fibers and filaments

the experts' magazine

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Dear Customers, dear Readers,

Coronavirus is not the emphasis of this edition of Fibers & Filaments, despite it remaining the primary focus of our lives and business activities. Here, I would therefore like to express just how dear to our hearts our close collaboration is – despite this now being in a somewhat modified form. To this end, digital services and networked maintenance and production are quite literally proving to be blessings. Let us remain in communication with each other by every available means and jointly develop solutions.

In such times, we unfortunately tend to forget the topic of climate change is now associated with lots of hype – with a huge number of emotional and non-objective discussions such as: Who's to blame – man or nature? Who's right and who's wrong? For this, our arsenal of science- and interests-controlled weapons is restocked on a daily basis. However, the rising clouds of powder smoke are obscuring any clear vision and are favoring populist and unrealistic agendas. What is being lost here is the fact that we need greater objectivity in order to come up with a halfway uniform picture of something as multifaceted as the future of the environment. For this reason, my standpoint is that we should focus more on acquiring clarity and on acting whenever and wherever we are convinced that we can make prudent progress.

Here, the textile industry is being particularly challenged, as both the manufacture and the disposal of ever-more apparel made from polyester are also requiring more resources and are additionally burdening the environment. Millions of tons of plastic waste and microplastics in our oceans are demanding solutions that also include a real circular economy and textile recycling. It is for these reasons that we are dedicating our current edition to these urgent issues.

As a leading manmade fiber manufacturing system technology provider, we also feel responsible and are therefore supplying solutions for a sustainable textile and plastic industry. Recycled fibers are a growth market, with environmentally-friendly products in demand – but not at the cost of quality. Therefore, we are – with our machines designed for sustainable processes, superb fiber quality and reduced production waste – a coveted partner for solutions aimed at processing recycled fibers and biopolymers. With our technology for transforming bottle flakes into yarn, we are also supporting the reutilization of plastic waste, something on which an increasing number of textile players are focusing.

Let us all continue to work together here!

With best regards,

Georg Stausberg
CEO Oerlikon Manmade Fibers Segment

fibers and filaments

‘Making it personal’

Dear Customers,
From now on, Oerlikon Manmade Fibers will be working with a new global CRM (Customer Relationship Management) system. The data protection of our customers is particularly important to us! In the very near future, you will be receiving two Oerlikon GDPR (General Data Protection Regulation) e-mails. One e-mail includes a registration link, while the other provides a temporary password for our Communication Preference Center.

Many customers have already successfully registered. To register, all you need to do is supplement the following details, which will take no longer than 1 to 2 minutes. Please note that we require your consent if you wish to continue receiving invitations to trade fairs, seasonal greetings and our Fibers & Filaments publication.

You can amend your personal information – or revoke your consent for it to be used and processed – at any time. Should you have any queries, please do not hesitate to get in touch with your Oerlikon Manmade Fibers contact partner or send an e-mail to: events.omf@oerlikon.com

Egy Stitch & Tex 2020
Oerlikon Manmade Fibers makes its mark on the African market

The Oerlikon Manmade Fibers segment presented itself at this year’s Egy Stitch & Tex – held in Cairo between March 5 and 8, 2020 – with a clear focus on the needs of the African market. The Oerlikon Barmag and Oerlikon Neumag experts showcased the comprehensive product and service portfolio of the world market leader for manmade fiber systems at the stand of Oerlikon’s representative ATAG Export & Import.

The spotlight of the Oerlikon Manmade Fibers segment’s trade fair attendance was on two core technologies: the new generation of Oerlikon Barmag eAFK Evo texturing machines was unveiled within the African market for the very first time. It promises higher speeds and productivity with consistently high product quality, along with lower energy consumption and simpler operation vis-à-vis comparable market solutions. In particular, the numerous value-added features include two that convince with cutting-edge technology: the optimized, innovative EvoHeater and the EvoCooler, a completely newly-developed active cooling unit.

The second technology focus offers new opportunities for the Egyptian market and the Middle Eastern markets in particular: with Oerlikon Neumag’s BCF S8 monocolor and tricolor system, the segment has unveiled its new carpet yarn production flagship. Superlative spinning speeds, up to 700 individual filaments, finer titers of up to 2.5 dpf the performance data and technological finesse of the new system have already made a huge impression at numerous trade fairs and roadshows over the past year. » (aw)

The two core technologies for the Egytian market: the BCF S8 (bottom) and the eAFK Evo texturing machine.

New thrust pad contacting device for the Baltic crimper
Less wear and superior fiber quality

Technological changes to Oerlikon Neumag's Baltic crimper thrust pad contacting device have resulted in considerably reduced friction in the crimper rolls and hence less wear and fewer metal particles contaminating the crimped staple fibers.

Thrust pads close the gap between the crimper rolls on either side. Normally, these thrust pads are continually pressed – under high pressure – against the sides of the crimper rolls. Wear and metal debris is the result of this constant contact. The metal debris can contaminate the fibers, something that is particularly undesirable in hygiene applications.

Signs of wear to the thrust pad after 24 hours of operation using the old contacting device with deactivated thrust pad rotation

Considerably reduced wear to the thrust pad after 24 hours of operation using the new contacting device with deactivated thrust pad rotation

New thrust pad contacting device for reduced metal debris and greater durability

With the new system, the thrust pads are pressed against the rolls with less pressure and then fixed into place. This prevents fibers from being caught and the frictional force between the pressure disk thrust pad and the crimper roll is minimized. Pilot applications have demonstrated that metal debris from the pressure disks thrust pads is dramatically reduced, making them between three and seven times more durable. The new thrust pad contacting device is now available. » (che)

FiltXPO 2020
Convincing meltblown and spunbond technology made by Oerlikon Nonwoven

In February, Oerlikon Nonwoven experts presented efficient solutions and comprehensive technology know-how for challenging filtration tasks to an international trade audience at the FiltXPO 2020 in Chicago, USA. Main topics were meltblown and spunbond technology for filtration applications, as well as electrocharging for superior filter separation performance. Oerlikon Nonwoven Sales Director Ed McNally was satisfied with his visit to the fair: "We were able to hold very qualified and concrete discussions with numerous trade visitors."

Approx. 10% of the technical nonwovens produced worldwide are used in filtration. For 2020, the total amount of all nonwovens produced for filter applications is expected to be over 610,000 tons. With 200 exhibitors and over 2,000 trade visitors as well as various lectures and training sessions, FiltXPO is on a growth path and thus reflects the market environment. » (che)

Oerlikon Manmade Fibers inve

With two major projects to expand the infrastructure at the German sites in Remscheid and Neumünster, the Manmade Fibers segment of the Swiss Oerlikon Group is setting clear signals for the future. "We have always based our global market leadership in mechanical and plant engineering on our innovative strength. It is therefore only logical to keep investing in our development, assembly and production locations," says Segment-CEO Georg Stausberg.

Groundbreaking at the Remscheid site

The groundbreaking for the extension of Oerlikon Barmag's Pump Division took place on February 25. With an investment in the high single-digit million-euro range, the new-build site represents a clear commitment of the Manmade Fibers segment of the Oerlikon Group to ensuring its business segment continue to be future-oriented.

"Our innovative strength has always been the reason for our globally leading market position in the manmade fiber systems construction sector."

Georg Stausberg, CEO of the Oerlikon Manmade Fibers segment

Here, Oerlikon Barmag will be manufacturing and testing hi-tech spinning, feeding and metering pumps in the around 4,000 m² no later than December 2020. The attractive new-build will also house offices and communal areas totaling approx. 500 m². With this investment, Oerlikon Barmag is creating new benchmarks in terms of Pump Division's profitability, process stability and logistics. Around 80 members of staff from incoming goods, logistics and pre-production with 40 production machines will be moving into the new-build, where they will also be benefiting from a new warehouse and logistics concept.

"There continues to be a high demand for our pumps. They are one of the most important core components within the spinning process. But our pumps are also deployed in many other industrial applications, such as the car painting industry, the chemicals industry and other industries. Expanding our production capacities was the prerequisite for optimizing our processes and fulfilling increasing customer demand. Our clients throughout the world truly value our pumps, particularly against the backdrop of the 'Made in Germany' brand", explained Klaus Lorenz, Head of Pump Division at the groundbreaking ceremony.

Georg Stausberg, CEO of the Oerlikon Manmade Fibers segment, added: "Our innovative strength has always been the reason for our globally leading market position in the manmade fiber systems construction sector. For this reason, it is only consistent that we would invest in our development sites in Remscheid and Neumünster."

Remscheid's Mayor Burkhard Mast-Weisz was present at the groundbreaking ceremony, as were numerous representatives of the city, of the construction company and the architect. Mast-Weisz underlined the significance of the building project for the city. "Creating new jobs on the back of this investment is hugely important for Remscheid", commented the Mayor.

