

fibers and filaments

the experts' magazine

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Manmade Fibers in industrial applications

Hanging on a super strong thread

Mooring ropes comprise a super-strong braid of high-modulus/high-tenacity manmade fibers – securing, for example, floating platforms in deepest waters receiving oil from nearby oil rigs.



Between software and solution

Service trends in machine and systems construction

What trends is Oerlikon's segment Manmade Fibers' service department focusing on now and in the future? 'Fibers and Filaments' spoke with Head of Service Sales Dr Wolfgang Ernst.



"Focus on the future with spunbond processes for technical nonwovens."

Dr. Ingo Mählmann
Product Manager Nonwoven
Oerlikon Neumag



From Melt to Material

The market for technical nonwovens annually grows by an average of 9%. You want to grow with this market? With our equipment you are prepared for the future:

- Full scope supply up to the finished rolled goods
- High throughput
- Low energy consumption
- High grade nonwoven material
- Competence in PET and PP

A combination of efficiency and productivity – e-save.



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In focus



Hanging on a super-strong thread
Mooring ropes comprise a super-strong braid of high-modulus/high-tenacity manmade fibers.

8



Essential textile helpers on a roll
They may not steal the limelight, but they do set the stage for smooth technical processes: fabric tapes.

12



Filters making the world cleaner
Filters are making a big impact on everything from clean air and water to efficient and clean manufacturing processes.

16

Innovation and technology



On a growth trajectory with Teknoweb partnership
Nonwovens will be making a decisive contribution towards the growth of the segment over the coming years.

20



High-speed winding concept for POY production
The WINGS concept is now also available for high denier polyester yarns.

23

In brief

News and reviews 4

Solutions and services

Between software and solution 26

On the markets

Techtextil unexpectedly dynamic 29

A platform for the Iranian textiles industry 30

Imprint..... 32

Editorial



Dear Customer, dear Reader,

Textiles are not merely clothing, they are quite literally all around us. Frequently, they are hidden and in places we would least expect them to be. And these are the very niche products that are the focus of our current edition of Fibers & Filaments.

Nonwovens and yarns in industrial applications is the topic of our summer edition – a diverse spectrum of products that our articles merely hint at. We would like to provide you with an insight into the potential harbored by fibers, filaments and nonwovens.

From filter applications for improving air quality and strong mooring ropes that stabilize drilling platforms in the sea all the way through to virtually invisible solutions, such as those offered by fabric tapes for enveloping cables and hoses. Be inspired by the diversity and the opportunities presented by the world of manmade fibers.

And we have also included something for our textile customers: our new WINGS POY HD, with which high titers can be achieved. The WINGS technology is now also capable of winding polyester POY with up to 500 den.

The repositioning of our nonwovens business is a further topic, as are service trends and our responses to these. Solutions are the program with which we make our customers strong players on the global market. Individual and tailor-made, economical and future-proof.

I am thrilled to be presenting you with a new edition of Fibers & Filaments and hope you enjoy reading it.

With best regards,

Georg Stausberg
CEO Oerlikon Manmade Fibers Segment

Trends in BCF yarn production

Manufacturing PA6 BCF yarns more profitably



Straight depositing on the cooling drum guarantees highest crimp quality.

According to PCI Redbook, just under 90,000 metric tons of additional capacity have been installed for the production of melt-dyed and raw white PA6 yarns over the last five years. Oerlikon Neumag's share of these capacities totals approx. 65%. And the trend towards high-end, fine single-titer PA6 BCF yarns continues unabated. The melt lines, specially optimized for this process, ensure optimum melt quality. A depositing shoe on the texturing unit especially developed for this and a so-called 'V' cooling drum guarantee the highest degree of crimp evenness and quality. And the specially-designed texturing components cater to the very highest demands when it comes to short-pile automotive applications. (che)

The 'Fiber Year 2016'

Latest market developments

From the textile perspective, the year 2016 will always be remembered as an historic milestone. The world market size surpassed the astonishing mark of 100 million metric tons.

Fiber production globally grew by 3% to 100 million metric tons due to an 8% rebound in cotton production after a disastrous contraction during the 2015/16 season. The world market even topped 101 million metric tons when taking cotton consumption – which was fairly unchanged compared to the previous year – into account. However, the new all-time high was the result of a further deceleration in demand at the retail level. Final end-use slowed for the fourth consecutive year to a little over 1%.

Manmade fibers now make up 70% of the global market. While synthetic fibers suffered the slowest growth in

eight years at below 2%, cellulosic fibers expanded at a rate of over 3%. The staple fiber market was up 1% following modest increases in synthetics and a 4% gain in cellulose. Natural fibers, still constituting 55% of the market, stagnated once again.

World filament production grew modestly by 2%, experiencing the slowest growth in polyester output since 2008, while polyamide registered an almost double-digit increase. Industrial yarn succeeded, for the third year in succession, to grow faster than textile filament. Spun yarn production stagnated, with cotton yarn output expanding slightly faster, especially in Bangladesh, Indonesia, Mexico and Vietnam. (ae)

The full report can be ordered from The Fiber Year GmbH at www.thefiberyear.com.

Meltblown nonwovens for filtration

New electro-charging unit

The Oerlikon Neumag has launched a newly-developed concept for electrostatically charging meltblown nonwovens. The new in-line charging unit differs from other concepts currently available on the market as a result of its high level of flexibility when charging the most diverse nonwoven products, particularly in the case of nonwovens with lower basis weights and tenacities.

Users can set the optimum charging condition depending on the filter application. High wrapping angles at the guide rollers ensure optimum charging, which can be carried out on both sides, positive and negative. Laboratory trials have shown that – in conjunction with the Oerlikon Neumag meltblown technology – the Oerlikon Neumag charging unit can also be used to manufacture EPA- and HEPA-class filters. To this end, an H14-class filter with an efficiency of 99.995% was produced with an overall pressure loss of less than 100 Pa.

Electro-charging for superior filter separation performance

Oerlikon Neumag meltblown technology is one of the most efficient methods for producing very fine and highly-separating filter media made from plastic fibers. Depending on the application, the pore size of a meltblown nonwoven material ranges from 5 to 40 µm. Here, smaller pores increase the mechanical filtration performance, albeit at the expense of higher pressure losses. The fineness of the meltblown fibers used for filter media lies in the 200- to 2,500-nm range. However, even fibers with nanoscale fineness are often not sufficient to separate the finest particles from air or liquid flows. Electrostatically charging filter media can significantly and inexpensively improve the filter performance without increasing the throughput resistance. (che)



The Oerlikon Neumag electro-charging unit can be used to manufacture EPA- and HEPA-class filters.

