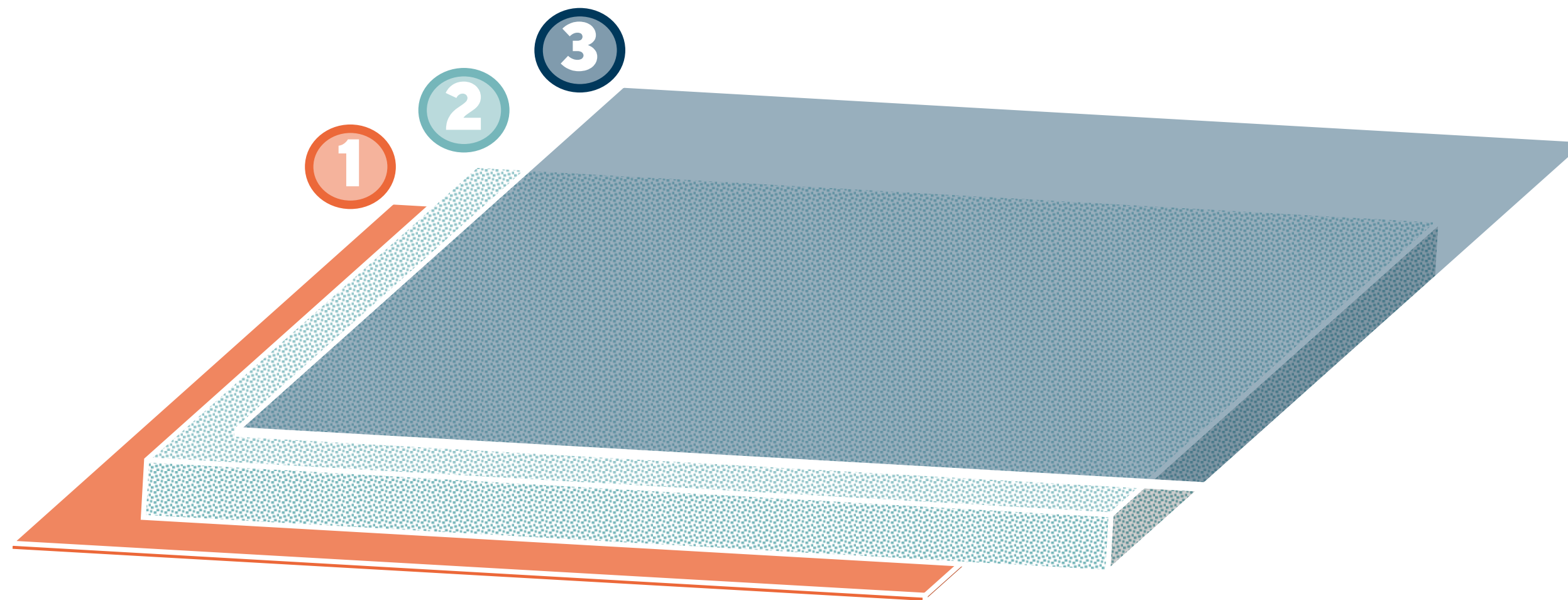
Coagulation



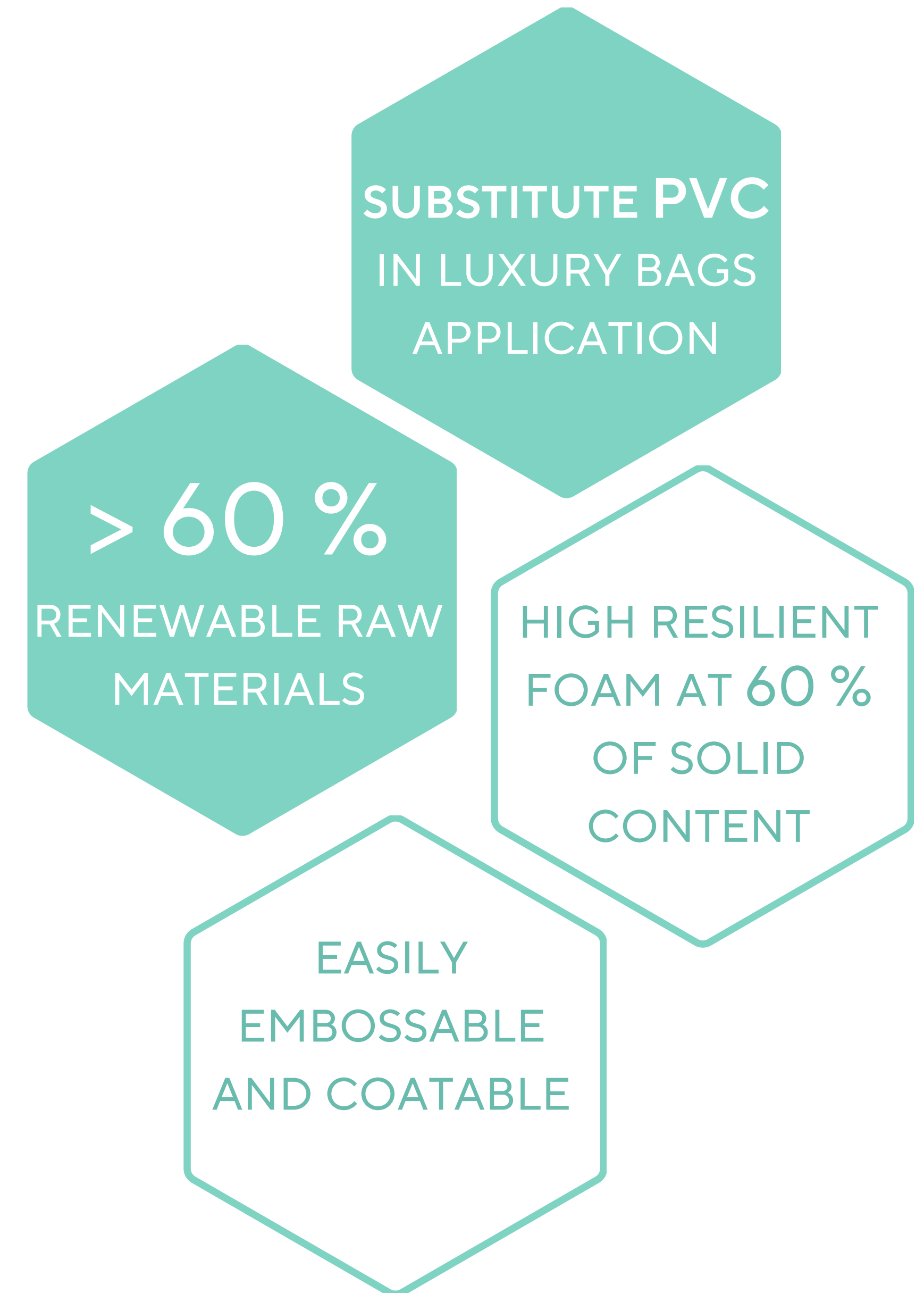
Foam Coating

Direct foam coating:

An alternative to PVC



- 1** RECYCLED PES FABRIC
- 2**  Rolflex[®] BIO HS 20 - 500 g/L FOAM - 0.5 mm
- 3**  Esacote[®] PVC TOP/K - 40 μ m