Following tradition, Klaus Lorenz, Georg Stausberg and the Mayor of Remscheid, Burkhard Mast-Weisz (from left to right), sink the time capsule.

This is what the new building of the Remscheid Pump Division (above) and the new R&D Center in Neumünster (right) will look like in the future.

sting in the future

Oerlikon Neumag remains on course for innovation
Construction work on the extension at the machine and plant manufacturer Oerlikon Neumag is currently making good progress and should be completed by early 2021 at the latest. With an investment volume in a low double-digit million range, the new building also documents the clear commitment of the Manmade Fibers segment to its two product lines BCF carpet yarn and staple fiber.

Joining forces at the groundbreaking ceremony: Matthias Pilz, Neumünster Head of the Town Council Anna-Katharina Schättiger and Mayor Olaf Tauras (from left to right).

"The extension helps us to further optimise our processes and to focus even more strongly on our customers"
Matthias Pilz, Oerlikon Neumag site manager

In Oerlikon Neumag's more than 70-year corporate history, numerous successful product developments stand for the innovative spirit of the textile machinery manufacturer. Today, more than 500 employees work at the Neumünster site, around 60 of them in research and development. "The signs are pointing to growth: The extension helps us to further optimise our processes and to focus even more strongly on our customers", says Oerlikon Neumag site manager Matthias Pilz. » (wa)

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Closed-loop systems require big changes

On the very long pa textile recycling

Ever-more fashion retailers are establishing take-back systems – but the world is still a very long way away from having a closed-loop system for textile recycling. Collecting and sorting clothing, separating materials, recycling – virtually each of these steps demands quantum leaps both in terms of concepts and technology. Meanwhile, the mountains of used textiles are growing ever taller because clothing has become a throwaway product. It is particularly for this reason that we must praise the many individual recycling activities that are showcasing the trend towards greater environmental awareness. A stock-take.

This figure provides food for thought: when talking about closed loop recycling, just one percent of clothing manufactured in 2015 was recycled into new fibers for the apparel industry. This is one of the findings of the British Ellen MacArthur Foundation, whose focus is to create an advanced closed-loop recycling system for the future. Its study estimates global fiber production for clothing alone over the examined period to be 53 million tons a year (Mta), of which 73 percent end up in landfill or are incinerated. Around 13 percent are recycled, usually turned into cleaning cloths or insulation materials, while a further 12 percent are cut-offs from production and excess stocks that are disposed of. One percent is microplastics, tiny plastic particles less than five millimeters in diameter that are released from synthetic textiles when washed and end up in our ground water.

It goes without saying that the study is in part based on estimates, as it is – even today – difficult to acquire reliable figures. However, the current trend does indicate that the overall situation is escalating. According to said study, the global consumption of textiles is expected to rise to 130 Mta by 2025 – faster that the world's population in terms of percentages. A significant reason for this is the fact that the consumption of clothing has risen, particularly in the last decade, driven by fast-paced fashion and cheap products of poor quality. At the same time, the frequency of use for clothing has fallen rapidly: in the USA – a fast-fashion paradise – for example, an item of clothing is now worn on average just 40 times, while this figure has fallen from 200 to 62 times in China over the past 15 years. Clothing has become a disposable product.

And that has far-reaching consequences. Rising consumption of textiles goes hand-in-hand with an increase in the use of resources and a rise in the impact on the environment. Because the lion's share of clothing manufacturing requires polyester and therefore crude oil, while cultivating cotton uses pesticides, fertilizers and a huge amount of water; and incinerating ever-more textiles also generates more CO_2 emissions. Add to this the fact that there will likely be fewer takers for the growing volumes of collected used textiles. Avid collectors such as the US, Germany and the United Kingdom have to date been exporting a significant proportion of used clothing to secondhand markets. However, their target regions – such as East Africa and India – are meanwhile starting to fight back, as their own textile manufacturers are suffering due to the existence of both these secondhand products and cheap new products from Asia. Textile collectors are themselves also struggling with the latter, as the poor quality in part does not even suffice for these textiles to be turned into cleaning rags. Ergo: used textiles warehouses are overflowing, prices are falling and sorting these textiles is becoming more complicated and expensive. And, in the European Union, new closed-loop system and waste framework guidelines are generating even greater pressure. To this end, the so-called Green Deal – within the context of the closed-loop economy

th towards real

action plan – demands that all EU countries adhere to prescribed recycling quotas and collect textiles separately to lower the volumes of household waste ending up in landfill. Whether this should come into force from 2025 or earlier has yet to be decided. But where will even more of these collected goods be taken to? And can money still be made with them?

Urgently required: closed-loop textile recycling

This large-scale picture clearly demonstrates that textile recycling is desperately required. This would allow the mountain of landfill waste to be further decreased, reduce fiber production, lower energy and water consumption and environmental pollution. However, this refers less to so-called open-loop recycling – in other words, the shredding and processing of textiles into lower-quality products (downcycling) for other industries – but specifically to closed-loop recycling, i.e. returning the recycled materials from clothing to the manufacture of clothing or quality textile products (upcycling). However, this ideal situation still requires technological further development. So, what is the textile industry doing today when it comes to recycling? What do the current technical solutions look like?

Re-manufacturing and take-back systems

Major fashion companies have been taking back used clothing and shoes for some time now, exchanging these for shopping vouchers. Here, service providers such as Germany-based I:Collect operate worldwide take-back systems with collecting, sorting and recycling solutions that sector giants such as Adidas, Levi's, H&M and C&A are already utilizing. In the best-case

scenario, the used textiles become secondhand goods, but also cleaning cloths and filling materials. In part, secondary raw materials – such as fiber blends, rubber and leather – are extracted.

This solution is considered an excellent example of progressive mechanical recycling, but also reveals its limitations. The sticking point lies in separating the materials. Clothing is usually made using mixed fabrics and is also often dyed or otherwise (chemically) finished. Breaking down the woven fibers into their specific components has not only been technically complex, time-consuming, energy-intensive and expensive (if it works at all) to date, the results have also been poorer in terms of quality than the original product. Hence, real fiber-to-fiber recycling is neither possible, nor economical.

From chemical recycling to fibers made from PET bottles

Chemical recycling promises to be a future solution, particularly with regards to polyester waste. Here, even contaminated or mixed plastics are thermochemically treated and converted back into raw materials such as oil and gas. With this, polycondensation processes can be used to make polyester for textile fibers. This would allow plastic waste – such as the plastic found in the world's oceans – to be used as a resource and not just for the textile sector, but above all for the plastics industry.

The trend of transforming old PET bottles and textile waste made from polyester into new fibers and textiles has already been long underway. Many companies are already producing bottle flakes and recycled fibers for textile processing. 100-percent recycled products encompass the most diverse items, including jackets, sneakers, sports bras, luxury bags and also geogrids used for reinforcement in road construction. And many major apparel companies are focusing on recycling, sustainability and environmental awareness as a way of augmenting their brands. In 2018, Adidas announced that it will be using exclusively recycled polyester for all its shoes and apparel by 2024. Machine manufacturers are also servicing this trend: to this end, Oerlikon Manmade Fibers offers sophisticated engineering solutions for mechanical recycling.

Numerous fiber types, numerous recycling models

Mohawk, a leading recycler within the carpet industry, also uses Oerlikon Manmade Fibers systems. The US company processes PET bottles into new carpets and recycles old carpets to create nylon and

PP pellets for the automobile and furniture industries. Dutch company DSM Niaga even promises that it is able to repeatedly recycle its carpet products made from mono-materials and duo-materials – all in an economical manner. And US carpet maker Interface boasts that its products are completely CO_2-neutral – from their manufacture all the way through to the end of their life – and uses recycled PVB compound material made from old windscreens to produce environmentally-friendly carpet tiles.

Recycling apparel with a high ratio of cellulose, i.e. cotton and viscose, has also been shown to be successful. To this end, the Swedish company RE:newcell manufactures biodegradable cellulose for clothing in this way. Here, used clothing is shredded, buttons and similar things are removed, the items are decolorized and finally chemically pulped. The process generates cost benefits vis-à-vis producing wood pulp, but has disadvantages with regards to economies of scale compared to large-format systems.

Focus on closed-loop recycling

As you can see, there are several concepts for the successful recycling of mono-materials, also with regards to fiber-to-fiber recycling. Although there are very few technologies aimed at recycling blended fabrics, there are however research developments. In 2017, the H&M Foundation announced that it had – in collaboration with the Hong Kong Research Institute of Textiles and Apparel (HKRITA) – developed a hydrothermal (chemical) fiber-to-fiber recycling process that separates cotton and polyester fibers. The same year, Mistra Future Fashion, a multidisciplinary Swedish research project, succeeded in completely re-utilizing poly-cotton blends by means of chemical recycling. The cotton was converted into high-end viscose filaments, while the polyester was transformed into pure, new monomers.