Events

International Conference on Polyester

August, 2-3, 2017, New Delhi, India
www.eliteconferences.com/indianpolyester-2017

IRANTEX

September 4-7, 2017, Teheran, Iran
www.spnco.net

Techtextil India

September 13-15, 2017, Mumbai, India
www.messefrankfurtindia.in

Manmade Fiber Conference

September 13-15, 2017, Dornbirn, Austria
www.dornbirn-mfc.com

Sustainable Textile School 2017

September 18-19, 2017, Chemnitz, Germany
www.sustainable-textile-school.com

IFAI Expo

September 26-29, 2017, New Orleans, USA
www.ifaexpo.com

Bondexpo

October 9-12, 2017, Stuttgart, Germany
www.bondexpo-messe.de

Filtration

October 10-12, 2017, Chicago, USA
www.inda.org

International Conferences on Technical Textiles & Nonwovens

November 6-8, 2017, New Delhi, India
<http://textile.iitd.ac.in/>

Hofer Vliesstofftage

November 8-9, 2017, Hof, Germany
www.hofer-vliesstofftage.de

Since

November 8-10, 2017, Shanghai, China
www.since-expo.com

ShanghaiTex 2017

November 27-30, 2017, Shanghai, China
www.shanghaiTex.cn

Strong partnership with RWTH Aachen University Oerlikon presents new take-up winder to ITA as partial gift

In May 2017, Jochen Adler, Vice-President and Chief Technology Officer at Oerlikon's segment Manmade Fibers, presented a Oerlikon Barmag take-up winder as a partial gift to Prof. Dr Thomas Gries, head of the Institut für Textiltechnik (ITA) at RWTH Aachen University. The new Type ASW602 winder, which is equipped with modern control software and user interface, replaces the institute's former Barmag take-up winder.

Due to this modernisation, the ITA has access to a latest generation take-up winder which is used for various research projects. The new winder is applied at ITA's two pilot melt spinning plants and ensures the transfer of new research and development insights

into the pilot scale. Furthermore, this winder has two winding positions and operates with winding speeds between 2500 m/min and 5500 m/min. The new winder is suitable for all kinds of polymers, from polypropylene to polyethylene, polyester, polyamide, etc. as well as for the production of several types of yarn, such as industrial yarn, pre-oriented yarn and fully-drawn yarn.

"We thank Oerlikon Barmag for the generous partial gifting and the support during the set-up of the new take-up winder", says Prof. Dr Thomas Gries. "The new equipment will keep the institute's machine park on a high and powerful level." The head of ITA's chemical fibre department Dr

Thorsten Anders adds: "This winder is designed for the needs of chemical yarn research. It allows state of the art technology research and development and pilot-scale production. We will use it for the melt spinning plants in the single- and bi-component spinning process. This way, we can access a wide variety of producible yarn types."

The Institut für Textiltechnik (ITA) is part of the outstanding RWTH Aachen university. Its core expertise consists of textile related production technologies and high performance materials. With the Centre for High Performance Materials, ITA offers small and medium-sized companies direct access to scientific research especially in the fields of high modulus fibres and composites. ITA provides research and development services and advanced training and creative workshops in cooperation with its partner company ITA Technologietransfer GmbH. Furthermore, ITA educates students in various textile related courses. Further information can be found at www.ita.rwth-aachen.de. (mbi)



CTO Jochen Adler (left) hands over an Oerlikon Barmag ASW winder to ITA's Prof. Dr Thomas Gries, providing the institute's machine park with modern take-up technology.

Nonwovens for High-performance Applications symposium Oerlikon Neumag exhibits at the NHPA



The NHPA (Nonwovens for High-performance Applications) – a symposium designed to provide information on the latest technical developments and opportunities offered in the area of technical nonwovens for high-performance applications – took place in Prague on March 7 and 8, 2017.

And Oerlikon Neumag also used this opportunity to showcase its solutions in

Dr. Ingo Mählmann's presentation on spunbond and meltblown technology triggered a lively discussion.

this area. The presentation by Dr Ingo Mählmann, Business Development Nonwovens, on the Oerlikon Neumag spunbond and meltblown technologies for filtration applications and geotextiles triggered lively discussions among the attending experts – both in the plenary session itself and in the subsequent breaks. (che)

Multicolored BCF yarns Trend continues

The demand for multicolored carpets has grown significantly, with the market seeking a wide spectrum of color separations in tricolor yarns. Oerlikon Neumag's S+ system concept offers the opportunity to produce the most diverse color separations, from mélange to strongly separated colors.

Variomelt – maximum flexibility for the production of monocolour and tricolor yarns

The Variomelt concept is synonymous with the highly-flexible production of large and small batches of monocolour and tricolor yarns: the unit can be

modified from tricolor to monocolour production with three single colors in less than 45 minutes. Long batch runtimes per monocolour extruder ensure particularly efficient raw material utilization. As customary, the diphyll-heated Variomelt spinning mill provides a constant, optimum spinning temperature.

Color Pop Compacting

Strongly separated yarns can be manufactured efficiently with the CPC (Color Pop Compacting) unit from Oerlikon Neumag. The individual threads are provided with yarn cohesion in the CPC unit before texturing so that they are no

longer able to become so intermingled in downstream process stages, producing a strongly color-separated yarn.

Produce tricolor efficiently with RoTac

Tricolor carpets must have a very uniform appearance, and an optimum tangle result in the BCF spinning system is crucial for this. These tangle knots are produced in defined spacings and tenacities using RoTac. Thanks to this tangling option, uniform tricolor results that cannot be achieved using conventional tangling units are produced even at high speeds. (che)