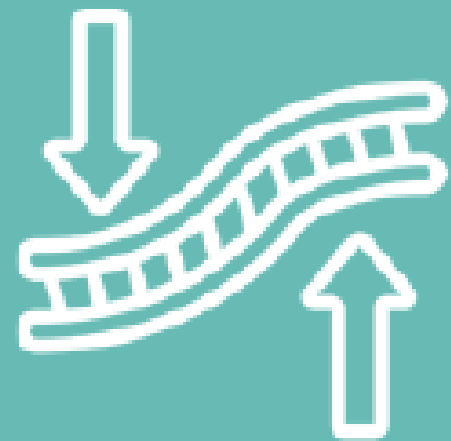
SUBSTITUTE PVC
IN LUXURY BAGS
APPLICATION

> 60 %
RENEWABLE RAW
MATERIALS

HIGH RESILIENT
FOAM AT 60 %
OF SOLID
CONTENT

EASILY
EMBOSSABLE
AND COATABLE

Foam performances



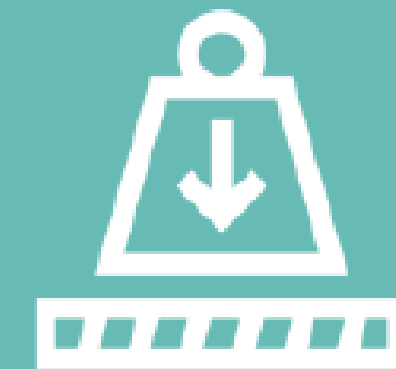
Flexible and crease resistant

More than 100,000
bally cycles tested



Abrasion resistant

More than 50,000
martindale cycles



Uncompressible

Less than 0.1 mm
Loss after
calendering



