

**INDORAMA**  
VENTURES

> *Mobility Group*



## **Empowering safety and performance**

Fibers and textiles that move the world

## Dear reader,

The development of mobility has always been intertwined with the development of fibers and textiles. These materials are responsible for providing safety, comfort and endurance in a mobile world.

Although the world of mobility is not limited to automobiles, especially the latest trends and developments like e-mobility, autonomous driving, shared mobility and smart vehicles are creating new opportunities for fibers and textiles.

Today's suppliers have to adapt to this. Strong, disruptive trends are already approaching—the increasing need for mobility and the changing framework conditions demand that all companies satisfy this demand with ever better products and faster service in a powerful organization.

Indorama Ventures has recognized this task and has decided to set up the Indorama Mobility Group, the largest integrated company globally in this business field. In recent years, Indorama Ventures has acquired a large number of global fiber and textile manufacturers in the automotive, tire and functional textile sectors. You know the companies—some of them for more than 100 years—as reliable and competent partners and manufacturers of high-quality filament yarns in the industrial sector. They have been known as strong suppliers who have always focused on quality, sustainability and reliability of their products.

This, of course, will not change being a part of Indorama Mobility Group. Much more: With the new structure and organization, we will be able to respond even faster to the needs of our customers. This should make communication with our partners even more efficient. New developments and projects can be advanced faster and better by bundling and concentrating our wide and diversified know-how.

We will continue to be your reliable and innovative partner with our broad product range and our comprehensive service offering, and look forward to continuing our cooperation with you, serving you with excellent fibers and textiles that empower safety and comfort of everyone!