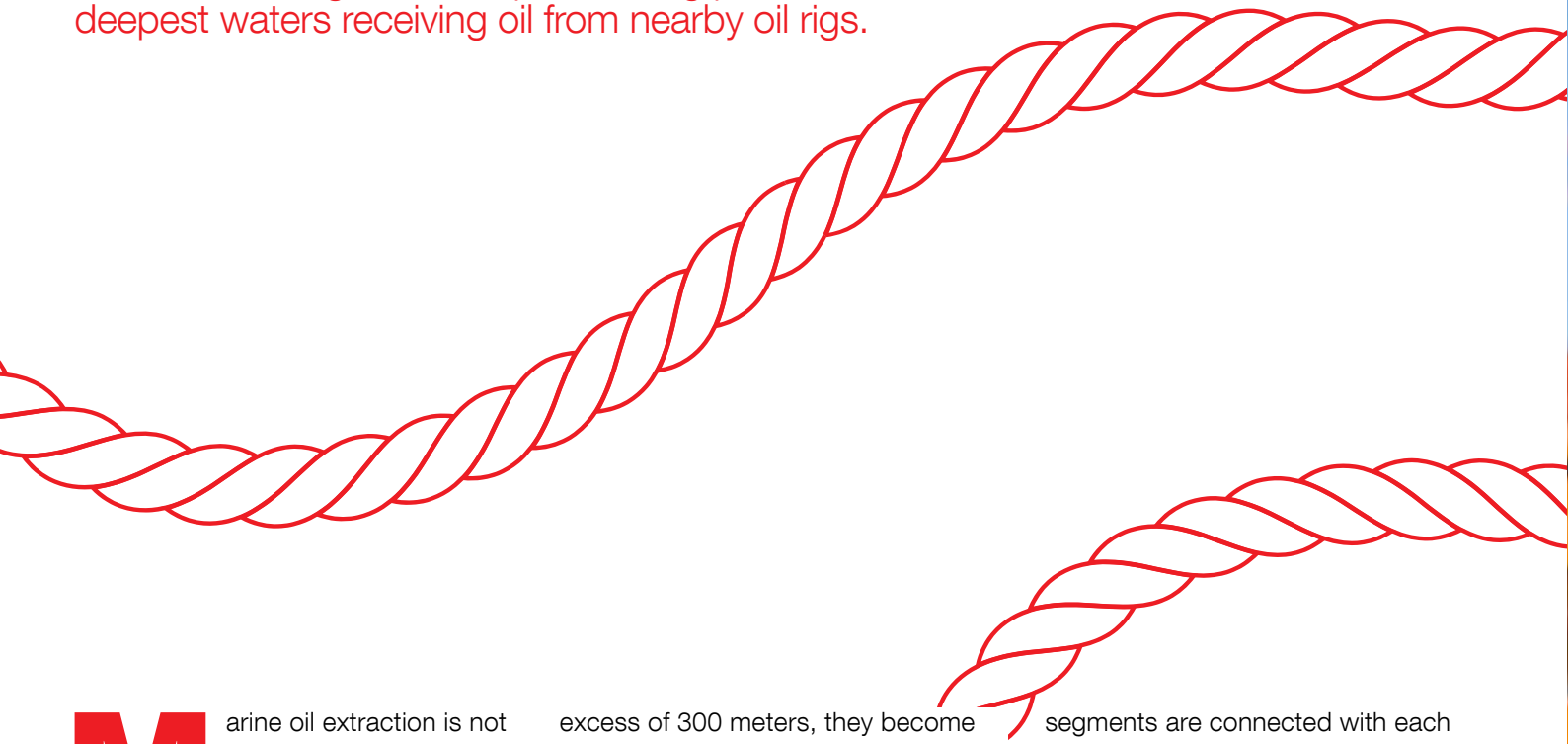


Get maximum flexibility from three colors with CPC – comparison of mélange and color pop carpet

Manmade fibers in industrial applications

Hanging on a super-strong thread

They are several kilometers long, thick as a man's thigh and can resist breaking loads of considerably more than 1,000 ton-force: mooring ropes comprise a super-strong braid of high-modulus/high-tenacity manmade fibers – securing, for example, floating platforms in deepest waters receiving oil from nearby oil rigs.



Marine oil extraction is not only back-breaking work for people that requires superlative fitness.

The technology deployed must also comply with the extreme conditions in every respect. The fact that synthetic fibers – of all things – are now demonstrating veritable superpowers may sound absurd. However, they solve one of the most-difficult challenges in this business far better than steel does.

So-called FPSO (Floating Production Storage Offloading) vessels, usually converted oil tanker hulls, process crude oil from nearby oil rigs and store it until it is collected – by oil tankers, for example. These floating platforms operate in deep waters, must however be permanently secured in a position-stable manner – regardless of wind or wave drift. Here, steel ropes offer insufficient prerequisites: at depths in

excess of 300 meters, they become too heavy and are therefore no longer able to adequately handle the loads. Furthermore, they have difficulty coping with the rough operating conditions.

3,000 meters long: mooring ropes

In contrast, special ropes made from high-tenacity manmade fibers offer many benefits. They are corrosion-proof and practically maintenance-free, UV-resistant, can in part float and are able to deal with virtually all environmental influences in the sea. Above all, they perform at least as well as steel ropes – and at a fraction of the weight of their metal counterparts. These mooring ropes can be used at depths of up to 3,000 meters. A typical rope has a diameter of 200 millimeters and a weight of around 26 to 28 kilograms per meter. To achieve the respective length required, two or more 1,000-meter-long mooring rope

segments are connected with each other.

Combined high-tenacity and high modulus/low-elongation polyester fibers have above all proven to be perfect as the base material for these super-ropes. They provide high tenacities at the lowest weights, stretch minimally at loads between 20-50% of breaking strength and are therefore excellently suited to securing platforms. Polyester is also exceedingly durable, even under extreme conditions, and is therefore a very cost-efficient solution.

More than 2,000 metric tons of yarn per platform

But it is not just the material that is decisive for the performance of the finished ropes, so too is the manner in which it is processed – and this is a special discipline mastered by various manufacturers. Mooring ropes general-





A single Floating Production Storage Offloading (FPSO) platform requires at least 2,000 metric tons of yarn.



ly comprise between seven and twelve braid cores, which are twisted together using various methods. These cores are bundled for the highest resistance using a protective jacket, which is also made from high-tenacity polyester fibers. And the yarn itself can be treated with a 'marine finish', an oily combination of wax and silicone, hence rendering it seawater-resistant and more abrasion-proof. A sensible measure in view of the fact that abrasion is caused both by the friction of the fibers against each other and the scraping of the rope against rough bodies in the area around the rope.

This permits the manufacture of wear-resistant ropes, which achieve the typically required breaking loads of 1,250 tons-force and more. Up to 24 of these mooring ropes secure an approximately 20,000- to 120,000-metric-ton FPSO platform. A single platform therefore requires 2,000 metric tons of yarn or

more. These volumes also offer market potential for yarn manufacturers. In 2016, 'Offshore Magazine'¹ estimated that there were 169 FPSO platforms operating across the globe, many of these off the east coast of Brazil, in the Gulf of Mexico, along the west coast of Africa or in the North Sea. And this figure is set to increase: "The Brazilian oil company Petrobras, the leading company within the FPSO sector, plans to install more than 40 new platforms over the next five years, mostly for the recent discovered ultra-deep water sub-salt offshore oil fields. I estimate that current demand for polyester for mooring ropes totals around 20,000 metric tons per year", states Milton B.