Foam performances

GOOD MECHANICS EVEN AFTER HYDROLYSIS TEST*

	TENSILE STRENGTH (MPA)	ELONGATION AT BREAK (%)	F 100 % (MPA)
BEFORE	1.8	500	0.46
AFTER	1.7	530	0.44

* TROPICAL TEST (ISO 1419) 3 WEEKS

AGEING RESISTANT

	ΔE	$\Delta GLOSS (60^\circ)$
AFTER QUV TEST**	0.15	0.2

** UVA LAMP 340 nm - 300H

BREATHABLE

JIS 1099 L B1 (g/m ² 24h)	JIS 1099 L A2 (g/m ² 24h)
11500	7000

Synthetic material

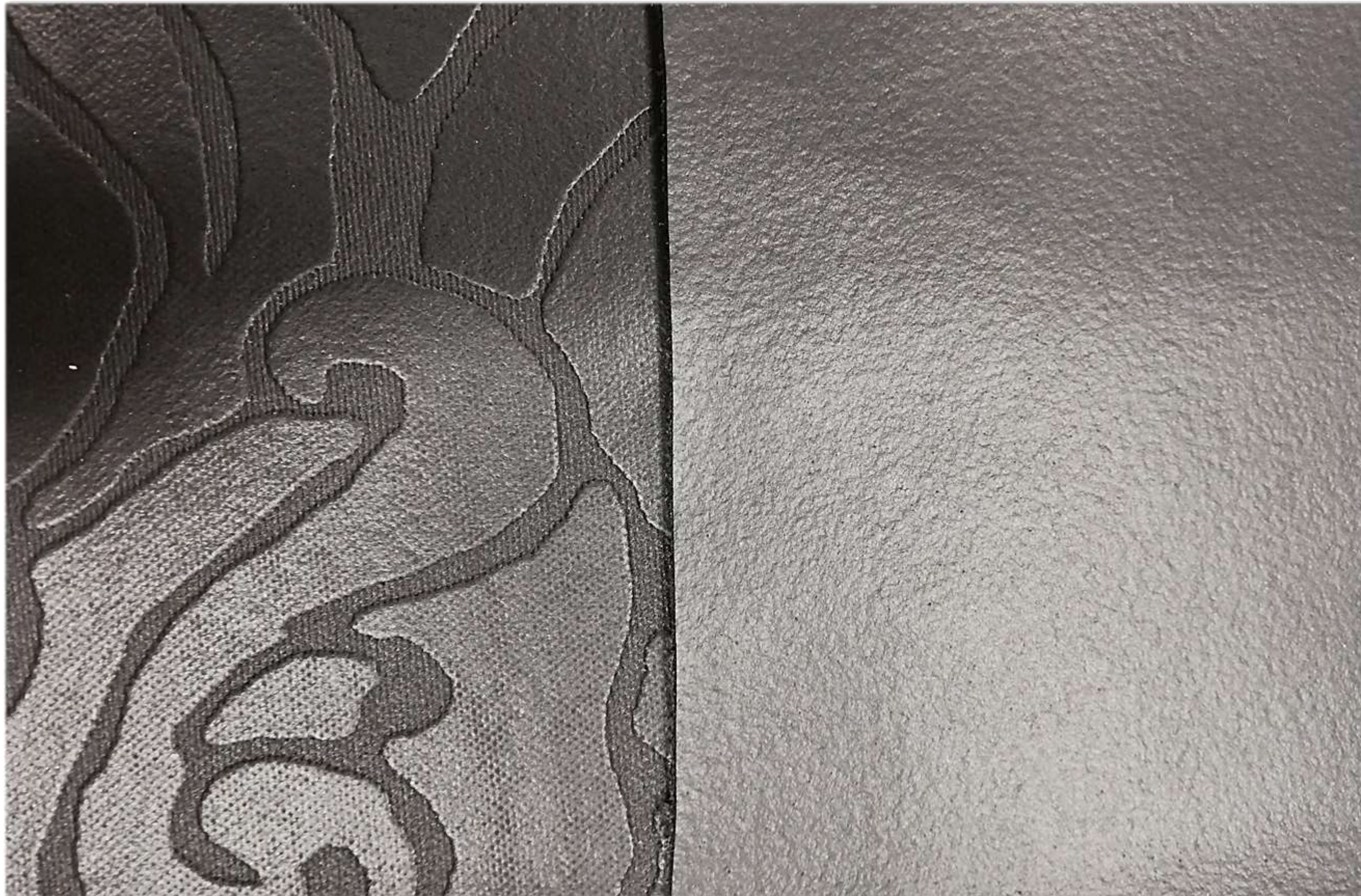