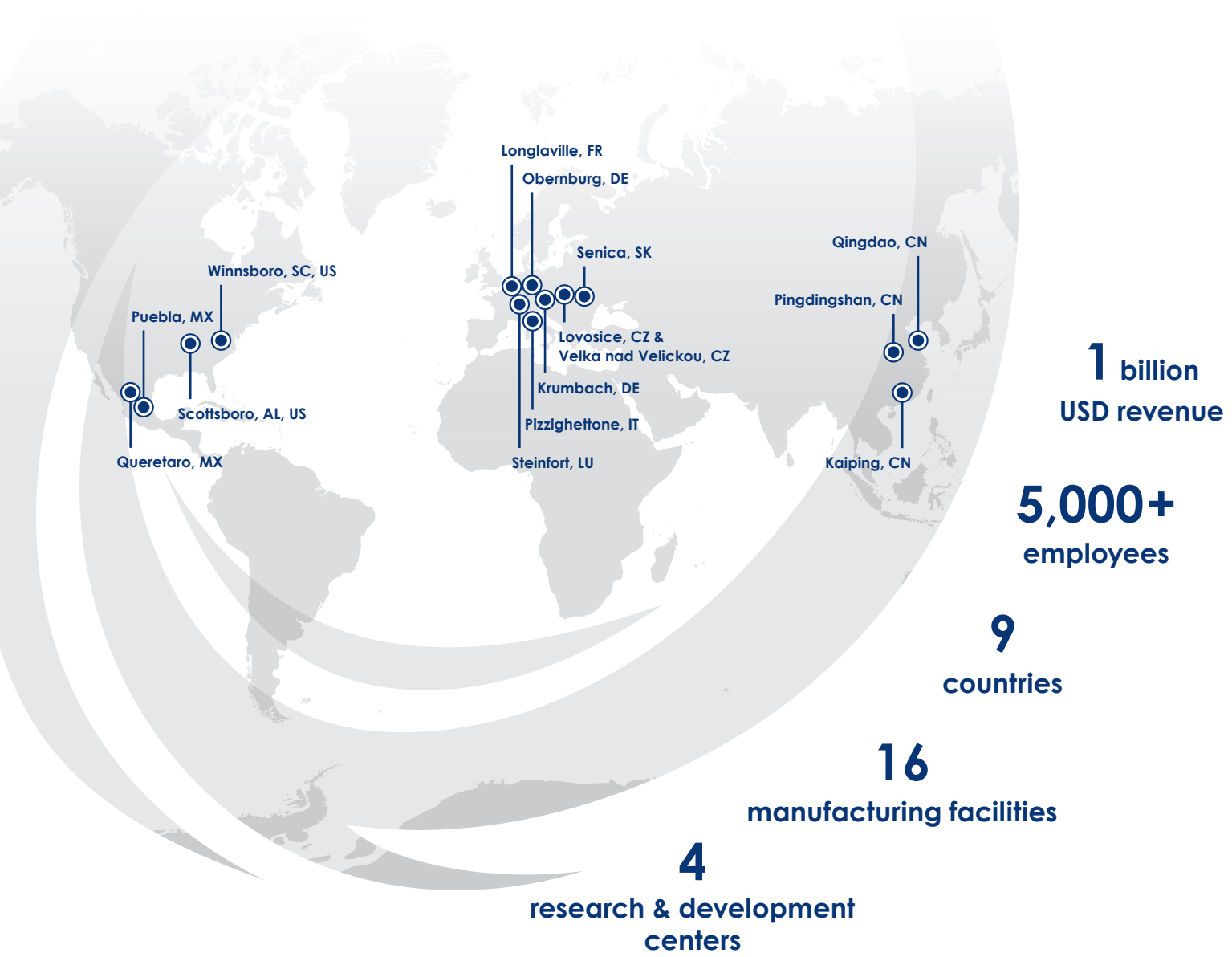
Yours sincerely,



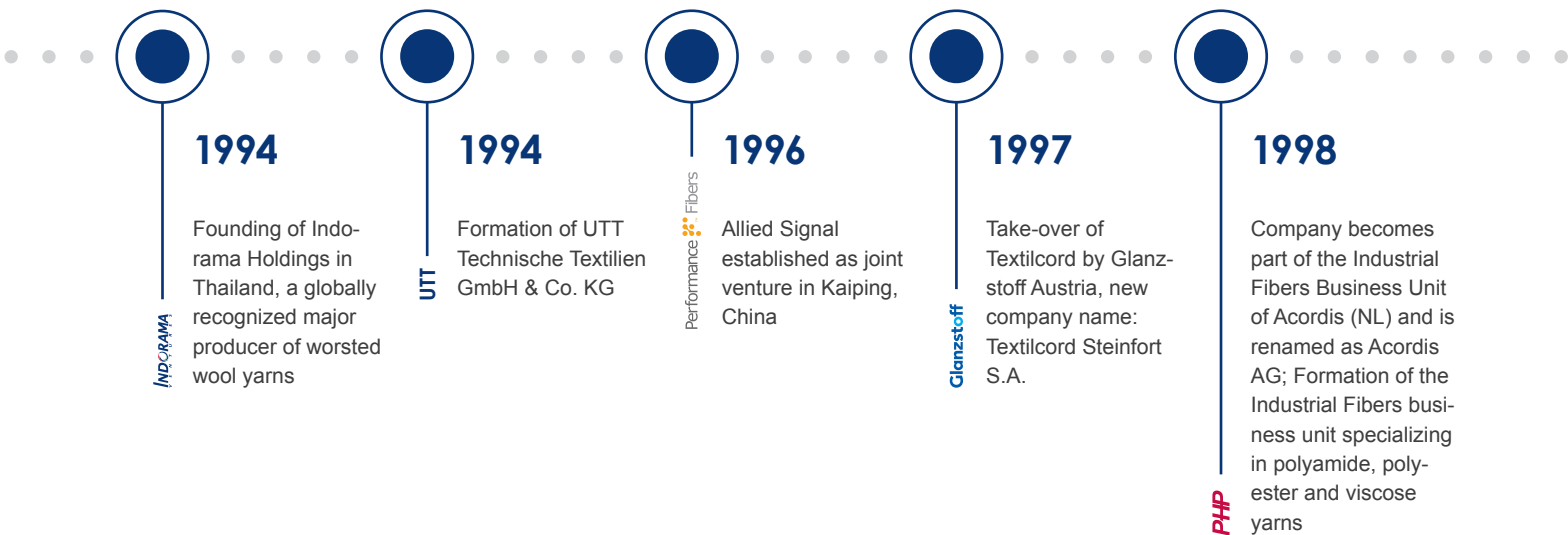
**Jochen Boos**  
Indorama Mobility Group,  
Chief Executive Officer



# The Indorama Mobility Group at a glance



## Brief history



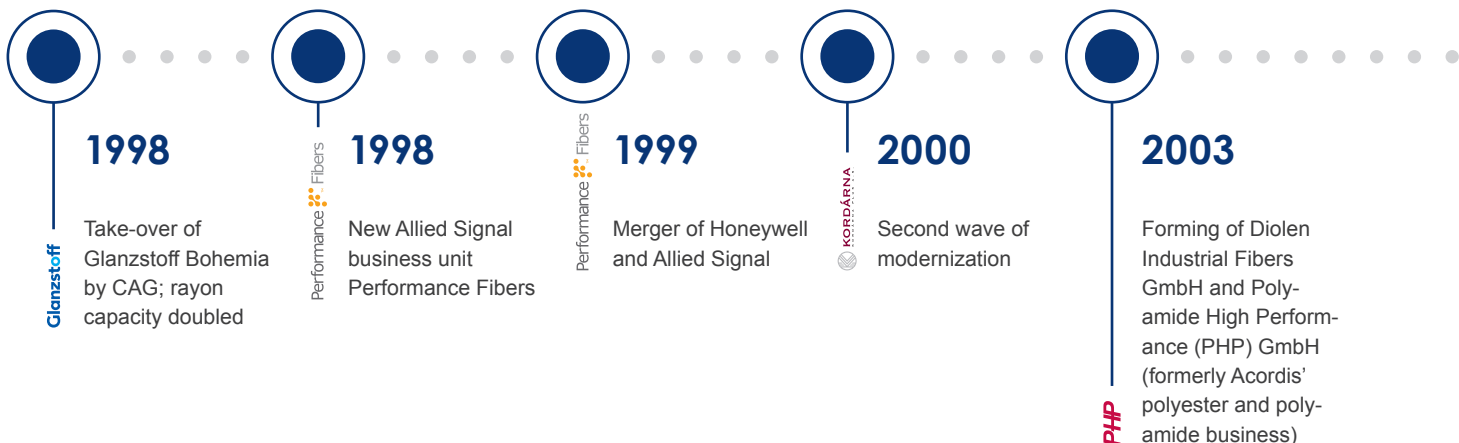
It is an exciting time to bring 5000+ employees across 16 manufacturing sites in 9 countries with broad and strong expertise together to create one of the largest and most diversified fiber and fabric players in the global mobility industry. The newly created Indorama Mobility Group, supported by its long-standing legacy brands, will seek to integrate all of its assets and have a combined and coherent strategic approach to the market.

Fiber in motion is the common basis of all Group companies: Our yarns and textiles are important components of products that move us forward and keep our world moving. With 3 main business segments, Tire, Automotive Safety and Functional Materials, each covered with a dedicated commercial structure, we will be able to better respond to specific market needs by leveraging our global operational footprint and tailoring our product portfolio.