Bastos, whose company MBB Enterprises – based in Orlando, Florida/USA – consults yarn manufacturers on the topic of mooring ropes, already has 15 years of experience in the sector and is an independent development and distribution partner for corresponding high-end yarns. Yarns that were not only developed using Oerlikon Barmag technologies, "across the globe, the majority of these specialty yarns are also manufactured using Barmag machines", estimates Bastos (see also adjacent text box). (tho)

Source:
¹<http://www.offshore-mag.com/content/dam/offshore/print-articles/volume-76/08/2016FPSO080816Ads.pdf>

Oerlikon Barmag technology: superlative yarn data for mooring ropes

There are good reasons why many industrial specialty yarns for mooring ropes are manufactured using Oerlikon Barmag machines. The systems technology allows yarns with superlative properties for mooring ropes to be manufactured in an extremely efficient manner. Adapted nozzle concepts featuring filtration and designed for high throughputs are deployed here. The robust godet family is suitable for high drawing forces. And, above all, the high-performance, high-frequency heating concept of the godet systems ensures even heating of the yarn. Here, the optimized, rotated yarn path permits heating of the fiber bundle from both sides. The yarn can be joined to create high overall titers – up to 6,600 dtex, depending on the plying pattern. All in all, this technology enables the manufacture of high-modulus yarns with high tenacities and low elongation, low creep behavior and high yarn titers.

Essential textile helpers on a roll

They may not steal the limelight, but they do set the stage for smooth technical processes: industrial yarns and nonwovens assume diverse functions in fabric tapes. In cars, for example, they offer protection against friction and heat in the form of harness tapes and they help provide insulation in construction. Just what these inconspicuous helpers are able to achieve is what Coroplast, a leading manufacturer of these industrial adhesive tapes, knows all about.

Without them, the warning lights in our cars would probably come on more frequently or – in the worst-case scenario – not come on at all. And driving would be an altogether noisier affair. Heated seats could malfunction – and at minus temperatures, needless to say. Or our cars could suddenly stop while driving. Without them, our homes would also not be quite as cozy in terms of climate.

Protecting cable harnesses

According to expert reports, all modern cars have two or more kilometers of cables and wiring. These conduct electricity to all parts of the vehicle, which is why they require sufficient protection to prevent short circuiting and malfunctions. Here, textile harness tapes are used. In each vehicle, around six square meters of these adhesive tapes keep cables and wires together, bundling them into cable sets or harnesses, protect against friction and rattling noises, against the heat from the engine or exhaust, against moisture, leaking fuel, oil and battery acid and other aggressive media – and all this for the entire lifecycle of a car, so around ten years. “German automakers prescribe delivery specifications with classifications for these properties.

For this reason, we subject our products to long-term testing with artificial aging techniques so that we are able to verify their resistance”, explains Dr Ralf Rönisch, Head of Development For Industrial Adhesive Tapes at Coroplast.

The globally-active family enterprise, headquartered in the German city of Wuppertal, is the world market leader for such products within the automobile sector, but supplies its products to many other sectors as well. And the construction sector is also a major market for Coroplast fabric tapes. Here, one-sided special adhesive tapes are used – for example, for fusing and fixing permeable films for roof underlays that allow water vapor to escape outwards and prevent moisture from penetrating inwards. And this application also requires rot-proof and weather-resistant textile base materials. And, finally, industrial textiles can be manufactured with defined elasticity and breaking forces.

From polyester to Maliwatt

In addition to rayon fabrics, Coroplast predominantly uses manmade fibers as the textile materials for its tapes: fabrics made from polyester, but also polyamide, and velours, needled nonwovens and polyester stitch-bonded nonwo-



vens, so-called Maliwatt. In the case of the latter material, fibers are first laid, then stitched. Various running meter weights are demanded depending on the stability required: for instance, 70 to 160 g/m² for PET fabrics, 200 g/m² for PA fabrics, 60 g/m² for needled nonwovens and 60 to 130 g/m² for Maliwatt.

Coroplast purchases these textured textile backing materials with previously defined specifications and finishes them with solvent-free hot-melt adhesives. Using a coating technique, these are applied to the textiles in liquefied form at – in part – high temperatures and fixed using cooling rollers. The finished adhesive tapes are wound onto wide rollers and finally converted in accordance with customer requirements.

Here, the unwinding force plays a huge role: in other words, how easy or difficult it is to unwind the adhesive tape. Because – depending on further processing, which is generally carried out manually – a precisely-defined unwinding force is required to simplify handling for personnel and to cut production time – particularly in the automobile industry. And the flexibility of the textile material also supports this simplification during assembly.

Fabric tape with dense and abrasion resistant cloth structure, easy to tear by hand – only one among the many special-purpose industrial adhesive tapes by Coroplast



Development trend: electromobility

It is undoubtedly the automobile industry that is creating development trends when it comes to fabric tapes. Ever lower weights and decreasing installation space – textile products can already help cater to these requirements. A further topic for Coroplast is reducing so-called fogging, the specific smell prevalent in new cars. Here, improvements can be achieved by thoroughly rinsing or post-treating the textiles used.

Within this context, the growing electromobility market and the driving assistance systems of tomorrow will be shaping the future. “This is resulting in further electrification with stronger currents in vehicles. And this also increases the application opportunities and the quality requirements for our industrial adhesive tapes”, comments Dr Rönisch, who believes that – compared to tubes and hoses – fabric tapes are on the rise as protective systems. Such positive developments would undoubtedly also further benefit the associated textiles market, which is already profiting today: Coroplast alone processes more than one million square meters of textiles each week. (tho)

Here, the unwinding force plays a huge role: in other words, how easy or difficult it is to unwind the adhesive tape.

Combines deep engineering expertise and decades of experience with industrial tape technology at Coroplast: the self-developed, highly innovative tape coating machine "BPH"



Filters making the world cleaner

Does the secret to a cleaner planet lie in an ancient invention? Filters are making a big impact on everything from clean air and water to efficient and clean manufacturing processes.



Aside from the annoyance of finding there are no more coffee filters in the cabinet when it's time to brew a pot, filters do not typically command much attention. However, many do not realize that filters, the utilization of which can be traced back to the earliest civilizations, represent a \$63.35 billion market globally and play a critical role in the consumer and industrial/manufacturing sectors.