FIGURE 3. FINAL ARTICLE AFTER AND BEFORE EMBOSSING

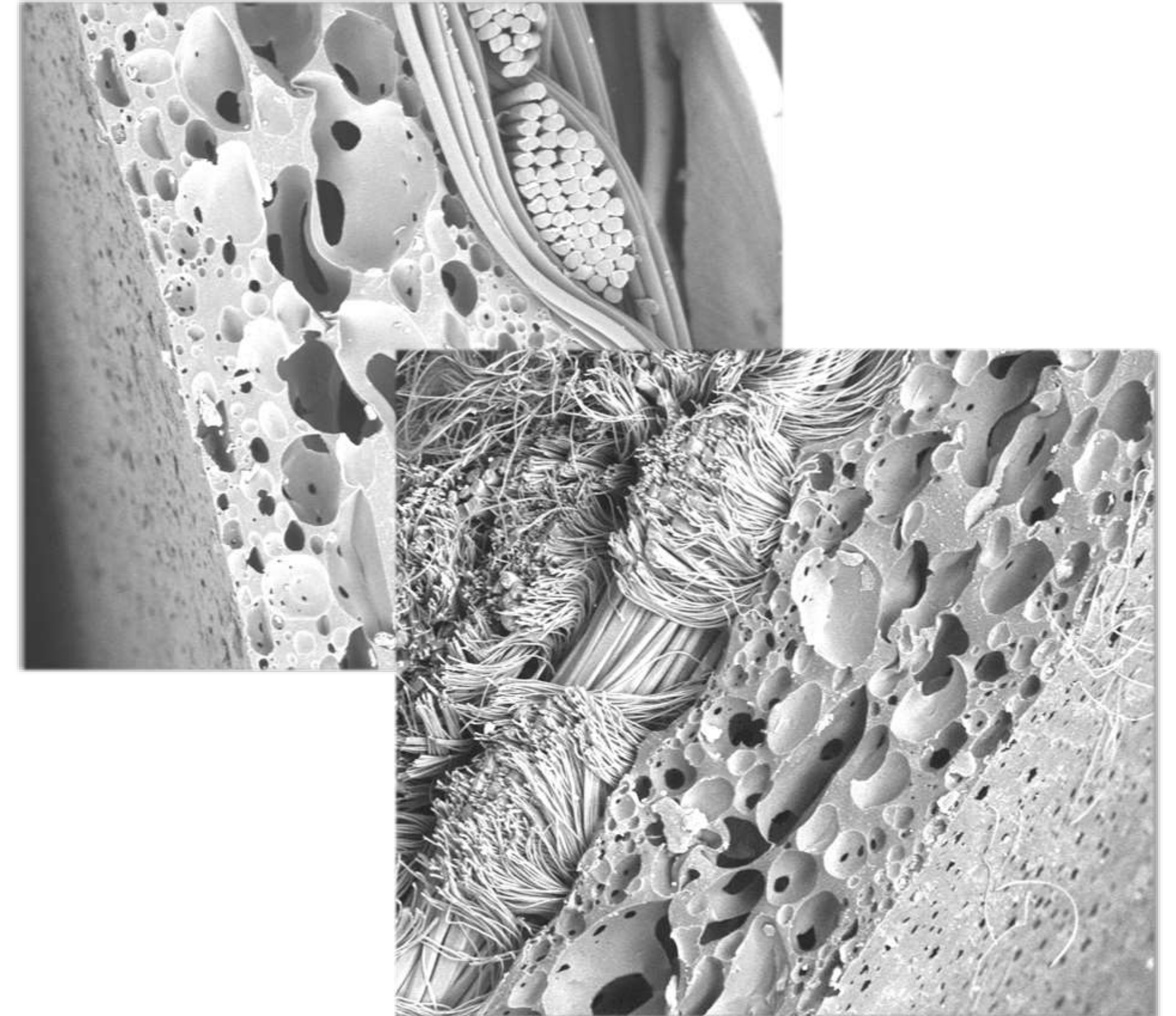






FIGURE 2. SEM PICTURES OF THE SECTION OF THE FOAM APPLIED ON FABRIC

Transfer Coating

Transfer coating

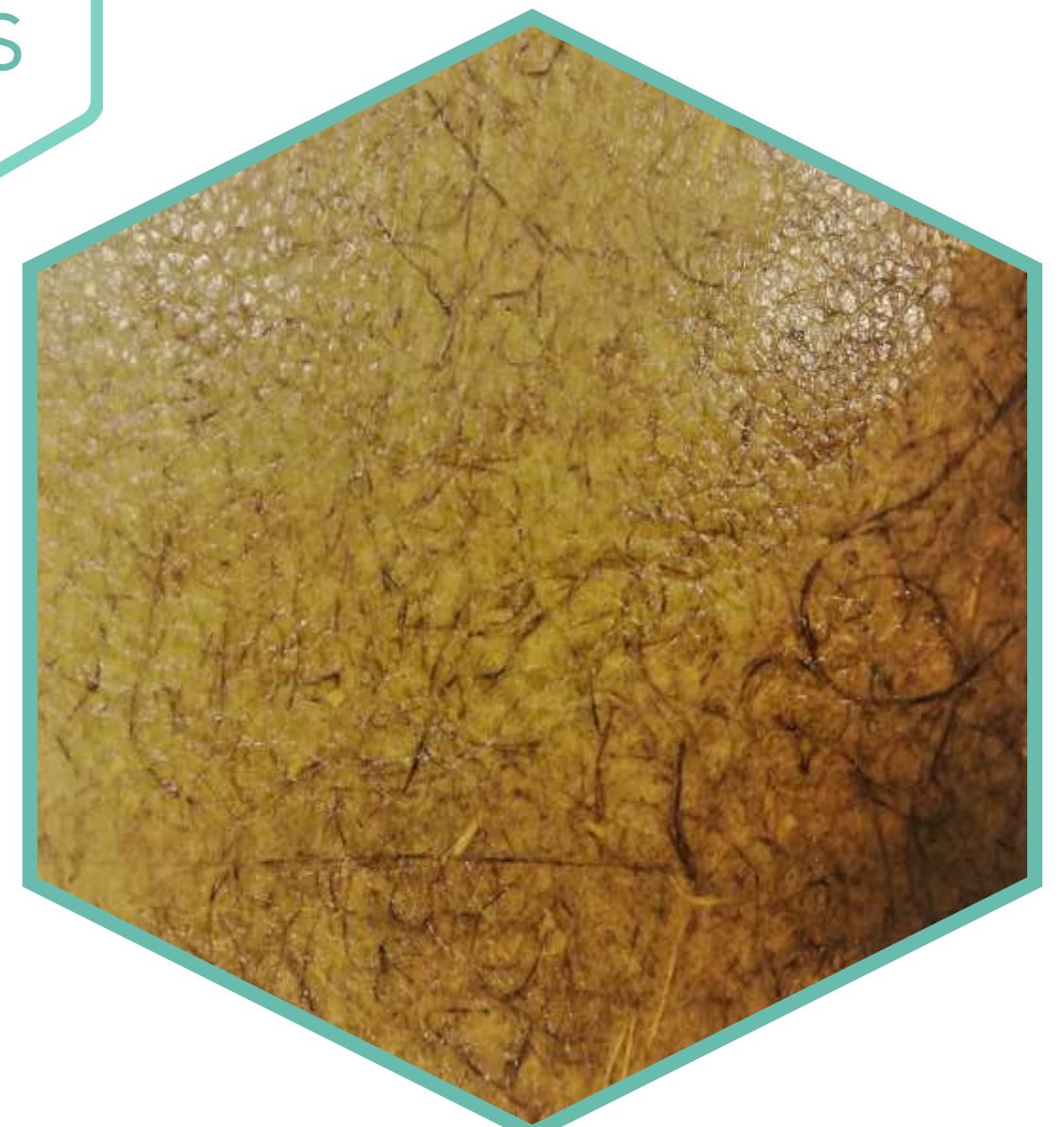
High renewability for upholstery



- 1** 100% NATURAL HEMP BASED SUBSTRATE
- 2**  Rolflex[®] BIO 4820 – WATERBORNE ADHESIVE
- 3**  Rolflex[®] BIO HS 20
- 4**  Rolflex[®] BIO OP 90 – LOW GLOSS BINDER
 Rolflex[®] BIO HS 20