To address the evolving market trends and needs, we will centralize the Group's R&D capabilities and combine its diversified know-how to foster innovation and technological advancements.



**Arnaud Closson**  
Indorama Mobility Group,  
Chief Operating Officer



# Our goal: add value to society

## Superior yarns and textiles for today and tomorrow

Chemical fibers play a most prominent role in the man-made fiber world. High-performance filaments not only make major contributions to road safety, but are also indispensable in a number of other fields such as healthcare, transport, and even construction.

### The Indorama Mobility Group—a strong part of Indorama Ventures

All constituent companies of the Indorama Mobility Group are proud to belong to the Indorama Ventures family, one of the world's leading integrated market players in the intermediate petrochemicals industry with a strong portfolio in high-value-added products.

All companies of Indorama Ventures are strongly committed to:

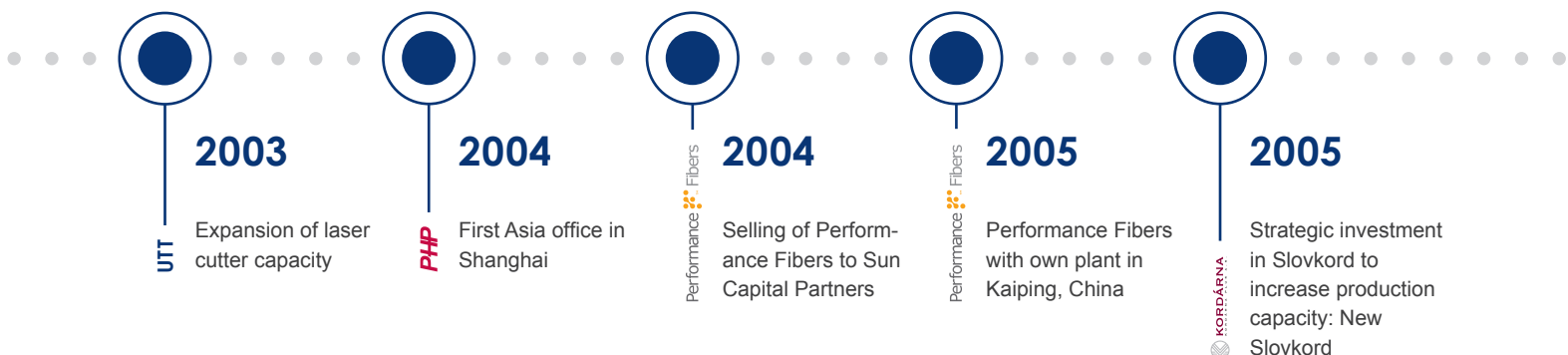
- Sustainability
- Society as a whole
- Strong customer orientation
- Investment in our employees
- Innovation in everything we do

Today, the Indorama Mobility Group is a strong partner to all its customers. The synergies, especially in the tire and automotive sector, enable the Group to follow a coordinated strategy for all Group companies.



With the leverage of our R&D capacities, the Group is able to expand innovation possibilities by combining yarns with different properties and modifications during the following converting steps. The highest goal is to deliver customized solutions to our customers.

Strategic innovations are mandatory for sustainable success in our markets. This means to stay on top of developments, to identify chances quickly, and to act directly on opportunities with our experienced and motivated employees.



# Fully committed to health, safety and the environment

## Our core value: sustainability across all our activities

In the pursuit of our business growth, we pay close attention to the triple P of profits, planet and people. To this end, the Indorama Mobility Group actively supports the principles of the European chemical industry's Responsible Care® Programme. We also engage in a number of pertinent networks and associations.

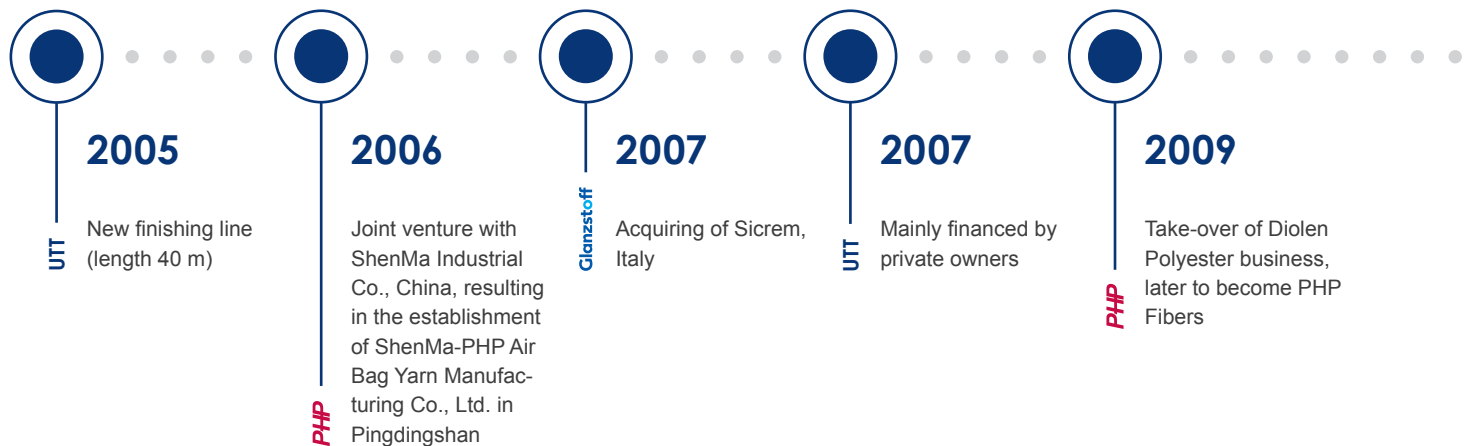
At Indorama Ventures, we share a common understanding of sustainability, which beyond environmental issues extends to our customer and employee relationships. We invest heavily in training and education, as this is the fundamental precondition for the central driver of our activities: innovation.