Many filters, many solutions
Filters are typically designed, in part, based on the physical state of the material undergoing filtration – typically

air/gases or liquids. To remove large or particle solids from liquids, a variety of filter types may be used:

- Bag filters, which typically remove large solids from a liquid by having it flow through a bag-shaped filter.
- Strainers have wider mesh to let through liquids and are typically used in manufacturing when the particles or components that need to be removed are too large for other filter media.
- Cartridge filters, usually cylindrical, act as a barrier and sifter to remove sediment and harmful solids.

- Hydraulic filters are industrial filters used to remove impurities from petroleum products (e.g. oil, gasoline, etc.) in a hydraulic system, protecting machinery from these elements.

Air and gas filtration is also an important sector. Filters commonly used for these applications include:

- Panel filters, which allow air to pass through and capture dust, particles and other matter.
- Air filters, which are important in manufacturing and consist of a mesh component that catches particles when air is forced through.

Gas filters, which help remove contaminants or particulates – which may be solid or liquid, depending on the application – from a dry or liquid gas stream.

One of the important innovations in the filter sector has been the growth of nonwoven filter materials, or 'nonwovens'. Simply explained, nonwovens are typically manufactured by putting small fibers or continuous filaments together in the form of a sheet or web, and then binding them. Depending on the type of nonwovens needed, there are a wide range of manufacturing technologies to produce different



nonwovens, e.g. carding, spunbond, meltblown or airlaid. Nonwovens, such as those manufactured with Oerlikon Neumag's machines, have been steadily replacing traditional filter media such as paper and textiles because of their efficiency, longevity and strength. For example, meltblown nonwoven filters can be precisely manufactured with a range of uniform pore sizes based on the filtration need. It can also be treated to catch even nanoparticles.

Currently, almost 500,000 tons of nonwovens are used annually in the production of filters, which corresponds to approximately 10% of

today's worldwide industrial nonwovens manufactured. In 2015, over 170,000 tons of nonwovens were manufactured for gas/air filters, while the volume for liquid filters, at around 295,000 tons, was twice the size of air filters.

Sustainability spurs sales

Where do these types of filters go into action? Motor vehicle applications were the dominant force, accounting for half of total global revenue in 2015. Increased demand for passenger cars and commercial vehicles in countries such as India, China and Brazil are being met with more stringent regulation and more consumer awareness about

emissions, creating demand for better filters to manage them. As these markets become more industrialized, urbanized and affluent, governments and consumers are placing new demands on manufacturers to improve product quality and reduce harmful emissions. Factors such as more effective construction and demand for sustainable filtration solutions across industries are also playing increasingly important roles in driving filter market growth. Consumers are also becoming more concerned about air and water quality, spurring interest in domestic air and water filtration. Essentially, consumers want filtration solutions to ensure that

the air they breathe and the water they consume are clean. Whether it is for ensuring stringent purity standards in the air or for removing harmful bacteria and other matter from the water supply, for maintaining clean-room environments free of particles and gases for pharmaceutical or electronics manufacturing to a myriad of other applications, the world relies on filters to get the job done. (gm)

Talking to Rainer Straub, Head of Nonwoven Business at Oerlikon Manmade Fibers

On a growth trajectory with Teknoweb partnership

Since early 2017, Rainer Straub has been responsible for nonwovens business. This field of business will be making a contribution towards the growth of the Oerlikon Manmade Fibers segment over the coming years.

With a considerably stronger focus on nonwovens solutions, the Manmade Fibers segment plans to expand its product portfolio – which is currently concentrated on the filament business – and hence position itself in a more balanced way in the long term.

» **Mr. Straub**, at the Index in Geneva, you announced that the Oerlikon Manmade Fibers segment has entered into a strategic partnership with the Italian company Teknoweb Materials s.r.l. What precisely is the objective of this venture and to what extent will this partnership strengthen the Oerlikon Neumag nonwovens business?

With this cooperation, we are expanding our portfolio of nonwovens production systems within the fast-growing market for disposable nonwovens. With a market volume of around CHF 300 million and average growth of between 4 and 5 percent expected over the next few years, the disposable nonwovens market is of great interest to us. In addition to the markets for technical nonwovens production solutions in which it already operates, this will also allow us – with our machine and systems solutions – to participate more actively in terms of volumes, fastest-growing

areas within the overall nonwovens market in the future.

» Why Teknoweb Materials?

Teknoweb Materials is an established wipes and other disposable nonwovens technology provider. The company has – in the form of the LEVRA technology – its own patented and particularly energy-efficient manufacturing process for wipes: Teknoweb also has outstanding process know-how in manufacturing these substrates and in terms of the special requirements in further processing. For our customers, this represents the optimum addition to our technology portfolio and our engineering competence.

The combination of Teknoweb's process expertise and our technological competence therefore provides the ideal prerequisites to now also offer innovative products in this market segment.

» How has the market reacted to this announcement?

The response has been very positive. At the Index, visitors practically 'kicked down our door'. Numerous customers and partners informed us that they regard this partnership as the ideal syn-

ergy of competencies. And we are now expected to deliver new, innovative products. In conjunction with our global engineering and service network within Oerlikon Manmade Fibers segment, this forms the basis for providing our customers with excellent consultation.

» Who should customers direct their inquiries to?

In the future, this too will be easier for our customers. In terms of technical applications, Oerlikon Neumag is – and remains – the primary contact partner. This will continue to be our focus. And if we are talking about systems for manufacturing disposables, the contact partner in the future will be Teknoweb Materials. Needless to say, customers can also get in touch with the contact partners they have been familiar with to date. We will then transfer inquiries correspondingly.

» **Mr. Straub**, what trends do you see within the nonwovens industry over the coming years? Do you feel you are well-prepared for the future?

Customers are not only demanding the best technology, they are also demanding new solutions to ensure they continue to be successful market players. Here, differentiation plays a major role for them. For this reason, our bicomponent technology will undoubtedly also be able to make its contribution. However, irrespective of whether we are looking at differentiation regarding filter media, geotextiles or wipes, we can play to our strengths here in an optimum manner. So, we feel very well prepared for the future.

Mr Straub, thank you for this very informative chat! (che)

Rainer Straub and Process Engineer Johannes Wulfhorst assess the quality of the nonwoven. Innovative products for technical applications are developed in the Oerlikon Neumag nonwoven R&D Center.