HIGH
RENEWABILITY
FOR
WALLCOVERING
AND SHOES

> 80 %
RENEWABLE
RAW MATERIALS



Synthetic material



- Strong-adhesion – Up to 60 Kgf/cm²



- Resistant to washing cycles at 60° C



- Up to 100,000 martindale cycles



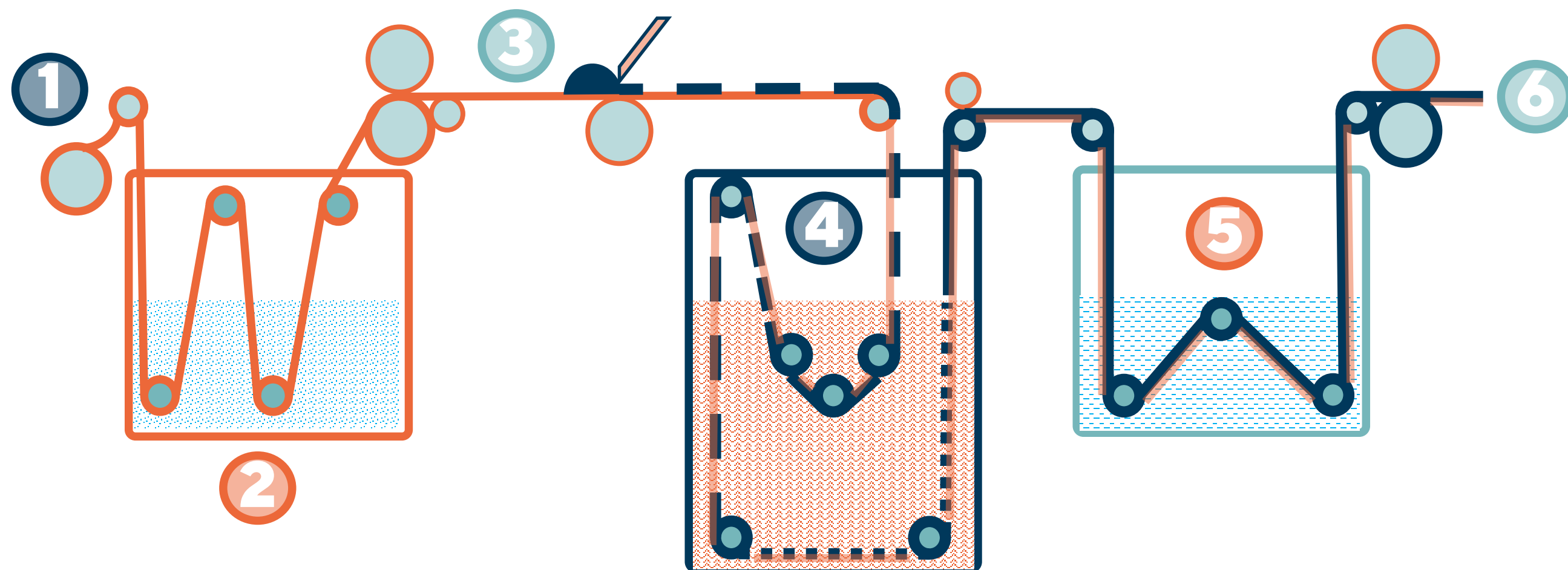
Coagulation





From the fabric, to the finishing.