Indorama Ventures has received various sustainability awards over the last years, among them the 2018 RobecoSAM Silver Class Sustainability Award.

MEMBER OF

**Dow Jones Sustainability Indices**

In Collaboration with RobecoSAM ●●



# The Indorama Mobility Group— closer than you think

## End uses

Our fibers and fabrics serve a wide variety of purposes. Some are quite obvious; others not:

- **Protection of people and goods**

End products made of our yarns and fabrics include safety belts, ropes, fire hoses, tarps and, last but not least, airbags. In fact, Indorama Ventures (through PHP Fibers) was the first manufacturer to develop a dedicated yarn for airbags.

- **Transport**

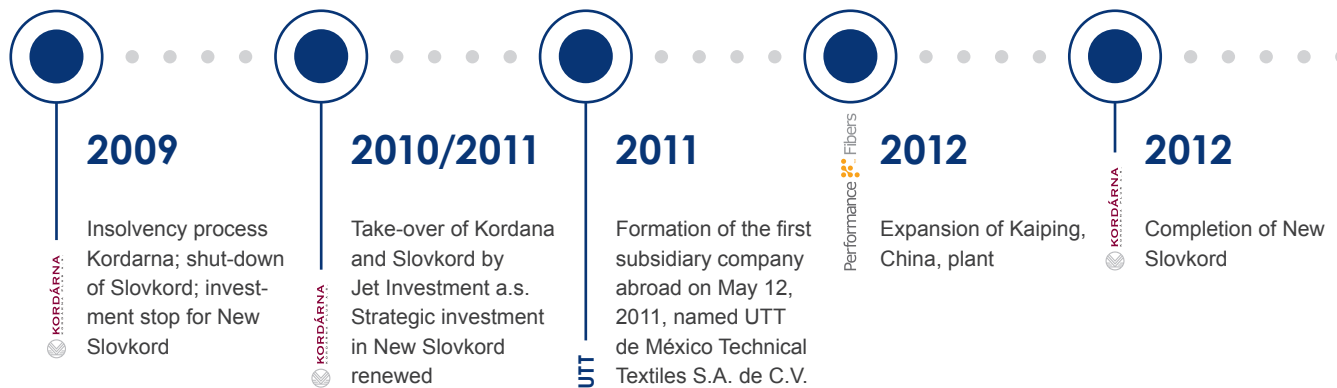
Fabrics from our yarns reinforce and stabilize tires, drive belts, conveyor belts and industrial straps, to name but a few.

- **Architecture and environment**

Our yarns are used to make eco-friendly textile building components, roofing membranes, geotextiles, billboard banners, and even art: in 2016, “wrapping artists” Christo and Jeanne Claude used fabric made of Indorama Ventures yarns for their “Floating Piers” on the Lago d’Iseo in Italy.

- **Lifestyle and well-being**

You will find our yarns in virtually all types of sports equipment, including sailcloth, outdoor clothing, rucksacks, tents and the like.





# The formation of the Indorama Mobility Group

## Our segments

The journey of a thousand miles begins with a single step. In May 2019, Indorama Ventures made an important step and created a new global business unit: the Indorama Mobility Group.

The Indorama Mobility Group inherits decades of industry knowledge, experience and brand equity of the legacy businesses: PHP Fibers, Performance Fibers, Glanzstoff, Kordarna and UTT, and reemerges as an integrated global business unit; it leverages synergy and embarks on a new journey with a coherent strategy, seeking to deliver superior long-term

customer value with its 3 new operating business segments, namely:

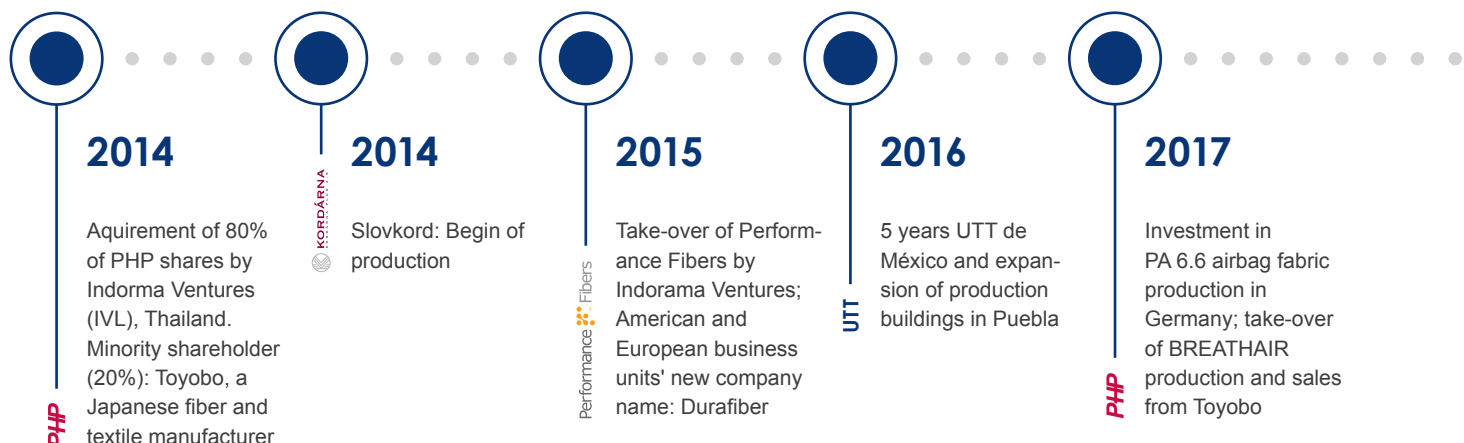
- Tire
- Automotive Safety
- Functional Materials

The Indorama Mobility Group today has a sales revenue in excess of US\$ 1 billion with 16 manufacturing sites in 9 countries on 3 continents, with more than 5,000 employees.