WINGS 1800

High-speed winding concept for POY production

The now 10-year success story of the WINGS concept continues unabated. Oerlikon Barmag revolutionized the conventional filament yarn spinning system with the idea of integrating the draw unit into the winder itself. The fact that the WINGS family is meanwhile available for all market-relevant textile processes proves its everyday usability.

The WINGS 1800 solution with 12 packages is today considered to be the standard. With more than 4,000 units sold since its market launch, this winding machine is one of the most successful products in Oerlikon Barmag's history. Just under three years following the commissioning of the first pilot positions, it has been proven that the operation window, performance, package build and yarn quality are at the same high level as in the design with the 1,500-mm stroke length which has been available since 2007. This guarantees superlative results in the DTY process.

With package weights of 15 kg (12-end variant) or 10 kg (16-end), the extended-stroke winding unit is extremely competitive. The production costs have been further optimized compared to concepts to date and competitors, while continually shortening the amortization period for systems. Special highlight: string-up for the WINGS 1800 is now even faster with its special string-up device. The technology saves around 30 precious seconds compared to its 10-end counterpart – hence making it considerably faster than its competitors. The result: less waste. A further benefit is greater efficiency, because: compared to the 1500/10-end

model, the WINGS POY 1800/12-end stands out with its lower space requirements per filament. The difference in the required space for the zigzag layout of the spin packs is even more noticeable, where the 16-end winder is able to reveal its advantages even better. Despite its lower package weight, its extremely low conversion costs make it particularly interesting for in-house further processors.

Cost-optimized production of polyamide POY and HOY

And the WINGS technology is also available for the challenging polyamide process. The POY process window ranges from 20 to 150 den final – or up to 100 den final for PA66. When the 12-end spinning process is combined with a 1,500-mm chuck, the concept also permits cost-optimized production of the package weights commonly requested by the market. In conjunction with the new EvoQuench quenching unit for polyamide, the solution also enables the manufacture of polyamide micro-titers of 0.4 dpf and greater with outstanding yarn quality. This opens up entirely new areas of application for polyamide yarns, enabling yarn manufacturers to enter new markets.

With its expanded godet system, the new WINGS POY HD winder has been designed especially for the requirements of high yarn titers of up to 500 den polyester POY.



Due to its relatively low market share, high-oriented yarn (HOY) is considered to be a specialty product; it makes up around 5% of all textile filament yarn production. HOY is considered a less-expensive substitute for FDY, but is comparable to the POY process in terms of its technology. However, it can be manufactured at around 10% higher production speeds than in the case of polyamide POY. Here, the process window ranges from 30 to 150 den final for winding speeds of up to 5,200 m/min.

Directly further processing the yarn requires the application of oil in excess of 1% for HOY yarn. Consequently, the HOY process requires more than twice the amount of spin finish compared to the standard POY process. This is precisely where the challenge of the HOY process lies. Oil is scraped off, and practically blown off the surface, at each point of contact between the yarn and the yarn guides and, of course, particularly in the tangling jets.

The resulting process-typical oil mist in the air and the oil film in the area around the winder make this working environment unclean for operating staff and systems and no longer tolerable from an HSE (Health-Safety Environment) point of view. Precisely these considerations influenced the development of a WINGS solution for the HOY process. The result is that the WINGS HOY solution features an enclosed draw unit ensuring that the scraped-off and/or spraying spin finish does not contaminate the surrounding areas. Innovative solutions in the suction unit of the specially-modified tangling jets as well as in the drainage channel directly underneath the draw unit also ensure safe removal of the surplus spin finish.

Housing the godets and the tangling unit has been made possible thanks to the compact design of WINGS. If equipped with a cover to their draw units, conventional POY/HOY concepts would be virtually impossible to

operate; furthermore, the energy consumption of special suction devices used in conventional system layouts is considerably higher.

For > 300 den titers: WINGS POY HD

When spinning polyester, the WINGS 1800/12-end solution has been optimized for the production of POY yarns in the 30 to 300 den final range. But yarn manufacturers can also deploy the tried-and-tested WINGS concept for larger titers. The latest member of the WINGS family – WINGS POY HD (high denier) – considerably expands the product spectrum: the 300 to 500 den final range – and here above all microfilament yarns such as 500D/576F – can be produced with optimum yarn properties. Standard end products are velvet fabrics for apparel and home textiles. When spinning polyester, the WINGS 1800/12-end solution has been optimized for the production of POY yarns in the 30 to 300 den final range. But yarn manufacturers can also

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The WINGS POY HD draw unit is equipped with an additional energy-efficient godet designed to attenuate the – in the case of microfilaments – high yarn tensions generated in the spinning system. These are created by the considerably increased air friction resulting from the high number of filaments. This can lead to an up to twelve-fold increase in the yarn tension with consistent total titer at the WINGS draw unit's entry godet (see chart).

Lower yarn tensions in the interlacing and winding zone for optimum yarn and package quality can be achieved with the new entry godet. A newly-designed yarn collecting system ensures the removal of the increased waste volume flow.

The construction of the new WINGS-design draw unit comes with all the benefits offered by the WINGS concept. The space required is identical to the existing design and the string-up device is oriented on the one supplied to date. To this end, the familiar operator and maintenance friendliness is also retained in the case of the WINGS POY HD solution.

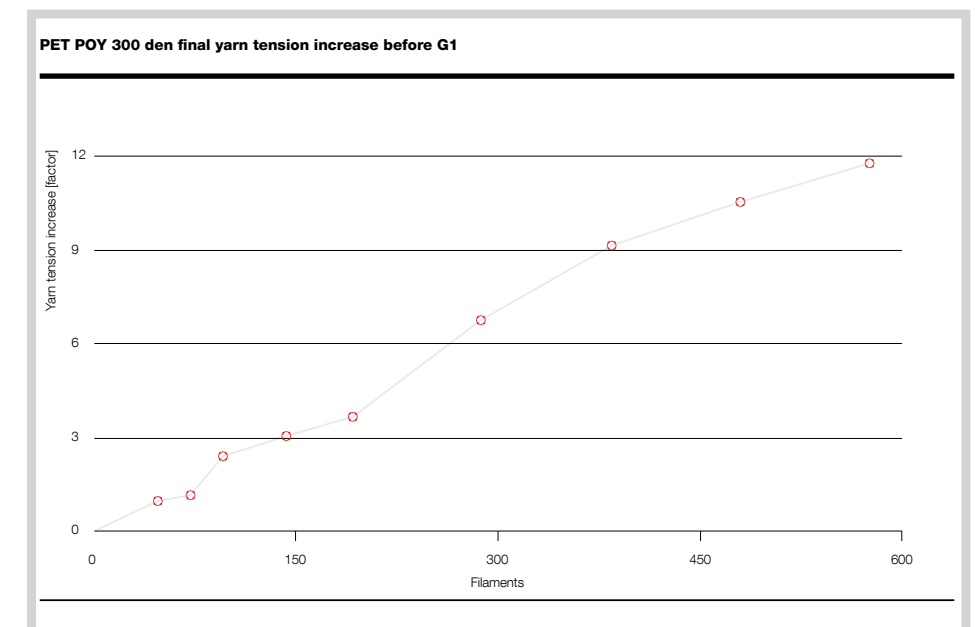
WINGS POY XS – the retrofit solution

Operators of older POY systems equipped with SW, CW and ACW winders can also benefit from the WINGS