Until 2022, the German 'DiTex' support project will be using digital technologies to place a spotlight on the complete cycle in a model for fiber-to-fiber recycling of occupational clothing and bed linen. Here, the aim is not only to produce new, high-quality materials from the textile fibers, analyses of the entire lifecycle of the textile products should also ascertain what benefits recycling offers over comparable products made from new fibers. The ultimate objective is to market commercial recycled textiles.

The latter project places the focus on one thing above all: establishing functioning closed-loop systems requires the collaboration of all players across the entire value chain. Here, the question arises: is it possible to convince a billion-dollar industry such as the textile sector to make far-reaching changes to its processes and its way of thinking? Because it is precisely this that is required to achieve a closed-looped textile recycling system. This colossal mission has already started: recycling initiatives in some countries demand that the fashion sector considers later recycling as early as the design phase. Politicians and pressure groups create and promote legal rules and regulations on expanded manufacturer responsibility for textiles, also with regard to closer cooperation between producers and disposers. But it is the consumer that has the most effective lever here – although they would have to decide not to purchase the cheap T-shirt, but opt for the more environmentally-friendly alternative. » (tho)

Bio-based, biodegradable and sometimes fossil: biopolymers are a

Bio is not necess

Bioplastics are on the rise: they also offer the textile market ever-more alternatives to manmade fibers produced from fossil raw materials – with forecasts predicting double-digit growth. But there are also sobering headwinds: their ecological qualities are currently not sufficient to get a handle on the global problem of rising plastic waste both on land and at sea. Here, a differentiated look at the science is well worthwhile.

Even the name of the family of bioplastics requires some explaining: here, bio is not necessarily bio. To this end, we have – on the one hand – bio-based plastics; they are partially, or completely, manufactured from plant biomass such as maize, sugarcane or cellulose. On the other hand, biodegradable polymers are produced. They, for example, break down into various metabolic products using microorganisms. Bio-based plastics can be, but do not necessarily have to be, biodegradable. Conversely, there are also polymers made from fossil raw materials that are biodegradable. So, bioplastics are a veritable patchwork family.

A family with excellent future prospects, if a current market survey conducted by the Institute for Bioplastics and Biocomposites (IfBB) at the Hanover University of Applied Sciences and Arts is to be believed. The researchers predict a global rise in the production of bioplastics from 2.61 to 4.35 million tons between 2018 and 2023 – an increase of more than 10 percent per annum. This sounds like very little in view of the 359 million tons of conventional plastics (source: Statista) plus 66.6 million tons of synthetic fibers (source: The Fiber Year 2019) manufactured in 2018. To date, the currently low oil prices, reluctant political support, limited market access and expensive manufacturing processes are hampering the success of bioplastics. According to the study, the market is expected to develop and rising environmental awareness among consumers and brands is anticipated to increase demand. This trend is also supported by innovative materials for bioplastics with improved properties and new functionalities and by the development of ever-new alternative plastic products and applications.

And biopolymers are a future market for the textile industry as well. According to the IfBB, 252,000 tons were used in textile applications in 2018,

Salomon uses DSM's EcoPaXX fibers made from bio-based polyamide for its mounteneering shoe chassis.

a patchwork family

sarily bio

ranking second behind the dominant packaging applications (together making up just under 1.86 million tons). In turn, this figure seems tiny compared to the already-mentioned 66.6 million tons of synthetic fibers produced in the same year. However, the following applies both to the textile market and all other areas of use: bio-based biopolymers in particular do not require fossil resources such as crude oil, whose processing causes environmental disadvantages and which is becoming ever-scarcer and will therefore become ever-more expensive in the future. For this reason, the textile industry is also increasingly looking at using such alternatives.

The biopolymer polylactide (PLA), for instance, has been manufactured on an industrial scale for quite some time now. PLA is manufactured by means of polymerization of lactic acid, which is derived from maize or tapioca starch and is therefore completely bio-based and simultaneously biodegradable. In addition to packaging, the material is also used as spunbond rolled goods as well as in filling fibers or in apparel worn directly on the skin. PLA ensures superior moisture balance, as it is able to relinquish and release more water than PET. It is also attributed antimicrobial qualities. Leading PLA manufacturers produce in the US (NatureWorks), the Netherlands, Germany and China, for example. Experts predict that demand for biopolymers will increase, as they can also tap into areas of use beyond that of conventional plastics. It is anticipated that PLA production capacities will double by 2023, while the manufacture of bio-based, non-biodegradable polytrimethylene terephtalate (PTT)

– used in the production of fibers for carpets and other textiles – is also expected to rise.

One successful PTT product is Sorona® by DuPont, for example. This bio-based polymer fiber has a weight ratio of 37 percent of annually renewable plant-based raw materials. It has the properties of polyester (PET) and nylon, is very soft and is extremely durable and stain-resistant. Sorona® is deployed in carpets, apparel and automotive textiles, for example. DuPont advertises performance first and foremost with the added benefit of enhanced sustainability: their manufacture requires 30 percent less energy and emits 63 percent fewer greenhouses gases than in the case of the production of polyamide 6. Compared to polyamide 6.6, the manufacture requires 40 percent less energy and emits 56 percent fewer greenhouses gases. “Sorona® is being used, more and more, as a stretch fiber replacement for Spandex due to its inherent superior performance and sustainability benefits. Sorona® polymer fabrics can be sorted into today’s 100 percent polyester fabric recycling streams without compatibility issues”, says K. Ranjan Samant, Technical Fellow DuPont Biomaterials.

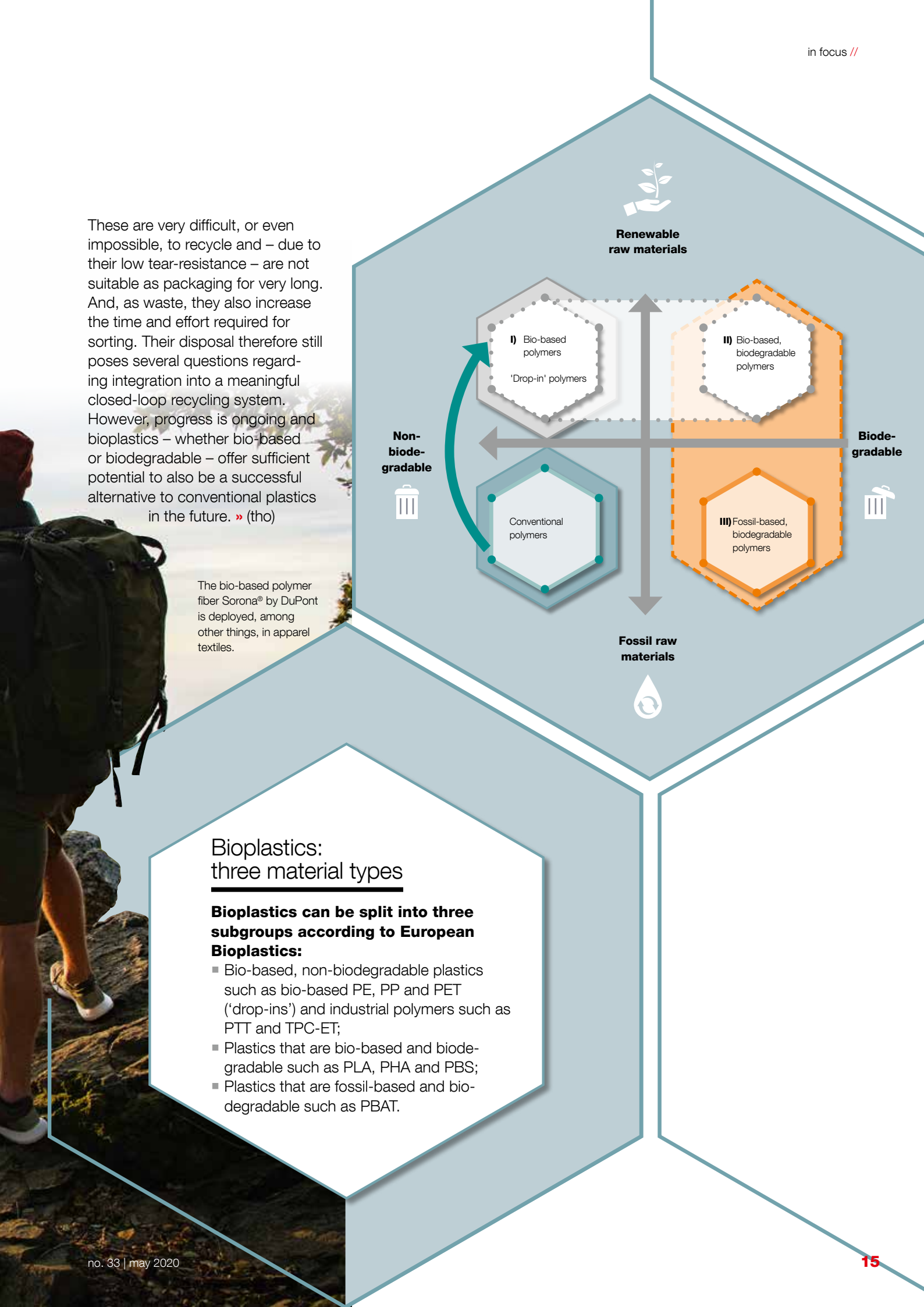
PA 5.6 also seems to harbor lots of future potential. The bio-based nylon material is generated from starch and does not need to shy away from comparison with PA 6.6 or PA 6. On the contrary: PA 5.6 fibers such as TERRYL® from Cathay Biotech, which can be used for sports apparel, underwear and carpets for example, are good for spinning, have good mechanical properties as well as a high degree of textile wear comfort and even exceed the classics in terms of their heat resistance and moisture absorbency. TERRYL® has also established itself in the high-performance industrial yarn market, which requires high melting temperatures and high modulus. “We are collaborating intensively with Oerlikon Barmag in order to generate optimum system processes for manufacturing fibers using biopolymers”, comments Alex Kedo, Vice President of Cathay Industrial Biotech in Shanghai, China. Markus Reichwein, Head of Product Management at Oerlikon Barmag, talks about several clients who have already acquired extensive experience with bioplastics using Oerlikon Barmag systems: “Biopolymers such as PA 5.6 and PLA are high on the agenda, particularly in China and Asia, where global bioplastics production is concentrated. Here, we are registering growing customer interest in such yarns. In other words: consumers are increasingly demanding sustainable clothing.”