Business segment		Tire	Automotive Safety				Functional Materials			
Sites regions	Indorama Mobility Group companies	Tire	Airbag	Seatbelts	Sewing thread	MRG <sup>1</sup>	Broad fabrics	RNTS <sup>2</sup>	Composites and specialties	
EU	PHP Fibers	X	X	X	X	X	X	X	X	
	UTT		X							
	Glanzstoff	X				X	X	X	X	
	Kordarna	X				X				
Americas	PHP Fibers	X	X				X			
	Performance Fibers	X				X				
Asia	PHP Fibers		X							
	Performance Fibers	X		X	X	X	X	X		
	Glanzstoff	X								

1 Mechanical rubber goods

2 Ropes, nets, tows and strappings



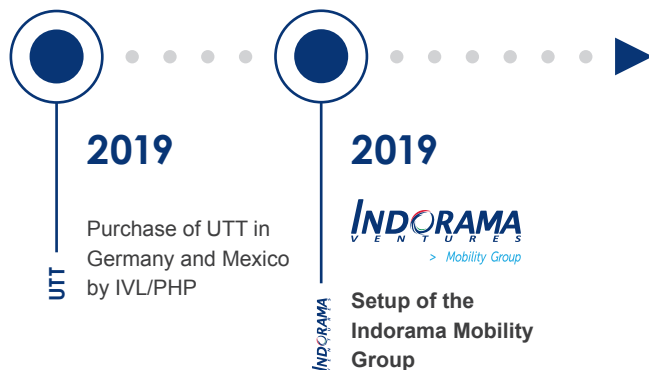
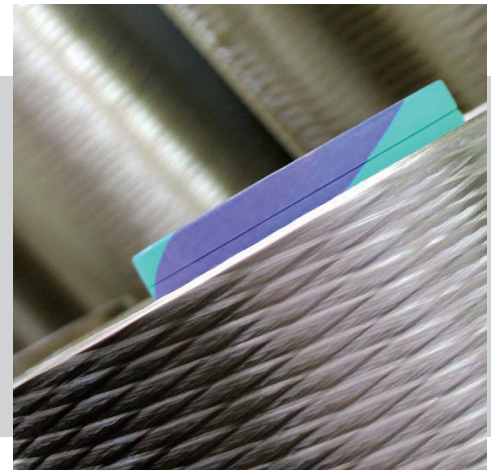


The Indorama Mobility Group arises as a new and well-positioned player in the tire cord industry, yet with a long history of market success of the individual companies and brands.

Combining the knowledge and manufacture know-how of polymerization, spinning, twisting and dipping, each of them offering a specific product portfolio with unique product qualifications and well-established customer relationships.

Enka® Nylon from PHP Fibers is recognized as a leading polyamide 6.6 filament supplier for passenger car and light truck (PCLT) tire cap ply reinforcements. Performance Fibers' DSP® HMLS is a pioneer material for dimensionally stable polyester for PCLT radial tire carcasses; Glanzstoff's Viscord® rayon cord and fabric as well as aramid hybrid has provided the superior reinforcement needs of UHP, run-flat and racing car tires; and Glanzstoff's and Kordarna's multimaterial conversion technologies have delivered tire cord solutions across different tire application segments.

*Our Viscord® rayon and aramid hybrid provide the high temperature dimensional stability and performance for UHP, run-flat and racing car tires.*



# The Tire business segment

The Indorama Mobility Group Tire business segment puts strong focus on the PCLT tire market and is constantly on the alert to the automotive industry development which is evolving at a fast pace. With the continued tightening of vehicular emission compliance, higher fuel economy targets, new tire labelling requirements, REACH implementation, electrification of powertrain and environmental sustainability, tire producers are constantly looking for solutions to meet the needs of OEMs as well as consumers. The Indorama Mobility Group offers a full range of tire reinforcement products for carcass, cap ply, chafer fabric and bead for PCLT, UHP, run-flat tires as well as other tire application segments.

Product innovation at the Indorama Mobility Group plays a key role in delivering new tire performance. The Group has 4 key R&D centers for tire reinforcements in Germany, Czech Republic, Austria and China; it continues to work on industry trends and has a strong pipeline of innovation programs at different stages aiming to enable the Group and its customers to be future-ready when it comes to tire reinforcement solutions.



- ECOTEC™ provides high tenacity or high denier reinforcement for reducing carcass weight and rolling resistance
- UNITEC™ imparts extra-high dimensional stability for enhanced tire handling
- THERMTEC™ gives robust adhesion at high temperatures and reduces risk of heat-generated failure
- PLYTEC® is an innovative polyester-based nylon-like tire reinforcement material replacing polyamide in motorcycle bias tire carcass
- CAPTEC™ is a polyester-based material replacing polyamide in cap ply
- Enka® Nylon BIO is *the* sustainable polyamide 4.10 material for cap ply—manufactured from bio-based polymers based on castor oil, Enka® Nylon BIO could be considered as a so-called “drop-in” alternative for current fossil-based products
- Viscord® rayon provides superior dimensional stability at high temperature for UHP tire
- Enka® Plast is the new elastic weft yarn for tire cord fabrics



In future, the Indorama Mobility Group Tire business segment will operate as a single integrated global tire reinforcement business unit and act with its international team. It will leverage cross-fertilization of R&D expertise and innovation pipeline, sharing manufacture process know-how and best practices, procurement synergy, proliferation of full product portfolio offering, all aimed at providing better value to customers.