technology. With the XS series, Oerlikon Barmag is expanding into the market for upgrades and modernizations to answer the high demand for WINGS retrofit solutions.

Due to its extremely compact design, WINGS POY XS can be used for virtually any building concept. This stand-alone solution offers the usual benefits of a WINGS winder and is available for polyester as well as polyamide.

The series currently includes five models with 8 to 12 thread and chuck lengths of 1,200 to 1,800 mm. Despite its compact design, WINGS XS produces packages with a volume of up to 23.2 dm³. (mfi, sfa)



'Quo Vadis' service?

Between software and solution – service trends in machine and systems construction

What trends is Oerlikon's Segment Manmade Fibers Service department focusing on now and in the future? What opportunities and challenges are opening up as a result of advancing digitalization and what are customers' requirements when it comes to tailored service?



Dr Wolfgang Ernst, who has been responsible for Service Sales at all Oerlikon Manmade Fibers segment sites since August 2016, spoke to 'Fibers and Filaments'.

» **Dr Ernst**, in addition to classical service offerings – such as maintenance and repairs – the machine construction division is increasingly making its mark with comprehensive service solutions. What can these solutions entail?

We definitely regard increasing digitalization as one of the decisive trends for the future of Service. On the one hand, this is of course down to the increased demand for continual updates for the existing software in our machines and systems; on the other hand, many customers use our Plant Operation Center (POC), the cross-production process software solution. It is designed to detect and optimize the production processes – starting with the raw material all the way through to the end product. It connects the production hall with the management.

Within the context of our digitalization strategy for Customer Service, we have – in the form of the 'Intelligent Plant Control – IPC 4.0' – provided our customers with a groundbreaking solution for the maintenance of man-made fiber systems and for the training of plant managers and their staff. Today, our customers are able to 'walk'

through their manufacturing systems using augmented reality glasses and acquire support for optimizing their production processes by means of 'remote access'. Thanks to the Microsoft HoloLens technology, customers and engineers or technicians have the same view and are able to communicate interactively with one another.

» What requirements do you see increasing in the future?

Concretely, our customers' ever faster and more efficient work processes and structures result in parts procurement and logistics becoming increasingly important within the production supply chain in order to constantly optimize productivity and system availability. For this, we have consciously established a program for optimizing our entire spare parts logistics: from procurement, warehousing all the way through to dispatch. Because – in addition to the quality of the spare parts – it is their fast availability that is a major criterion for our customers.

To also be able to support our customers as quickly as possible in other matters, we constantly strive towards partnership-like collaboration. For this reason, our Service Sales team regularly visits customers on-site, with the aim of directly reacting to their wishes and challenges in dialog. In addition to customer care from Germany, our colleagues at our local subsidiaries make an invaluable contribution towards pro-

viding fast and flexible support across the globe.

» The production systems and equipment are the capital of all Oerlikon Manmade Fibers customers. How is innovative service able to protect and strengthen this capital?

We all know that the sustainability of systems and machines is of preeminent importance for the long-term success of businesses.

To achieve this, we offer our customers 'lifecycle management' concepts for extending the lifespan of their machines and equipment. And upgrades, modernizations and original spare parts help bring the existing technology up to standard for future tasks. And this not only applies to the systems and machines, but also to complete factories – from the polycondensation stage all the way through to the DTY machine – very much in line with our 'From Melt to Yarn, Fibers and Nonwovens' philosophy.

Let me mention just three examples here: firstly, modern maintenance concepts are increasingly being requested. To ensure that our customers are able to concentrate on their core business, i.e. the development and production of high-quality fibers, we assume the maintenance of their winders and pumps, for example, in our own workshops, which can also be located at customers' sites. As a result of the close interaction between our workshops

Techtextil unexpectedly dynamic

The international textile industry positioned itself as a high-tech sector over four days. Every two years, the Techtextil in Frankfurt is a showcase for industrial and functional textiles innovations.

Between May 9 and 12, more than 47,500 visitors came to Frankfurt to have 1,789 exhibitors inform them about new materials and manufacturing processes – allowing the organizers to register a 14% rise in visitor numbers.

The 'Innovative Apparel Show' in the foyer of Halls 5.1/6.1 proved to be a veritable audience magnet: several times a day, the excited audience was presented with high-tech textiles on the catwalk.

'Living in Space' exhibition takes a daring look into space

The special 'Living in Space' area presented the textile product precisely as what it is: a future-proof, sustainable high-tech sector. Space-compatible materials, a 'Space Habitat' designed by Dutch star architect Ben van Berke and a virtual reality-staged trip to Mars wowed the many visitors.

New insights into the use of textiles in industrial applications were shown by the 'Textile Strukturen für neues Bauen' (Textile Structures for New Construction) student competition. Supported by the association Tensinet, students from international design universities showcased their design ideas for textile buildings solutions. Various materials, textile structures and tent architecture reveal countless possibilities for construction solutions for (living) spaces.

And the Techtextil once again proved to be an important catalyst for exciting discussions with customers and partners. "Many of our industrial yarn and nonwovens manufacturing customers and the respective further processors were themselves exhibitors at the fair. This provided excellent opportunities



The 'Innovative Apparel Show' proved to be a veritable audience magnet.



Visitors to the Oerlikon Manmade Fibers stand showed great interest in the digital concepts and Industrie 4.0 solutions.

for intensive discussions relating to the entire process chain – right down to the finished product. In the discussions, we clearly detected that the market is now increasingly focusing on quality and higher-end textile products, where – as a from melt-to-yarn solutions provider – we collaborate closely with our customers", summarized Markus Reichwein, Senior Manager Business Development at Oerlikon Manmade Fibers.