Experts predict that demand for biopolymers will increase, as they can also tap into areas of use beyond that of conventional plastics.

Incidentally, bio-based materials are – contrary to what some say – not really manufactured at the expense of the food sector. According to figures provided by the European Bioplastics association, 94 percent of all globally-available arable land are currently used for grazing, fodder and food production, with just 0.02 percent used for growing biomass for producing bioplastics in 2018. However, there is a surprising downside to biodegradable polymers. The University of Plymouth in the United Kingdom discovered that these do not break down in the environment very much faster than conventional plastics. Its study compared shopping bags made from various plastic materials: conventional ones manufactured from polyethylene, biodegradable, compostable and so-called oxo-degradable ones, which (incompletely) degrade in the absence of UV light, heat or oxygen. After three years under stable laboratory conditions, in the open air, in the ground or in the sea, the results were very sobering: only the compostable bag had lost some firmness in the ground and had completely decomposed in the sea after three months. However, it remained unclear here whether microplastic residue was released into the water.

Another argument currently casts doubt on the ecological benefits of biodegradable plastics.

These are very difficult, or even impossible, to recycle and – due to their low tear-resistance – are not suitable as packaging for very long. And, as waste, they also increase the time and effort required for sorting. Their disposal therefore still poses several questions regarding integration into a meaningful closed-loop recycling system. However, progress is ongoing and bioplastics – whether bio-based or biodegradable – offer sufficient potential to also be a successful alternative to conventional plastics in the future. » (tho)



The bio-based polymer fiber Sorona® by DuPont is deployed, among other things, in apparel textiles.

Bioplastics: three material types

Bioplastics can be split into three subgroups according to European Bioplastics:

- Bio-based, non-biodegradable plastics such as bio-based PE, PP and PET (‘drop-ins’) and industrial polymers such as PTT and TPC-ET;
- Plastics that are bio-based and biodegradable such as PLA, PHA and PBS;
- Plastics that are fossil-based and biodegradable such as PBAT.

Plastic waste is endangering the seas

Islands destro paradise

Five huge waste vortexes have formed in the world's oceans, the largest of which is located in the North Pacific between California and Hawaii and, according to estimates, could meanwhile be the size of Europe. What is visible on the surface of the sea is merely the tip of the iceberg. More than 70 percent of the waste sinks to the ocean floor, with a further 15 percent reaching the coast, according to a United Nations Environmental Program (UNEP) study.

The consequences of this environmental pollution are quite staggering. Plastic can survive for centuries in the ocean. During this time, it slowly breaks down and can release toxic additives into the environment. Ultimately, people are also impacted by these when – at the end of the food chain – they consume seafood contaminated with residues or toxins released by plastic products.

Where does this plastic in the oceans come from?

According to studies, around 80 percent of plastic waste flow into the sea via rivers, with ten rivers considered the primary sources of these discharges, mainly in Asian countries. Another cause is also the (illegal) disposal of waste from ships out at sea. According to a study by the British Eunomia Research & Consulting consultancy, drink bottles and packaging make up the lion's share of this waste, followed by fishing nets and microplastic particles. The latter make up a 7.7-percent share of this waste, coming – for example – from binding and filling agents used in the cosmetics and personal care products, tire abrasion, industrial pellets and washing residues from clothing, which predominantly end up in the sea via waste water. Because even well-equipped waste water treatment plants in industrialized countries are not yet able to filter out these particles, which are less than five millimeters in diameter. Conversely, textiles make up 20 percent of microplastics, although they are only responsible for 1.5 percent of the plastic waste in our oceans.

More than 70 percent of the waste sinks to the ocean floor, with a further 15 percent reaching the coast.

What solutions relate to the textile sector?

Since the 1980s, political solutions for the problem as a whole have focused predominantly on regulating the future discharge of plastics into the oceans. Since the public has been aware of the topic, ever-more initiatives, organizations and businesses are searching for ways to avoid waste, to remove it from our waters or to recycle it. Here, there are a rising number of projects of the most diverse kind and scale that focus on textile topics:

ying

We are forever reading about the 150 million tons of waste that are currently polluting our oceans. It is anticipated that between eight and twelve million tons will join these annually by 2050, at which time there would be more waste in the oceans than fish. Although synthetic textiles only make a small contribution towards this environmental pollution, the textile industry can however help create solutions for tackling the waste issue, as evidenced by ever-more projects.

- An alliance of important European industry associations, including the European Apparel and Textile Confederation (EURATEX) and representatives of the sports goods industry, such as the European Outdoor Group (EOG) and the Federation of the European Sporting Goods Industry (FESI), is looking for valid measurement methods for detecting microplastics in water and for solutions to prevent the release of such particles when washing synthetic textiles. Against this background, German alliance project 'Textile Mission' places a particular spotlight on the situation in waste water treatment plants.

- Adidas is co-founder and partner of 'Parley for the Oceans', a global cooperation network that aims to raise awareness for the protection and conservation of the oceans. Among other things, the sports goods manufacturer has set itself the objective of no longer using plastic bags or plastic particles in personal care products, preventing the discharge of plastic into the oceans, reusing plastic waste found on beaches and coasts and to reutilize recycled plastics to produce sports apparel and shoes.

- Back in 2014, the Dutch fashion brand G-Star launched a jeans collection in collaboration with Bionic Yarn, which were partly made from recycled plastic waste from the sea.

- Bureo transforms old fishing nets into new products such as skateboards. Here, the US company is collaborating directly with fisheries in South America, but has also forged global contacts in order to promote its local solution.

- Ecoalf has launched its 'Upcycling the Oceans' (UTO) campaign, aimed at cleaning up our oceans. To this end, the Spanish fashion company is cooperating with fishermen and divers in Spain and Thailand, removing usable PET material from the waste that has been caught in the trawl nets, which it then recycled into clothing.

Ever-more initiatives, organizations and businesses are searching for ways to avoid waste, to remove it from our waters or to recycle it.

- In view of the gigantic islands of waste, such projects are undoubtedly just a 'drop in the ocean' of the overall problem. However, they can possibly create a greater sense of responsibility and help prevent a former paradise suffocating in plastic waste: our oceans. » (tho)

Ever more companies are manufacturing textiles from single-use pr

Recycling: engine for success

Since **1993**, leading recycling pioneer Patagonia has been producing apparel from PET bottles, waste and old clothes.

The German Huesker Group has introduced the **world's first geogrids made from 100% recycled PET bottles** for deployment in road building. Each kilogram of recycled yarn cuts **4.3 kg of CO_2** emissions, which corresponds to a 33-km car journey.

By **2024**, **Adidas** is planning to exclusively use recycled polyester for all its shoes and apparel.

95% of used textiles can be recycled. Globally, only 20% of clothing waste is collected for reuse or recycling, leaving 80% for landfill or incineration.

Danish fashion company KnowledgeCotton Apparel plans to process **5.5 million recycled PET bottles** by 2025, creating one jacket out of 25 PET bottles.