# The Automotive Safety business segment

## Empowering safer travelling

The Automotive Safety business segment of the Indorama Mobility Group focuses on 3 end uses, namely:

- Airbags
- Seatbelts
- Sewing threads

## Airbags

The Indorama Mobility Group derives its strong position in the airbag market from PHP Fibers who was the pioneer in the development and production of airbag filament yarns with now a global manufacture footprint in Germany, North America and China (joint venture with Shenma). The Enka® Nylon airbag yarns with different shrinkage behavior and with high or superhigh tenacity in NDPF and LDPF (normal resp. low denier per filament) characteristics in all required yarn counts and PET airbag yarns enables the Group to provide the optimum yarn for all airbag types and fabrics.

The strategic move to integrate fabrics production started when PHP Fibers established airbag-weaving and coating operations in Germany and the US, using a technology from its minority shareholder Toyobo. In 2019, it completed the acquisition of UTT Technische Textilien in Germany and Mexico to solidify its position as an airbag fabric player.

The Indorama Mobility Group has now combined and advanced all its technologies and manufacturing capability and is a full portfolio supplier of both polyamide 6.6 and polyester airbag yarn and fabrics, coated or uncoated, with flat-woven fabric and the latest one-piece woven (OPW) technology to the airbag industry.

UTT uses all commercially available yarn deniers to make fabrics in various constructions to meet a variety of technical requirements. The process control for all fields of work enables a comprehensive traceability for the automotive industry. With airbag's increased adoption of polyester yarn where Indorama Ventures has rich expertise, coupled with the strong historical polyamide 6.6 filament yarn reputation and newly acquired fabric position, the Indorama Mobility Group seeks to build an even closer and stronger partnership with the airbag and automotive industry.

## Seatbelts

Seatbelt webbing has long been relying on polyester yarn for its break-strength reliability, prominent abrasion resistance and excellent dyeability. The Indorama Mobility Group supplies performance polyester yarn of high consistency and uniformity for seat belt warp and weft applications through PHP Fibers and Performance Fibers.

## Sewing threads

Besides a wide range of standard polyamide 6.6 yarns for sewing thread applications, PHP Fibers offers the unique product Stanylenka®. This is a high-tenacity filament yarn made from polyamide 4.6 with higher heat capacity: Sewing threads made of Stanylenka® result in enhanced seam durability. These yarns are the material of choice for all kinds of demanding sewing thread applications where the following properties are essential:

- Tenacity
- Thermal stability
- Abrasion resistance

Performance Fibers is also a long-standing supplier of low denier polyester yarn to major global sewing thread companies for a variety of industrial applications.



*Our yarns are always on your side—to protect your health or save lives in emergency situations.*



# The Functional Materials business segment

## Empowering performance and comfort

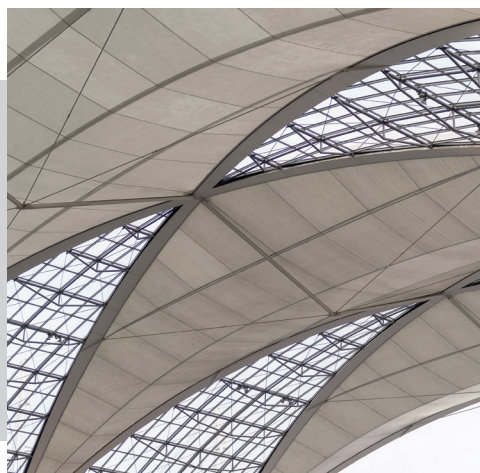
The Functional Materials business segment leverages the Group's core manufacture capability and the wide portfolio of high-value filaments providing special functions to the final customer products. It supplies a diverse applications and global customer base in such markets as:

- Broad fabrics
- Mechanical rubber goods (MRG)
- Ropes, nets, tows and strappings (RNTS)
- Composites and specialties

### Broad fabrics

The broad fabrics market segment covers a wide spectrum of various applications. The extra-low shrinkage polyester yarn and its consistency enable window-blind fabric produced to premium quality. Special polyester yarns have been qualified for supply to military applications.

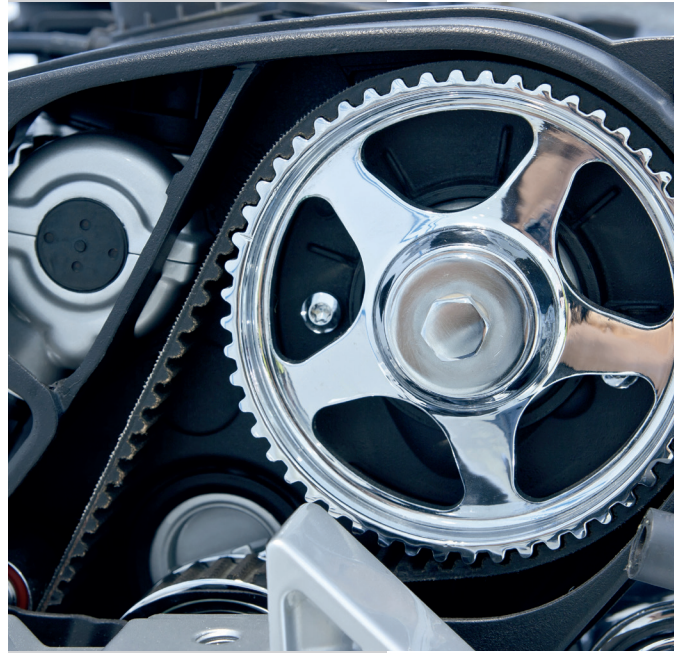
Another specialty is the antiwicking yarn type from PHP Fibers for translucent coated fabrics used for textile constructions and structures, backlits, awnings, billboards and moveable tents. Standard polyester yarns consist of numerous circular microfine filaments. The hollow spaces between the filaments are responsible for capillary activity and may cause wicking in coated polyester fabrics. The Diolen® yarn prevents harmful capillary activity through a special process modification during yarn production, and the hydrophobic finish avoids wicking. With this treatment, surface tensions are reduced so that aqueous fluids will no longer penetrate the bundle of filaments and therefore the fabric cannot be soiled.