Waterborne coagulation for Bags - Wallets segment



1 RECYCLED PES MICROFIBER

2 Rolflex[®] BIO BATH

3 Rolflex[®] BIO PASTE

4 COAGULATION IN ACID BATH

5 WASHING IN WATER

6 DRYING AND CURING

SUSTAINABLE
PROCESS FOR
FASHION MARKET

UP TO 90 %
OF RENEWABLE
RAW MATERIALS

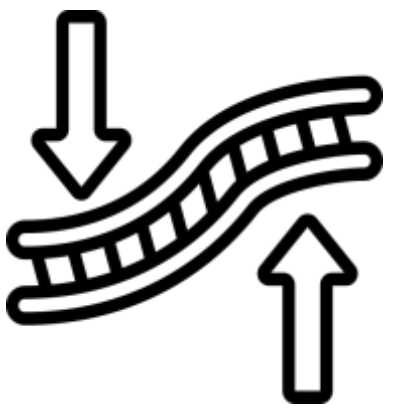
DMF FREE

EASY TO
OVERCOAT

Synthetic Material performance.



- More than 6,000 Martindale wet cycles tested (padding application)



- Resistant to 100,000 bally cycles (coating application)



Measurement of the chemical homogeneity in the fabric



FIGURE 6. SEM COMPOSITE PICTURE OF THE SECTION OF THE FABRIC IMPREGNATED WITH THE COAGULATED PUD.

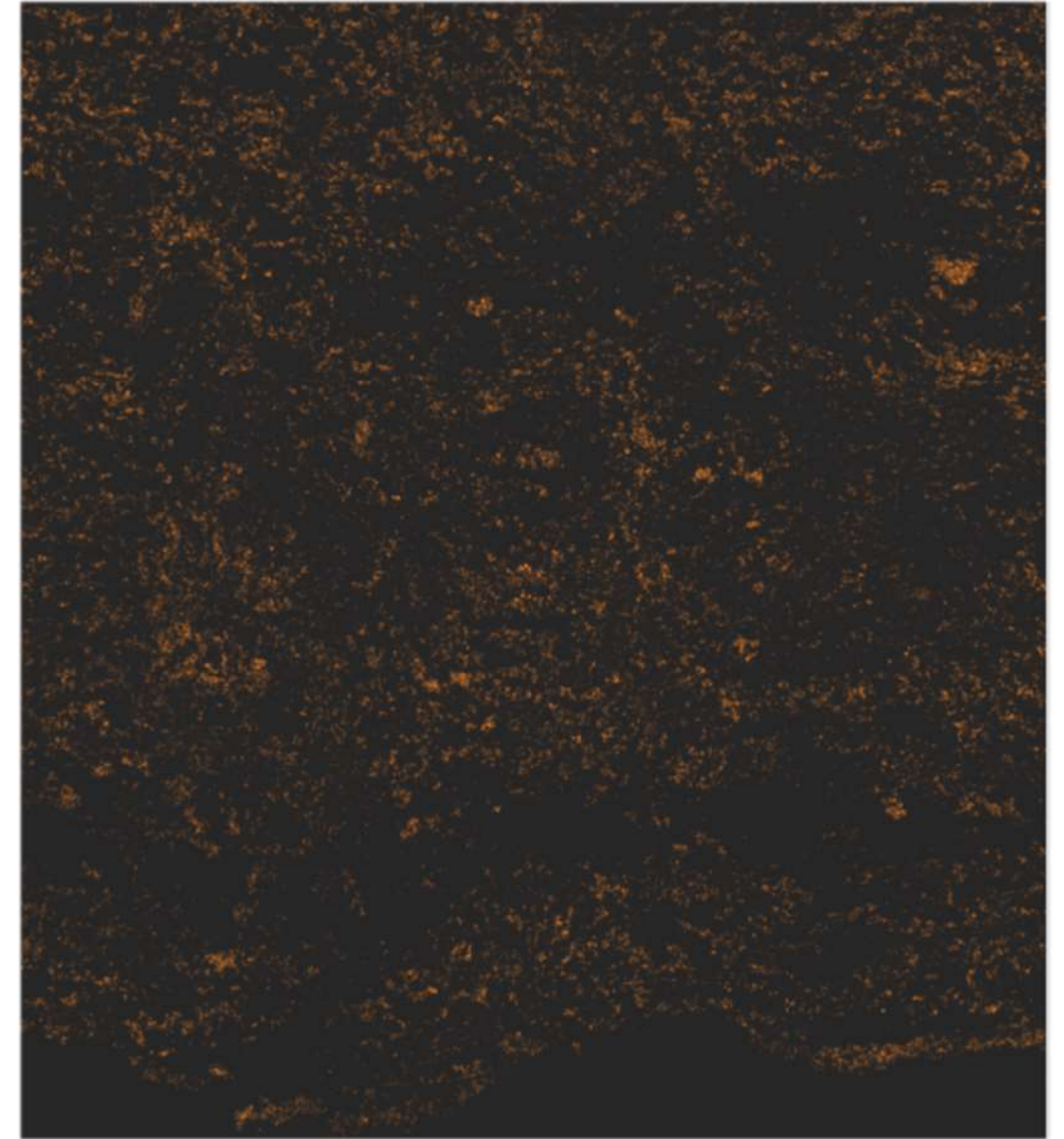
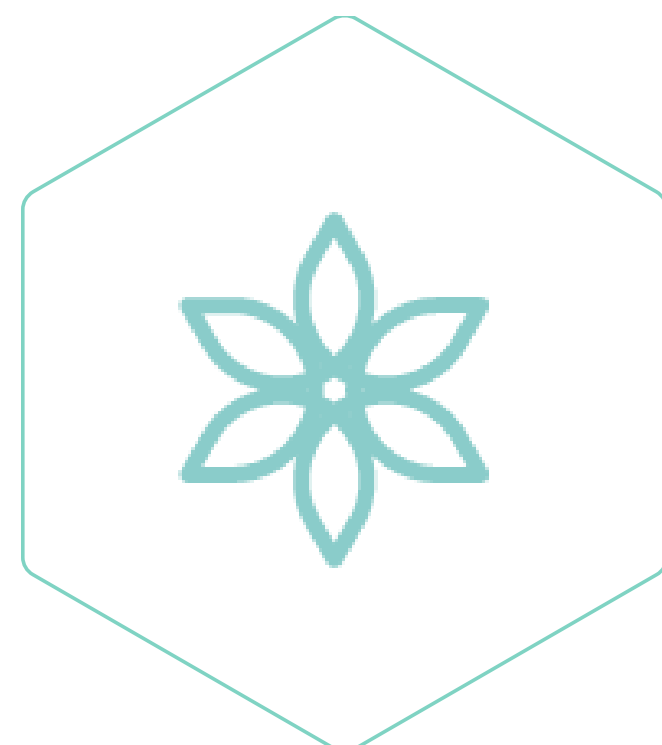