The Estonian start-up **Gelatex Technologies** creates an alternative for leather from gelatin and received the **Green Alley Award** in 2019.

roducts

Fashion label **Sundried**, owned by triathlete Daniel Puddick, makes **sports bras** using 100% recycled materials, processing **used coffee filters** and PET bottles to do so.

The Swedish manufacturer **Fjällräven** recycles plastic bottles to make **backpacks**, saving water, energy and chemicals by deploying an ecological technology during dyeing.

52,000 pairs of shoes end up in the **world's first industrial recycling system** every day. Soex Recycling Germany processes these into around two tons of recycled material daily, which in turn can be used to produce shoe (inner) soles, flooring, floor and judo mats.

Global coalition for more sustainability in the textile business

Teaming up to make all fashion good

‘Fashion for Good’ was established at the beginning of 2017 with an initial grant of the Laudes Foundation (formerly C&A foundation) with the aim to scale sustainable innovations in the fashion industry. Its Innovation Platform brings together start ups and brands in an industry-wide collaboration. ‘Fibers & Filaments’ talked to Dr Ashley Holding at ‘Fashion for Good’ about trends and challenges in the field of textile recycling and circular economy.

An Ellen Mc Arthur Foundation study on textile recycling, which is predominantly based on 2015 figures, states that just one percent of apparel manufactured worldwide was recycled into new fibers destined for the clothing industry. Have you noticed any significant increase during the past few years?
One thing that is quite difficult to do is track the exact end of use pathway for all garments in the supply chain, so accurate data in general is quite difficult to come by. This is an issue for the whole industry.

There are no current technologies which operate at scale for the recycling of polyester (PET) fibers to fibers. Most recycled polyester (rPET) fibers are made from PET bottle waste, and the waste stream often has to be fairly clean and contaminant-free in order for this.

Cotton can be recycled mechanically into new yarns, but this results in a shorter fiber length and much lower quality yarn, which often has to be mixed with virgin cotton or other fibers to create high quality garments. This is only done on a very small scale. There is also the option to use waste cotton as a feedstock for rayon fiber (Viscose or Lyocell) production, however, this also includes only a small amount of waste cotton feedstock. We still have a long way to go before we shift the needle on the recycling of post-consumer garments into new garments again.

How would you describe the ideal closed-loop recycling system for textiles? How does your C2C (cradle-to-cradle) guide come into play?
In the ideal system, garments would be designed from the outset for recycling. Mono-materials – garments made entirely out of one material – should be preferred. This ties into the C2C guidelines around designing products with their whole lifecycle in mind for inclusion in technical or biological cycles. In most cases, for current materials we should focus on the former – capturing the most value out of the materials we produce by recycling them into new products again.

FASHION FOR GOOD

The other missing link here is the recycling technologies themselves – in reality, only chemical recycling methods have the ability to close the loop on textiles, most of which are not yet operating at large-scale capacity, as some are just moving out of the lab. Finally, the collection and sorting infrastructure is just not in place like it is for packaging waste. Once recycling technologies are scaled in order to take these materials, the business case for waste collectors will be better.

What would the textile industry have to change to bring about significant improvements to textile recycling?
Brand off-take agreements with innovators are important for helping innovations in recycling to scale – it signals to investors that there is a demand for the product and decreases the risk factor of collaborating on nascent technologies.

Brands should be specifically targeting their public commitments at recycled polyester specifically from post-consumer garment waste, otherwise they will continue to

source rPET fibers from bottles, which doesn't support the wider market for rPET from textiles. Additionally, support of innovative recycling companies through financing, co-development projects and involvement in multi-stakeholder consortiums is a great approach. The latter is something that Fashion for Good is hoping to play a role in bringing our brand partners around the table to align and synergize our efforts to identify and scale the best innovations with all the relevant value chain stakeholders on board.

Do certain things need to also change at the beginning of the value chain when manufacturing the fibers? What could the manufacturers of machines for producing manmade fibers do to support textile recycling?
I don't believe much needs to change at the beginning of the value chain in terms of technology. I can perhaps see a role of technology providers making testing and piloting facilities for their machinery more accessible to early-stage companies looking to scale up their processes – some might not have the expertise in filament or pellet extrusion if their focus in the past has been on the development of a chemical process for outputting commodity, TPA (terephthalic acid), for example.

Do pioneering technologies for closed-loop recycling of clothing made from blended fabrics that could also be implemented on a large scale already exist?
Most innovations that target blended textiles are still at a pilot stage – they have smaller-scale pilot reactors and are optimizing their processes on a large scale for the first time. Many may be seeking financing for building demonstration systems and trying to secure agreements with brands for off-take of their materials in the future.

We have supported companies such as Ambercycle, Worn Again, Tyton Biosciences and Infinited Fibre Company in our Scaling Programme at Fashion for Good and will be shortly launching a working group with our brand partners to further accelerate the adoption of technologies in this space. » (bey)

"I can perhaps see a role of technology providers making testing and piloting facilities for their machinery more accessible to early stage companies looking to scale up their processes."

Dr. Ashley Holding, Innovation Manager at Fashion for Good

Dr. Ashley Holding is Innovation Manager at Fashion for Good, the global platform for collaborative innovation in the fashion industry. Ashley brings his technical expertise to focus on plastics and chemical recycling. Ashley joined Fashion for Good from Worn Again Technologies, a Fashion for Good innovator, developing an innovative new technology for recycling used textiles. Prior to this, he pursued his PhD in Organic Chemistry from the University of Helsinki, where he researched new methods of making cellulose materials.

Fashion for Good is the global initiative that is here to make all fashion good. It's a global platform for innovation, made possible through collaboration and community. With an open invitation to the entire apparel industry, it convenes brands, producers, retailers, suppliers, non-profit organizations, innovators and funders united in their shared ambition.

Based in the organisation's headquarters in Amsterdam, the global Fashion for Good Accelerator and Scaling Programmes gives promising start-up innovators the expertise and access to mentoring and funding they need in order to grow.
www.fashionforgood.com

Staple fiber plant is set to help a sustainable leader take global rec

Gama Recycle goes even gre

Business growth and environmentalism rarely go hand in hand. For some, the two ideas are diametrically opposed, forcing companies to take an either-or approach. One of the global recycling pioneers Gama Recycle, however, has spent the last two decades spinning other people's waste material into a new kind of gold – regenerated yarns and fibers. Fibers & Filaments had the opportunity to discuss with Zafer Kaplan, founder of Gama Recycle, the current state-of-the-art in recycling and catch a glimpse of how the company is planning to ramp up production with an upcoming stable fiber plant from Oerlikon Neumag.

Zafer Kaplan, founder of Gama Recycle, has been establishing sustainable processes for more than twenty years.

As one of the largest producers of regenerated yarn and fibers, you both recycle textiles and use R-PET bottle flakes in production. How did this develop, and why did you commit yourself to recycling?

We have been in business since 1997. From the very beginning, we produced recycled items. We gained a reputation for recycling textiles, as well as some plastics, so five years ago we even changed our name to Gama Recycle. To be honest, it was both environmentally and financially relevant at the time. There was a huge amount of plastic and textiles waiting to be reused. One of the most complicated aspects, though, was actually collecting all the materials.

What special considerations are required to produce regenerated yarns and fibers?

In the beginning, producing regenerated fibers and yarns was not a high priority for most people. Most countries and companies were not particularly sensitive to environmental issues. A lot of the cutting waste from the garment or textile industry was simply thrown away as trash or sent to be incinerated. It was not valuable for them to actually take care of these leftover materials.

As a result, we developed some ideas to turn these 'unusable' materials into regenerated fiber and yarn for several industrial use cases. We already have 18 patents for recycled products, machines, and equipment, with 10 more currently under review. Today, most garment manufacturers have started to sort and sell their leftover cutting materials, instead of simply throwing them into the garbage.

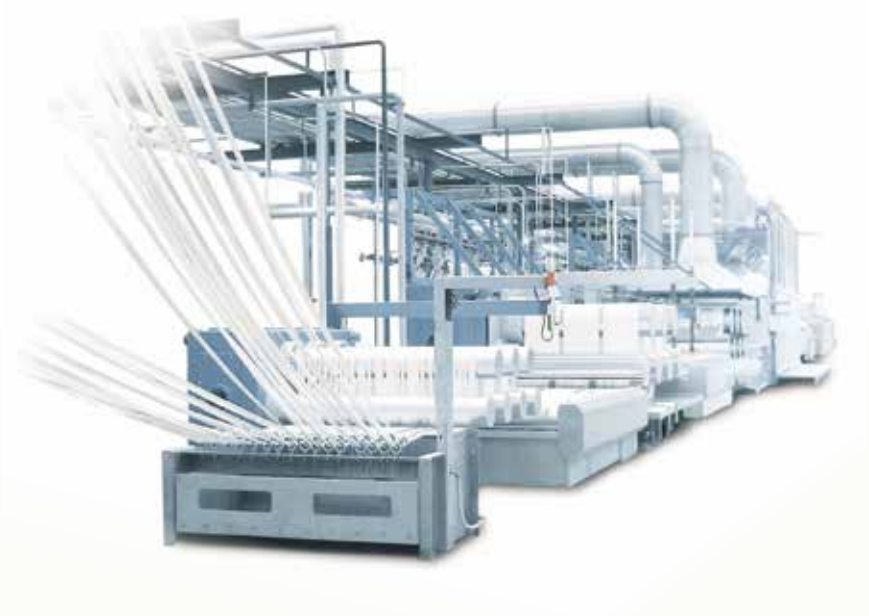
This is a huge improvement, because there were also only a few machine manufacturers on the market when we started recycling textiles, and most of the time we had to convert or modify our machines to make it suitable for recycling processes. Today, a lot of companies are focusing on recycling machines, and this has helped encourage a lot of growth in the whole industry as well.

