



fibers and **f!laments**

the experts' magazine

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Plastics for a more sustainable future

page 6

TPU – an exciting raw material for manufacturing nonwovens

page 20

Dear Customers, dear Readers,

Manufacturing textiles is energy-intensive. Historically, around 25 percent of the costs for manufacturing textile fabrics were attributable to energy. Today, this percentage is likely to be considerably higher. That and falling market demand is putting the sector under considerable pressure. We are dealing – and will continue to deal – with this in precisely the same way we have in all other crises we have faced throughout our 100-year history. So, let us view the continuing global energy crises as a challenge that we can only master together.

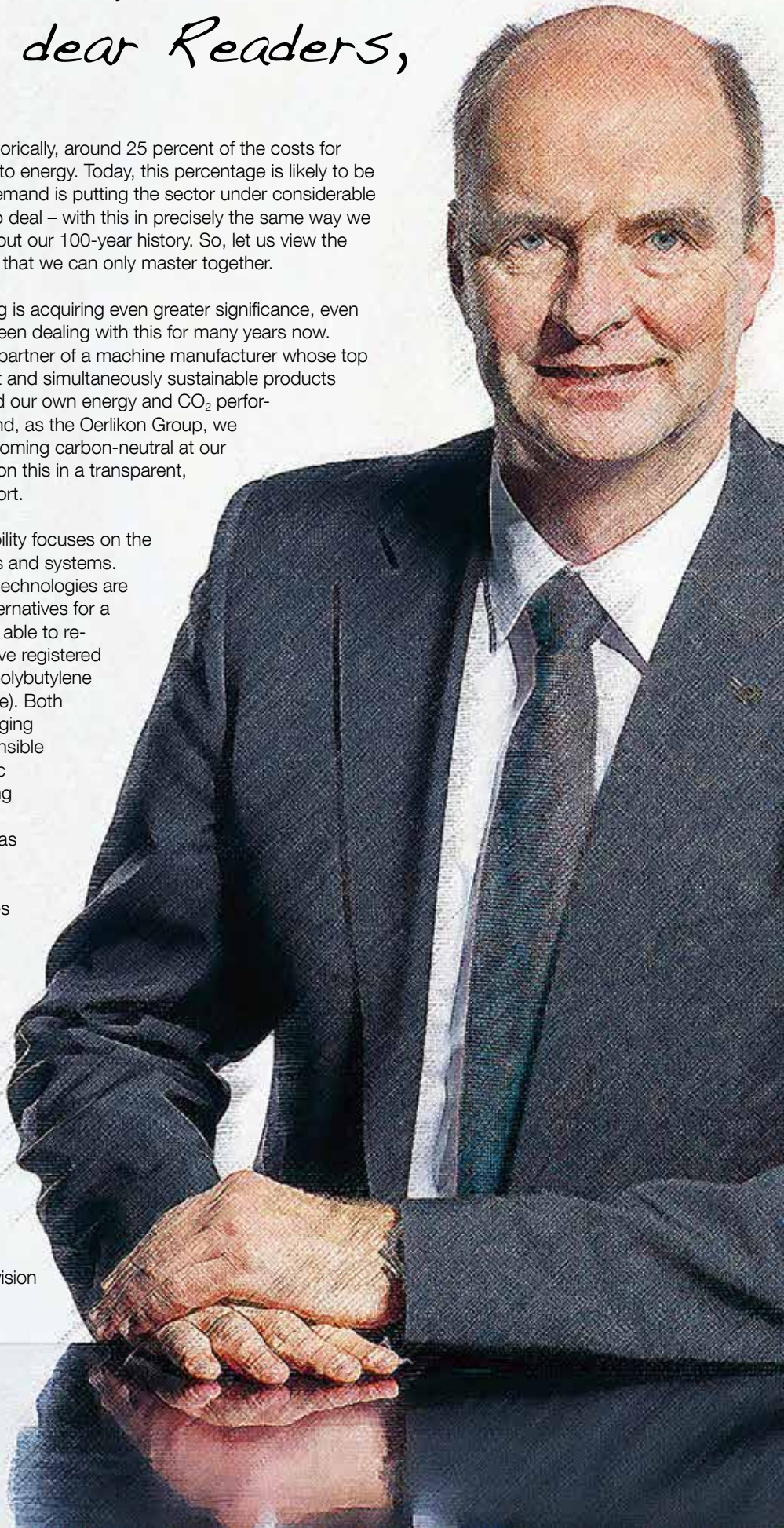
In this situation, sustainable thinking and acting is acquiring even greater significance, even greater urgency. However, you and we have been dealing with this for many years now. Otherwise, you would not be a customer and partner of a machine manufacturer whose top priority is to provide you with the most efficient and simultaneously sustainable products possible. And our own production facilities and our own energy and CO₂ performance are always under ecological scrutiny and, as the Oerlikon Group, we have set ourselves the ambitious target of becoming carbon-neutral at our own sites by the end of 2030. We also report on this in a transparent, open manner in our annual Oerlikon ESG Report.