"We have invited visitors to our stand to accompany us on a journey into the digital future of the textile industry. Our digital Plant Operation Center or the possibilities offered by remote service by systems such as the Microsoft HoloLens are only a few stations on this exciting journey which we would like to continue with our customers through the textile process chain." (bey)



and the development, production and service departments within the Oerlikon Manmade Fibers segment, we provide an extremely high standard of system maintenance – resulting ultimately in higher availability and running times and therefore superior system availability for customers with optimized costs.

A further example worthy of mention is the upgrading of systems. By means of conversion, our carpet yarn systems product portfolio can be expanded from PP to include PP + PET or PP and PA6. An existing PP monofilament system can therefore be upgraded for new applications and trends, such as the increased demand for BCF made from PET.

We also have concepts for filament yarn systems allowing these to be adapted to new challenges. Trends such as spinning yarns or the inclusion of other additives require special retrofit solutions, both for continuous polycondensation and for extruder spinning systems. In addition to the melt modification, we also look after the winding by retrofitting special sensor systems for yarn break sensors, which also enable the manufacture of black-dyed yarn, for instance.

» Are there any other developments you are currently observing?

The topic of sustainability/cost cutting is at the very top of our customers' list of priorities and is growing in importance. Since 2004, we have been catering to this development with our e-save concept for energy-efficient systems, machines and components. Mean-

while, e-save has established itself as a comprehensive efficiency improvement program brand. Without exception, all our innovations are developed taking the four e-save criteria – energy, economics, environment and ergonomics – into consideration. Just one current example among many is a new suction gun, which consumes considerably less compressed air while retaining the same level of performance. The trend towards sustainability with increased efficiency will without doubt be accompanying the manmade fiber sector in the future as well.

The constant improvement of the product quality is a further development for our customers, as the downstream processes are becoming increasingly demanding. For this reason, we are currently developing new solutions even for the smallest parts of our systems, such as the spin-finish applicators and yarn guides, for example. In addition to superior service lives as a result of new materials, it is considerable improvements to the oil application and its evenness that have an extremely positive influence on the further process characteristics of the fibers.

Thank you for speaking to us, Dr Ernst. (wa)

"Within the context of our digitalization strategy for Customer Service, we have – in the form of the 'Intelligent Plant Control – IPC 4.0' – provided our customers with a groundbreaking solution for the maintenance of manmade fiber systems..."

A platform for the Iranian textiles industry

For the Iranian textiles industry, and specifically its manmade fiber sector, the 'Technology Forum' hosted by the Manmade Fibers segment of the Swiss Oerlikon Group in Tehran at the end of May was a highlight in many respects.

Around 300 attendees from business, science and politics intensively took advantage of the event to not only talk to the Oerlikon experts about the latest technologies for manufacturing manmade fibers, but also to discuss with each other new strategies for the future of a prosperous country.

With the 'Technology Forum', Oerlikon Manmade Fibers segment created this discussion platform for the entire Iranian textiles industry at the perfect time – directly following the official announcement of the reelection of Iranian President Hassan Ruhani. "President Ruhani is considered by many to be a moderate reformer, with his reform

policy having reopened the markets and hence revived the economy. This is a great foundation for new business for both the Iranian textiles industry and for us", stated André Wissenberg, Head of Marketing, Corporate Communications and Public Affairs, talking in the opening speech of the 'Technology Forum' at the Espinas Hotel in Tehran.

Positive pioneering spirit

"The positive pioneering spirit of the Iranian textiles and manmade fibers industry is currently clearly tangible in all discussions", explained Jilali Lakraa, Oerlikon Barmag Regional Sales Director responsible for the market. It is above all existing spinning plants and texturing facilities with, in part, decades-old machines and equipment that are currently considering modernizing their systems or investing in new equipment. Here, Oerlikon offers – thanks to its expertise – outstanding, sustainable and above all highly-efficient solutions. These range from preparing the polymer melt using state-of-the-art polycondensation and extrusion systems, spinning plants all the way through to the textured yarn. As the highlight, Jilali Lakraa therefore also presented

The symposium was well attended by the Iranian textile industry.



the eAFK HQ – the latest automatic Oerlikon Barmag texturing machine with a total of 576 positions – to the world; triggering murmurs throughout the room and subsequently resounding applause.

In his presentation, Jochen Adler, Chief Technology Officer (CTO), intensively focused on the advantages of the Oerlikon machine and systems solutions. "The interaction between the individual technology processes increasingly generates the decisive competitive edge along the entire value chain", explains the CTO of the Manmade Fibers segment. This is being increasingly positively reflected both in the homogeneity and the quality of fibers and yarns as well as in the topic of tracking & tracing end products and in complex logistics processes associated with modern automation solutions.

Investment in science

Within the context of a first-class panel discussion, the participants on the podium gave, among other things, their thoughts on the steps required for rebuilding and intensively supporting the Iranian textiles industry. The result was a consensus, which particularly thrilled the three university professors –

Presented the leading technologies for manufacturing BCF yarns: Arnd Luppold, Sales Director at Oerlikon Neumag.



Dr M. Mojtahedi (Tehran Polytechnic Textile University), Dr H. Tavanaei (Isfahan Textile University) and Dr M. A. Tavanaei (Yazd Textile University): Once again, there has to be intensive investment in science training aimed at providing graduates for a nascent textiles industry.

In addition to the current staple fiber systems solutions, Arnd Luppold, Sales Director at Oerlikon Neumag, presented the leading technologies for manufacturing BCF yarns on the world market. It is above all in the northern part of the country – close to the border with Turkey – that Iranian PET- and PP-based carpet manufacturing plays a major role. "Here, the sales markets are practically on our doorstep", explained Arnd Luppold, who has been active in Iran for many years now.

Andreas Müller, Finance Director, showed the attendees ways of financing new projects – a topic that proved to be of great interest in view of the fact that the country is still dealing with sanctions. (red)

CTO Jochen Adler fascinated the audience with Oerlikon's segment Manmade Fibers' solutions from Melt to Yarn.



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fibers.filaments@oerlikon.com
www.oerlikon.com/manmade-fibers

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Editorial staff

ae Andreas Engelhardt
aw André Wissenberg
bey Susanne Beyer (responsible)
che Claudia Henkel
gm Gwen Moran
mbi Merle Bischoff
mfi Martin Fischer
sfa Stefan Faulstich
tho Thilo Horvatitsch
wa Ute Watermann

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