## Mechanical rubber goods (MRG)

The Mechanical rubber goods (MRG) market segment covers a diversified and specialized range of applications such as reinforcements for conveyor belts, industrial and automotive power transmission belts, timing belts, and various kinds of industrial and automotive hoses. Textile cords and fabrics are needed in MRG composites as they determine such critical properties as strength, elongation, creep and dynamic behaviors. The Indorama Mobility Group has production capabilities in 3 global regions and contributes to these application fields with yarns, cord and fabrics made from standard polyester (PET), HMLS PET, polyamide, aramids, hybrids and PEN—all tailored to the specific needs of mechanical rubber goods with the goal of offering increased value through improved performance.



## Ropes, nets, tows and strappings (RNTS)

The RNTS market requires high strength and durable material to support their functions. In off-shore mooring (OSM), high strength-to-weight rope made high modulus-twisted polyester coated with special Seagard® marine overlay finish deliver the highest level of durability and performance predictability.

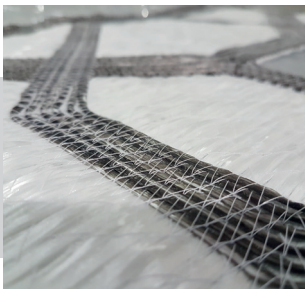


# The Functional Materials business segment

## Composites and specialties

The composites and specialties market segment caters to industries seeking alternative materials to deliver new functions in response to trends in light-weighting, comfort, cost reduction, and compliance of regulations. A recent development at PHP Fibers the next generation of Enka® TecTape Hybrid Roving making conversion into fiber-reinforced composites more versatile than before: Its constant dimensions and smooth surface are ideal for the wasteless, load-path-oriented tailored fiber placement (TFP) production of economic lightweight textiles. The newly developed low-shrink matrix fiber material enables the conversion into demanding composites even under low-pressure conditions.

BREATHAIR® is the latest innovative 3D structure nonwoven solution for everywhere you sit, lay down and relax. From a slim, flexible protective layer to a thick cushioning, BREATHAIR® is *the* Material for multiple applications. Being highly water-repellent, exceptionally air-permeable and lighter than polyurethane at the same level of hardness plus its rubbery elasticity makes BREATHAIR® exceptionally durable. Since it is recyclable and suitable for recycling to Bunker A fuel oil, PHP Fibers provides at the same time an environmentally friendly loop structure with excellent hygiene properties. BREATHAIR®—the embodiment of well-being.





## Next generation brands

In line with our commitment to innovation that adds value to society, we constantly develop new materials to address urgent industry and consumer requirements.

### Enka® Nylon BIO

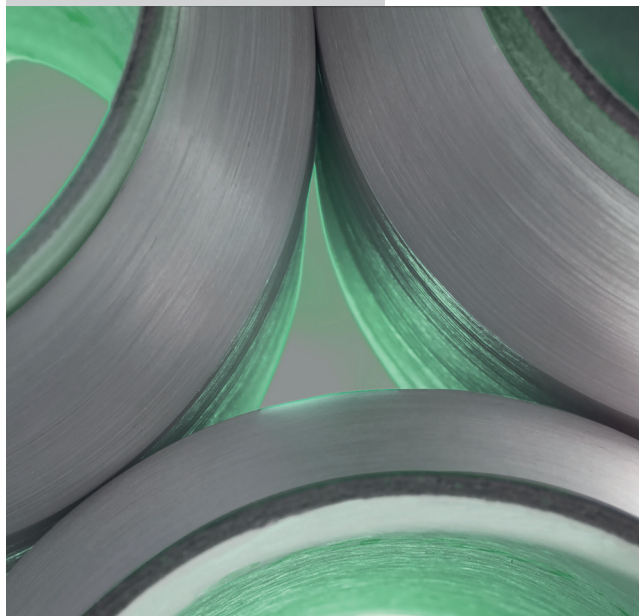
Sustainable drop-in solution for fossil-based polyamide 6.6 yarns

The need to reduce CO<sub>2</sub> emissions and to become independent of fossil-based fiber products was the motivation to search for bio-based alternatives. This led to Enka® Nylon BIO, our new polyamide 4.10 fiber type. Polyamide 4.10 polymer is based on castor oil, and its CO<sub>2</sub> footprint is almost zero. Enka® Nylon BIO yarn is the sustainable drop-in alternative for fossil-based polyamide 6.6 yarn.

### Enka® Plast

Elastic weft yarn for reliable tire production

With its elastic polyamide core and stiff cotton shell, Enka® Plast yarn ensures high output throughout the whole process of tire cord manufacturing. During tire assembling, Enka® Plast yarn provides the reliable equidistant spacing of carcass reinforcement.