FIGURE 7. DISTRIBUTION OF THE FILLER IN THE IMPREGNATED FABRIC.

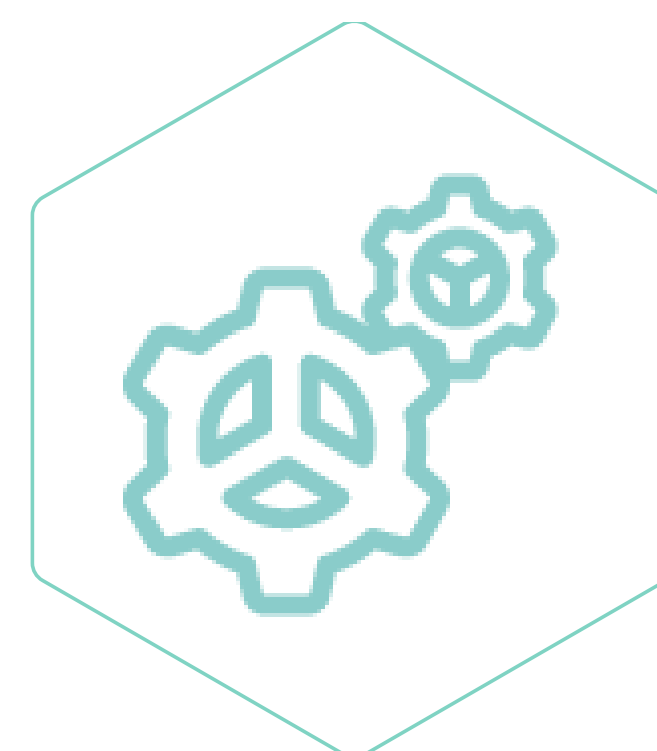
Sustainable chemistry is reality. Let's work together!



We're turning to a sustainable way to produce waterborne synthetic polymers.



Up to 70 % of carbon content from renewable source, to replace crude oil.



Synthetic Materials industrialized with many different partners in Europe.



A wide range performing products from natural derivatives,

**Sustainable chemistry is reality.
Let's work together!**



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