What do you recycle, and which polymers are these materials made of?

We recycle pre-consumer cutting or industrial waste as well as post-

ycling to the next level

eener with Oerlikon Neumag



With a staple fiber plant from Oerlikon Neumag, Gama is able to control the whole production process in a very efficient way.

consumer garments, PET bottles, PET trays, and other PET-based packaging materials or consumer products. We also have several patents for recycling previously used garments into recycled cotton and polyester fibers.

In what condition do you purchase your raw materials, and which steps of the process do you handle internally?
Sourcing is the most crucial and complicated part of our work. We purchase waste (our raw materials) from all over the world. We have several standards for raw materials, but unfortunately sometimes this does not match up with the specification of what you actually buy.

You will also use a staple fiber plant from Oerlikon Neumag in your production. What makes this plant technology so interesting for your process?
Recycled fibers have huge market potential. End-users are looking for environmentally friendly products, but they won't compromise on the quality of the products they buy. This is why we prefer to use the Neumag fiber line. We are able to control the whole process in a very efficient way, with a consistently high quality of fiber as well as less production waste.

The preparation of recycling materials is a bit more complex. It seems that producing yarn and fiber from recycled materials is really profitable compared to virgin material. Or was your decision motivated more by idealism?
Yes, it is more profitable in most of cases – but also riskier and more complicated as well. You need a lot of know-how and experience, good machinery and equipment; otherwise, it will be a huge loss. While we do run a business, we are of course proud to do our part for sustainability and the environment by extending natural resources for future generations.

For example, we have developed a new patented fiber called CUPROCEL that is made of rPET polymer. Its touch, drape, stretch, recovery, etc., is not comparable to any other synthetic fiber. It is almost like cellulosic fibers such as modal or lyocell. We sell it as a fabric which is created with recycling processes. We even offer to buy cutting waste from our customers, as well as post-consumer garments. That is how we take sustainability into consideration. We believe this will help other people to follow suit.

What are your goals for the next three to five years? And what role does the Oerlikon Neumag plant play in your overall approach?
We will work up to a total of 300 tons of PET flake capacity per day, which will allow us, on a daily basis, to make 200 tons of recycled polyester fibers and 100 tons of PET chips for filament yarn and bottle-to-bottle (food-grade) applications. This is a great opportunity to have the Neumag line. With its impressive technology and capability, we will be able to achieve our goals more easily. » (wca)

Domotex 2020

Carpet yarn solutions from 0.5 to 30 dpf

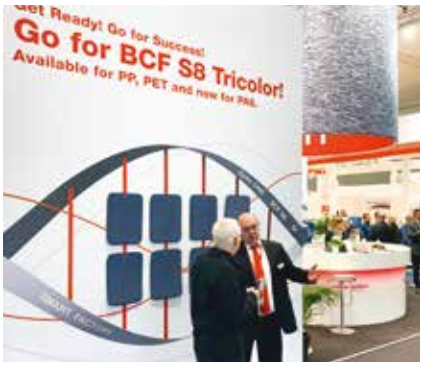
Market leader Oerlikon Neumag has its finger firmly on the pulse of their customers with the new Color Pop Compacting unit (CPC-T) for the BCF S8 carpet yarn plant, which is now available for the Polyamide 6 process. The new solution, which was on show between January 10 and 13, 2020 at the Domotex 2020 in Hanover, attracted great interest from many trade visitors.

Following the trend for multicolored carpets, BCF S8 sets new standards in regards to color separation. The plant, launched as a tricolor solution at last year's ITMA in Barcelona, makes anything possible – from mélange to strongly separated. It promises carpet yarn producers even more flexible color mixing variants for product differentiation. The core component in this process, the Color Pop Compacting unit (CPC-T), offers more than 200,000 different color shades from three colors. The innovation, which has been filed for patent, is available for polypropylene and polyester polymers as well as for the polyamide 6 process.

Polyester, recycling polyester and fine titers are on trend

During numerous conversations with customers, Martin Rademacher, Head of Sales Oerlikon Neumag, observed a noticeable trend for polyester in the carpet industry even outside the USA. Sustainable solutions are equally sought after: "Our customers increasingly demand plants that can process recycled polyester," explains Martin Rademacher.

The Manmade Fibers segment presented an additional solution by Oerlikon Barmag for polyester applications that need fine single filament



titers from 0.5 dpf and high filament counts: puffy, soft polyester filament yarns with BCF-similiar properties are produced on the basis of a POY and texturing process. Core components of the processes are the POY take-up unit WINGS HD as well as the new texturing machine eAFK Big-V.

Retrofitting business and original parts in strong demand

The orders completed in the customer service area during the Domotex show the importance of core and micro components for a stable spinning process. "All in all, we have been able to secure original parts, service and modernisation orders in the six-digit euro range," says Niels Herrmann, Director for Service Sales at Oerlikon Neumag, with pleasure. "Our customers are very quality conscious. They know that high-quality yarn and efficient production depend on the optimum condition of the system. Our services and training offerings, as well as custom-fit original parts and individual upgrades, help to achieve optimum production conditions." Sales successes could also be celebrated in the plant business: the market leader in the area of carpet yarn and filament plants secured five orders for BCF and DTY plants. » (bey)

The BCF S8 sets new standards in regards to color separation.

First wiping robot successfully commissioned in India

Automated wiping reduces yarn breaks

Following its installation at several major yarn manufacturers in China, the first wiping robot has now been operating in India since the end of 2019. As already the case with our Chinese clients, the performance of the Oerlikon Barmag solution there demonstrates the same properties: an even, high-quality wiping process providing considerably reduced yarn break rates and higher full package rates. Regular wiping (cleaning) of the spin packs is important for process stability and yarn quality.

The performance data at the Indian yarn manufacturer was collated and evaluated over a period of three months. The results revealed that the yarn break rate has – regardless of the product – fallen by almost 30%. The early run time breaks have decreased by 10% and string-up breaks by 40%. Consequently, full package rates have risen by 3%, while waste rates have fallen by 0.2%. “Yarn breaks are always an issue; they have a direct impact on the production figures. This is where the wiping robot reveals its added value”, comments Stephan Faulstich, Technology Manager POY. The system automatically and autonomously controls the individual positions in accordance with the scheduled wiping cycles. In addition to the scheduled wiping processes, there are also events that cannot be planned or that are not immediately visible. Here, the wiping robot – as a result of its management functionalities – is able to identify issues such as yarn breaks or parallel wiping processes and to independently offer solutions. The same also applies to manual requests: if another action is simultaneously required here, the system identifies this and offers solutions.

All wiping positions, cycles and times can be saved in the wiping robot’s management system. The robot accesses the saved wiping intervals in an automated and safety-relevant manner.

The wiping robot operates in a cross-line manner. In contrast to manual wiping, the cleaning quality remains constant around the clock, considerably reducing the impact of the wiping on both the spinning plant process stability and on the yarn data of the spun yarn. And production times can be increased between two cleaning cycles as well: whereas repeated wiping is required after 48 hours in the case of manual wiping, utilizing the robot extends the interval between two wiping processes to up to 60 hours. The considerable increase in the spinning process efficiency achieved by the wiping robot also has a positive impact on margins. To this end, one customer deploying the wiping robot was able to reduce its production costs for the same yarn by more than 3%. » (bey)

Industry 4.0

From conce

Industry 4.0 – a buzzword that has been accompanying us for several years now. We asked our readers:
What does industry 4.0 mean to you? In what way has digitalization already influenced your business environment? What digitalization solutions do you expect from machine builders like Oerlikon Manmade Fibers?