*Yarns from bio-based polymers—sustainable options for technical textiles.*

## Enka® TecTape Hybrid Roving

The tailored solution for fiber reinforcement composites

Designed for the economic and automated manufacturing of advanced composite structures that require lightweight and stable product parts. Over-molding of structures based on Enka® TecTape Hybrid Roving enhance the composite's performance and keep production costs low.

## Viscord® FR

Our innovative solution for protective garments

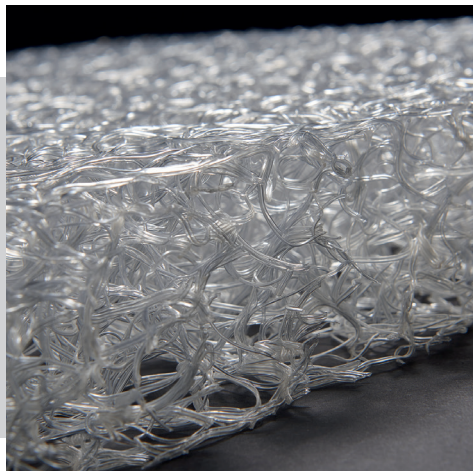
Viscord® FR is a high-tenacity flame-retardant viscose filament yarn for textile application. Its permanent FR properties are due to the incorporation of a flame-retardant agent during the viscose spinning process. Viscord® FR has a cool and silky touch, a high durability and is biodegradable. As the yarn cannot melt or drip, it is used in protective garments for the military, firefighters and law enforcement.

## BREATHAIR®

Sustainable fiber materials for enduring comfort

This innovation joined the PHP Fibers portfolio in 2017. Due to its complex 3-dimensional fiber structure, it is highly elastic and breathable—perfect for padding in furniture, automobiles, apparel or packaging. It can also be recycled easily.

*Highly elastic, washable and breathable 3-dimensional fiber structure—provides comfort and addresses sustainability.*



# Next generation brands

## PLYTEC®

PLYTEC® is an advanced polyester tire cord fabric which exhibits a nylon-like stress-strain curve and imparts a high toughness allowing replacement of polyamide in selective bias tire carcass applications.

## ECOTEC™

ECOTEC™ addresses the trend of lightweight tire and lower rolling resistance by providing a polyester-based tire cord fabric with high tenacity (HT) or high denier (HD). Both versions enable carcass weight reduction and the HD version facilitates carcass ply reduction, without compromise on handling properties.

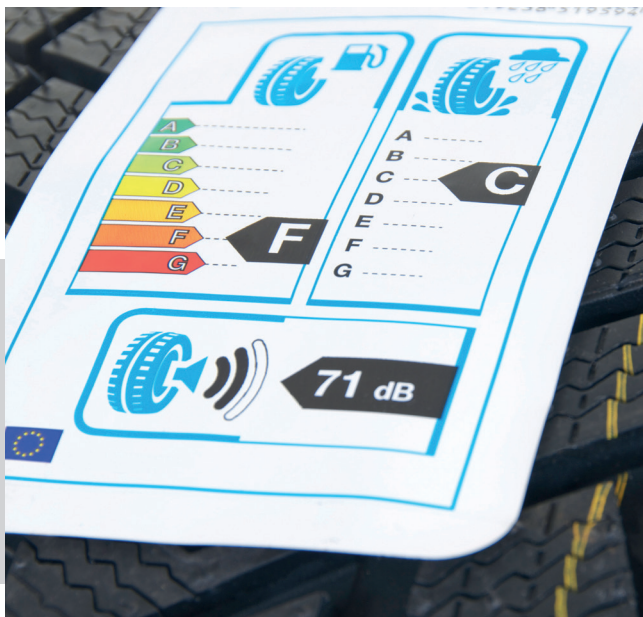
## DIPTEC™

DIPTEC™ is a technology platform that provides a sustainable dip solution-free of resorcinol formaldehyde for regulatory compliance while delivering good adhesion performance with rubber across multiple types of tire reinforcement materials.


## Viscord® CS4

High performance produced out of renewable raw materials

Viscord® CS4 with improved fatigue properties compared to standard rayon tire cord fabrics. Better durability and tire performance over time. The enhanced capability enables the tire industry to reduce carcass weight without compromising on handling characteristics.



*Our new products address the performance trend and regulatory compliance that the tire industry faces.*



**We make the materials  
that move the world.**



**Contact:**  
**Hans-Bernd Luchtefeld**  
**Marketing Manager**

### **Indorama Mobility Group**

PHP Fibers GmbH  
Industrie Center Obernburg  
63784 Obernburg  
Germany

[communication@php-fibers.com](mailto:communication@php-fibers.com)



An Indorama Ventures Company

### **PHP Fibers GmbH**

Germany  
T +49 (0) 202 32-3319  
F +49 (0) 202 32-2377

[mobility@php-fibers.com](mailto:mobility@php-fibers.com)



### **Performance Fibers**

Hong Kong  
T +852 2110 8242  
F +852 2110 0033

[enquiry@performancefibers.com](mailto:enquiry@performancefibers.com)



### **Glanzstoff Industries AG**

Luxembourg  
T +352 399 881-1  
F +352 399 881-213

[info@glanzstoff.com](mailto:info@glanzstoff.com)



### **Kordárna**

Czech Republic  
T +420 518 312-224  
F +420 518 312

[kordarna@kordarna.cz](mailto:kordarna@kordarna.cz)



An Indorama Ventures Company

### **UTT**

Germany  
T +49 (0) 8282 897-0  
F +49 (0) 8282 897-100

[info@utt.de](mailto:info@utt.de)