Another, equally important aspect of sustainability focuses on the materials that you process using our machines and systems. Here, innovative biopolymers and processing technologies are increasingly offering new opportunities and alternatives for a better future. In some areas, these are already able to replace fossil-based plastics. To this end, we have registered considerable increases in demand for PBAT (polybutylene terephthalate) and PBS (polybutylene succinate). Both biodegradable polymers are suitable as packaging materials and hence as environmentally-responsible solutions to the mountains of single-use plastic waste. Our subsidiary Oerlikon Barmag Huitong Engineering (OBHE) is building polycondensation systems for these beacons of hope and has already assembled initial systems in China.

This issue of Fibers and Filaments also includes articles on textiles recycling and modernization, automation and digitalization solutions. You all contribute towards improving our sustainability performance – and are therefore examples of the fact that we closely support you, particularly with regards to such topics and issues.



Georg Stausberg
CEO Oerlikon Polymer Processing Solutions Division



fibers^{and} filaments

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BCF technology

Tangling 6,800-dtex yarns with the RoTac³

High-pile carpets and carpets for outdoor use are currently on trend, with demand for these high-margin yarns noticeably rising. The thick BCF yarns made from PP, PET and PA6 required can now be tangled using the RoTac³. In so-called plying, all three filaments are jointly fed through a tangling opening in the RoTac³ and then tangled. "BCF yarn manufacturers can now also use the RoTac³ for yarns of up to 6,800 dtex. They not only benefit from energy savings due to lower compressed air consumption and considerably more even tangling knots, manufacturers can also respond more flexibly to market requirements and hence expand their product portfolio", explains Arnd Luppold, BCF Sales Director, talking about the advantages of plying using the RoTac³.

Even at high production speeds, tangling knots can be set much more evenly with the RoTac³ than in the case of other conventional tangling units. Frequent tangling glitches are now a thing of the past. This ensures better yarn quality and has a positive impact on further processing. The result: the carpet has a visibly more even appearance. Furthermore, compressed air consumption is reduced by up to 50 percent, depending on yarn type.

The 3-in-1 plying package is optionally available for the BCF S+ and BCF S8 with RoTac³ systems and can also be retrofitted on request.

» (che)



Oerlikon Nonwoven wins FILTREX Innovation Award

At this year's FILTREX conference in Berlin, Oerlikon Nonwoven received the Innovation Award for its hycuTEC hydrocharging unit. Conference attendees were able to choose from four innovations previously nominated by EDANA and chose hycuTEC by a large majority. The FILTREX Innovation Award is presented every two years and is the only award that recognizes innovations from the filtration industry. » (bey)

Marines Lagemaat, Scientific and Technical Affairs Director at EDANA (right), presented the award to Ralph Berkemann (left) and Dr. Ingo Mählmann (center).

Neumünster

New high-tech Staple Fiber Technology Center

Extending to around 2,100 m², Oerlikon Neumag in Neumünster is home to one of the world's largest staple fiber technology centers. As of now, its state-of-the-art staple fiber technologies are also available for customer-specific trials.

The focus during the planning and the design of the Technology Center was on optimizing components and processes. Here, special attention was paid to ensuring the process and production parameters in the Technology Center system could be simply and reliably transferred to production systems. "We are not only able to run all standard products available on the market at our Technology Center, it also offers us the perfect prerequisites for the development of new processes and products", explains Tilman Reutter, Head of Staple Fiber Process Technology. Here, the fiber processing

line is modular in design. All components can be combined with each other as required. And comprehensive set-up options supply detailed findings for the respective process for various fiber products.