“For us, Industry 4.0 means we are able to further optimize and dynamically monitor our production sequences and processes both in our POY production facilities and our DTY processing systems – across the entire value chain, from the raw material through to the packaged, finished end product, practically by means of digital value-added. It is particularly important to us that we can better fulfill the requirements of our customers by means of order management data analysis and digitalization. Here, we not only require our processes to be digitalized, we above all also need to process the considerable volume of data in an intelligent manner. Furthermore, we expect that the digital factory will dynamically monitor – and hence considerably reduce – production, HR and energy costs.”

Chen Fei, Vice President, Fujian Jinjiang, China

“Industry 4.0 is the age of systems automation and intelligent information systems. Intelligent machines are replacing physical work. The factory operates automatically; this increases manufacturing efficiency, minimizes error rates and relieves the burden on our employees. Fundamentally, we have achieved the degree of automation necessary for our production. However, it should in future be possible to automate and monitor every single step within the production process and to analyze the respective process data. The efficiency and data accuracy that come with Industry 4.0 solutions have a positive impact on product quality. To become even better here, we need data transparency for the entire value chain – from the melt all the way through to the packaged yarn. We have been able to adapt and optimize the processes in accordance with each respective market situation, hence increasing satisfaction among our clientèle.”

Lv Bin, CIO, Zhejiang Hengyi, China

pt to reality

"The future of the textile industry is being increasingly determined by Industry 4.0. The interconnection of information technology and manufacturing processes is on track. Industry 4.0 has many dimensions and possible fields of application. In three of them (smart services, operations and factory), key solutions are provided by the machinery industry. The other ones – from smart textile products, marketing and sales, employees through to strategy and organization – are specific know-how issues for the textile mills. With regard to business models for the textile industry, the speed factory project of a well-known manufacturer of sports articles is particularly challenging. It shows us where the path is leading: fast + flexible production up to batch sizes of 1. Industry 4.0 is paving the way towards individualized mass production. However, every sector and every company must develop its own strategy. How do you introduce Industry 4.0 within a company? To start with, Industry 4.0 can be internal or external in its orientation – and will be both in the long term. Internal orientation focuses on the company's own production process (including suppliers) and external orientation encompasses predominantly the relationships with customers."

Thomas Waldmann, Managing Director, VDMA Textile Machinery, Germany

"We believe Industry 4.0 is about the evolution from focusing solely on tangible products to now placing greater value on the intangibles surrounding the product or provided by the product. Products are now being tasked with solving an array of complex problems or making life easier/better, etc. An important factor driving this evolution is the new consumer – who now has more time to experience the products, research the various product options more easily and explore the diversification of products. Any entity that requires intensive labor is going to be disrupted by digital and automation solutions. Digital solutions can handle intricate product portfolios, sophisticated logistics and complex supply chains, while simultaneously keeping inventories low and manufacturing efficiencies high. Automation can reliably improve repetitive activities and/or dangerous tasks. We expect machine builders to provide systems and equipment in which digitalization solutions are fundamentally part of the underlying infrastructure of the ecosystem rather than optional add-ons."

Edmir Silva,
Ph.D., Director, Global Innovation
Unifi Manufacturing, Inc., USA

Oerlikon Manmade Fibers segment sets a trend with three Custom

Technology transfer that is cre

The Oerlikon Manmade Fibers segment has been informing its Indian customers within the context of a technology symposium held in Daman/ Silvassa for more than ten years now. Numerous Indian manmade fiber producers have settled in this region to the north of Mumbai.

Once again, 450 manmade fiber industry experts accepted the invitation to attend and inform themselves of the latest product and services portfolio developments this year. For the third time in succession, Oerlikon also entered into dialog with the next generation of managers at major Indian polyester and nylon manufacturers in a separate event hosted in Mumbai beforehand.

The technology symposium was again held – for the very first time – just a few days later and in a slightly modified form in Kolkata in West Bengal. This is a potential second future key location for manufacturing manmade fibers in India according to plans revealed by the Indian government. In a target group-appropriate manner, the discussions focused above all on the transfer of technologies for manufacturing various polymer products.

Jürgen Vogel and Debabrata Ghosh opened the technology symposium in Daman, attended by around 450 people.

The Manmade Fibers segment is able to offer the entire process chain – from the melt to the finished, textured yarn or the fibers and including the necessary semi- and fully-automated logistics processes – from a single source. This is of interest above all for potential new customers and investors in West Bengal and neighboring Bangladesh, as some do not yet have decades of expertise in manufacturing manmade fibers.

Clean Technology. Smart Factory.

The focus was on the latest product and service developments from the Oerlikon Barmag, Oerlikon Neumag and Oerlikon Nonwoven brands. With their ‘Clean Technology. Smart Factory.’ motto, the engineers from Germany presented selected machines and systems specifically designed for the Indian market, along with the associated services.

Technological highlights for efficient production

Oerlikon Barmag’s eAFK Evo, introduced at ITMA 2019, promises superior speeds, greater productivity and consistently high product quality, along with lower energy consumption and simpler operation vis-à-vis comparable market solutions. In particular, it is two of the machine concept’s features that excel with fantastic technology: the optimized, innovative EvoHeater and the EvoCooler, a completely newly-developed active cooling unit. Another focus was on WINGS FDY, that is now also available for the polyamide 6 process. To this end,

With the topic of ‘recycling’, Jochen Adler looked to the future of potential new materials for the textile industry.

the new 24-end winding concept makes the efficient production of FDY PA6 yarns a reality. Extending the polyamide yarn production to 24 ends with DIO and WINGS FDY pays yarn producers dividends, particularly in terms of investment expenditure (CAPEX) and operating expenditure (OPEX): significant savings with regards to energy, footprint and – due to the more ergonomic design – string-up time are among the concept’s most convincing arguments.

The new BCF S8 production platform promises manufacturers of carpet yarns greater performance within this fiercely-competitive market: spinning speeds of up to 700 filaments and fine titers of up to 2.5 dpf are standard. And the system promises carpet yarn producers even more flexible tricolor mixing variants for product differentiation. The core component in this process, the Color Pop Compacting unit (CPC-T), offers more than 200,000 different color shades from

ner Days in India
eating waves

Michael Roellke, Volker Schmid, Jochen Adler and André Wissenberg (from left to right) at the podium discussion together with Sudipto Mandal from the Indian subsidiary.

three colors. The innovation, which has been filed for patent, is available for polypropylene and polyester polymers as well as for the polyamide 6 process.

Zero-waste philosophy successfully implemented

With the new VacuFil® recycling range, Oerlikon Barmag is now offering – in cooperation with its own subsidiary, BBEngineering – a zero-waste solution. Decades of experience in the areas of extrusion, filtration and spinning systems have been bundled into a novel core component – the vacuum filter. It unites gentle large-scale filtration and controlled intrinsic-viscosity build-up for consistently outstanding melt quality.

Exciting podium discussion on digitalization, automation and recycling

Within the context of a podium discussion, Jochen Adler, Chief Technology Officer of the Manmade Fibers segment, responded to questions concerning the future and relating to the topics of digitalization, automation and the closed-loop economy for the textile value chain.

Here, Jochen Adler stated: “We want to further optimize the efficiency of our systems and the quality of the end products with our digital solutions. True to our e-save philosophy, our mission is to protect the environment and to promote the sustainability of our solutions – in future undoubtedly also with a focus on recycling. For this, we are deploying the know-how of our large-scale systems engineering team, including full-automation, transport, packaging and warehouse logistics and end-product automated quality control. We combine these with our process competencies and digital data handling using our Plant Operation Center (POC) and our artificial intelligence-based software solutions – known as ‘AIM’, our abbreviation for ‘Artificial Intelligence Manufacturing’. In turn, this allows us to build bridges between data and material flows and between the virtual and real worlds.”

Complex large-scale systems from a single source

A further information focus during the symposium was on the execution of complex large-scale systems including supporting the financing of projects. The benefits of executing a factory project with Oerlikon are obvious: Customers have a single contract partner who assumes the overall responsibility. A project manager acts as the primary contact partner. All core components come from Oerlikon’s in-house manufacturing facilities. Planning reliability, high efficiency as a result of continual process optimization, an optimized CAPEX/OPEX ratio as well as comprehensive handling of quality data – from the raw material all the way through to the individual package round off the scope of the turnkey project. » (aw)

The ‘Sukalyann d’entourage’ dance troupe thrilled the audience with its ‘Amar Sonar Bangla’ program.

Engineering and systems for recycled polyester (rPET)

Recycling solutions for

Whether for apparel, carpets or industrial textiles – yarn producers have not just recently started looking for manufacturing processes with which they can spin recycled bottles, textiles or other waste into new fibers and yarns.

The diversity of the systems and processes available on the market makes it difficult to find the right concepts and – more importantly – concepts that work. Fundamentally, we distinguish – when it comes to mechanical recycling solutions – between flake to yarn, fibers and nonwovens and between flake to chips to yarn, fibers and nonwovens. Furthermore, solutions for post-production and post-consumer waste recycling are currently being developed – very much in line with zero-waste concepts.

Product and engineering solutions for mechanical recycling from Oerlikon Manmade Fibers have been available for many years now. To this end, more than 500 tons of BCF yarns can be manufactured from rPET per day, for example. The first Oerlikon Neumag staple fiber system that is also able to process rPET was commissioned as far back as 1994. The US filament yarn manufacturer Unifi has been producing its recycled yarn Repreve, which is in demand across the globe, on Oerlikon Barmag spinning and texturing systems since 2007. These are just a few examples of the diverse applications for recycling solutions available from the Oerlikon Manmade Fibers segment.

Flake to yarn: tried-and-tested technology

For its spinning and nonwoven processes, Oerlikon Manmade Fibers has an all-in-one solution that transforms rPET bottle flakes directly into yarn, fibers and nonwovens. Depending on the quality of the bottle flakes, the process has an upstream preparation unit that is designed to harmonize fluctuations in the raw material quality and to make the polymer usable for the spinning process. Contami-

VarioFil R+, introduced in 2014, is successfully operating at the sites of various Asian customers, manufacturing high-quality rPET yarns.

all processes

nants that cannot been separated in the downstream process – such as PVC, polyolefins, undesirable dyes, metals and other foreign bodies – are extensively removed, with minimal loss of material.

The subsequent inline process dispenses with re-granulation and hence renders interim storage in silos or big bags superfluous. Compared to offline solutions with re-granulation, this has the advantage of considerable energy savings of 0.4 kWh/kg. At an average price of US$ 0.1 per kWh, this results in operator savings of US$ 40 per ton of material. However, the requirements for the raw material in the case of this process – especially in terms of evenness and material supply – are even greater than for the offline solution. Predrying, decontamination and extrusion take place in a combination comprising vacuum system and single-screw extruder.

Following extrusion, the melt is carefully filtered before being spun. The overall design has been developed specifically for constant melt pressure upstream to the spinning pumps. The fine filtering guarantees that the spin packs are highly durable and ensures constant, efficient production.

To maintain maximum flexibility for the system, both rPET flakes and granulates of various polymers (PET, PP, PA) can be processed – independent of the process.

VarioFil R+: compact system for flake to POY production

As the world's very first POY spinning system, the VarioFil R+ compact spinning system utilizes recycled bottle flakes as the starting material for textile filament yarn. The system offers various technological features such as a special extrusion system for bottle flake materials, the very latest metering and mixing technology for spin-dying and expanded 2-stage melt filtration. This turnkey spinning system comprises between 4 and 16 spinning positions, each equipped with an Oerlikon Barmag 10-end WINGS POY winder. And the system, introduced in 2014, is successfully operating at the sites of various Asian customers, manufacturing high-quality rPET yarns.

The challenge of chemical recycling

It is not least in view of the omnipresent climate debate that recycling textiles and processing recycled materials is increasingly moving into the center of public interest. To this end, the topic is progressively becoming an important issue for yarn producers as well. The Manmade Fibers segment has taken on this challenge and is already developing solutions that overcome the limitations of mechanical recycling to date and that can also process contaminated raw materials and mixed textiles. » (bey, che)

Digitalization in inventory management for spare parts

Customers benefit from

The production facilities are the capital behind our customers' success, now and in the future. Maintaining and improving the future-readiness of the plants and machines is the focus of Oerlikon Manmade Fibers' Customer Service. Manuel Haid, Head of Global Service Fulfillment, explains how customers benefit from digitalization in Customer Services.

Mr. Haid, you are responsible for material planning, purchasing and logistics in Customer Services. What are your key challenges?
The service business has some very unique challenges – demand is very erratic and, as a result, very difficult to predict. For example, if you are looking at the demand for spare parts, you can never anticipate when a machine at the customer site will break down or when customers plan their machine maintenance. However, our goal is to provide the very highest service levels to customers and therefore stock spare parts that are available whenever customer demand arises.

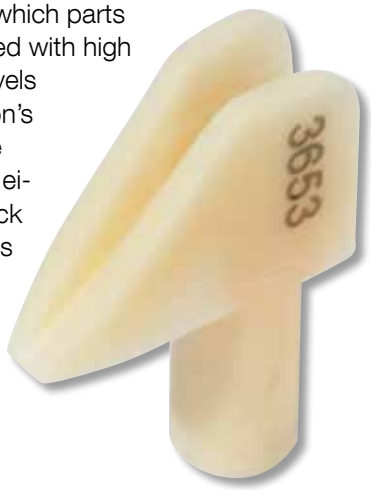
Furthermore, we need to look at our company's efficiency and the effective use of our assets and resources. This means we need to balance high service levels with the costs of inventory and the expense and effort of managing operations. Finally, many customers are operating extremely old machines. The supply of these old components is not only difficult, but prices are also constantly rising due to the decreasing volumes.

> "We need to balance high service levels with the costs of inventory and the expense and effort of managing operations."
> Manuel Haid, Head of Global Service Fulfillment

That does indeed sound like a difficult task. How are you approaching this challenge?
We introduced software that supports us in this regard. We are using advanced forecasting algorithms to predict future demand. These may include trends and patterns, but also sales forecasts and the development of our installed base in certain regions. The forecasts then form the basis for our stocking and supply strategies. In addition to this, the software helps us fulfil the demand in the most effective way. It proposes safety stock levels, ordering times and quantities. This balances the costs of supplying parts and inventory costs.

How do customers benefit from these efforts?
On one hand, we have substantially increased service levels with regards to the availability of parts. To date, we are providing an availability from stock of about 75%. This means that, of all parts ordered by customers, we have about 75% of all order lines available in full at our warehouse. For frequently-demanded parts, we are even achieving service levels in excess of 90%! On the other hand, we are now managing our purchasing operations and inventories much more effectively. As a result, we have reduced costs, which helps us offset price increases for older parts.

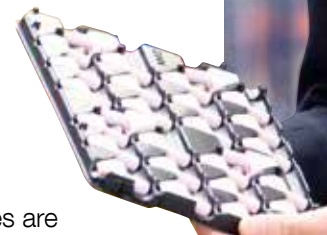
This actually sounds like you have been able to improve service for customers.
This is absolutely right and was one of our primary objectives. We want our customers to perceive us as the service supplier of choice – with high availability and short lead times. This will then also provide our customers with some tangible benefits. If customers are aware of which parts are stocked with high service levels by Oerlikon's Manmade Fibers segment, customers can either reduce their own safety stock or even eliminate their inventories entirely, as delivery times from our warehouses in Germany, the US, China and India are short. As a result, they can reduce their own net working capital impact.



Net working capital is a hot topic for our customers. What do our customers need to do to make the most out of the improvements made and reduce their net working capital?
Communication between our Service Sales and customers is very important. There has to be transparency about what Oerlikon Manmade Fibers is stocking for

high availability

the customers and what not. For those parts on stock customers can adjust the replenishment lead times to only the delivery time from our warehouse to the plant in their ERP system. This will automatically reduce the safety stock proposed by their ERP system.



Customers also need to know about those parts that we do not stock due to their infrequent demand and for which longer lead times are unavoidable. However, when openly discussing these, their lead times, criticality and stock-out costs, we can jointly develop solutions aimed at deciding whether and where to stock parts to ensure smooth operations.

These changes are probably not the only ones you have made. What are the next steps?

The introduction of the software at all Customer Services sites, in Germany, the US, China and India was only the first step on our journey towards achieving our vision of 'acting as a high-performance network for superior customer service'.

The next step is to let our customer services network 'communicate'. More precisely, we are exchanging information about forecasts and possible network demand between our regional warehouses and the central warehouses. This may result in the production of components even before regional warehouses order the components for restocking purposes. Furthermore, we will exchange information relating to lead time adjustments and stocking / not-stocking situations in real time between the central and regional warehouses.

The final step is about letting the network 'collaborate and act as one'. This is where we are really moving into nearly unchartered waters with regards to supply chain and inventory optimization. We are currently working with our software supplier on integrating multi-echelon inventory optimization (MEIO) concepts to further increase availability and inventory distribution. Finally, we are analyzing how to utilize digitalization and data analytics advancements, such as artificial intelligence (AI), to refine our demand forecasts.

Apparently, there is much more to come in the future. Mr. Haid, a final statement before we thank you for the interview?

I guess it becomes obvious that 'service fulfillment' is much more than just fulfilling orders. Service fulfillment and its supply chain functions are real value-added generators for customers. I am confident that our customers know that only considering the price in purchasing decisions is short-term thinking. When considering the total cost of ownership – influenced by short lead times, the availability of parts, supply risk, inventory holding costs, etc. – the benefits of the value-added the Oerlikon Manmade Fibers Customer Services network provides exceed those of low prices alone many times over. » (wa)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