The Technology Center is also equipped with two spinning positions for mono- and bicomponent processes. The same round spin packs are used for both processes, characterized by excellent fiber quality and properties and meanwhile very successfully deployed in all Oerlikon Neumag production systems. Furthermore, the spinning plant is complemented by automation solutions such as spin pack scraper robots, for example. "In future, we will be able to focus more strongly on the special requirements of our customers with the configuration of our product lines", comments Tilman Reutter. » (che)



Head of POY Process Technology Stephan Faulstich spoke on microfiber production in the polyamide 6 POY process with EvoQuench at this year's Global Fiber Congress in Dornbirn.

Global Fiber Congress

Dornbirn

Sustainability and innovation

Fiber innovations, recycling, circular economy - these were the main topics of the 61st Global Fiber Congress in Dornbirn, Austria. From September 14 to 16, more than 450 stakeholders from around 200 research institutes, industrial companies and start-ups met to exchange innovative ideas and network.

Oerlikon's Polymer Processing Solutions Division was represented with a presentation on microfiber production in the PA6 POY process. Here, speaker Stephan Faulstich presented the possibilities of the EvoQuench quenching unit, which has already been proven for years in the polyester process. With this radial quenching unit, the economical production of polyamide microfibers in excellent quality is a reality and thus opens up the opportunity to develop new yarn products. » (bey)

Innovative bioplastics and processing technologies are creating new opportunities and a

Plastics for sustainable

Polymers are the primary players among the materials for the fiber and packaging industry. The most powerful driver for their developments and markets has meanwhile become omnipresent: sustainability. Although bioplastics are currently unable to replace fossil-based polymers across the board, some of the alternative materials and technologies do however already offer interesting opportunities and are enjoying growing interest.

a more sustainable future

According to figures supplied by the German statistics portal Statista for 2020, bio-based and biodegradable polymers, or bioplastics for short, are still light-weights within the approx. 367-million-ton p.a. plastics market. In 2021, they accounted for just over 2.4 million tons according to European Bioplastics. If we are to believe the market researchers, the production capacities for these products are however expected to rise by an average of 24 percent per annum and reach a total of almost 7.6 million tons in 2026. This predominantly reflects the hunger of the packaging industry, which consumes the lion's share. In terms of the entire fiber industry, the use of biopolymers totaled just 0.24 million tons – of the total of around 109 million tons within the global fiber market.

However, there is a feeling that market demand for bio-products in the textile and packaging industries could be considerably higher. Environmental awareness among manufacturers and consumers is rising continually with sustainability already a major trend. Bio-based polymers, in particular, have a small carbon footprint and do not require fossil resources such as crude oil, which are detrimental to the environment when processed and becoming increasingly scarce and

expensive. Although often produced using plant biomass sourced from maize and sugar cane, for example, they are targeted by critics because the plants are no longer used as foodstuffs. There are, however, ever more counterarguments. Furthermore, the political support for bioplastics is growing worldwide. For example, biodegradable plastics offer potential solutions for the global problems of plastic waste and microplastics. And with greater production volumes and innovative technologies, it may be possible to reduce the still high prices for manufacturing bioplastics and make them more competitive.

Biodegradable plastics offer potential solutions for the global problems of plastic waste and microplastics.

PBAT/PBS: beacon of hope for the use of PE and PP

The thermoplastic, biodegradable plastic PBAT (polybutylene adipate terephthalate), for example, offers growing potential. It comes with properties comparable to those of PET and PBT, has good elasticity, a high elongation at break, heat resistance and impact strength and is predominantly used as a packaging film material. "We are observing a considerable increase in demand for PBAT", states Michael Mächtigt, Product Manager at Oerlikon Manmade Fibers Solutions. To this end, market researchers at Wood Mackenzie anticipate a massive expansion of the production capacities for PBAT and PBS (polybutylene succinate) to a total of 4 million tons in China by 2030. The decisive driver for this is the ecological direction that China is taking, as the country already produces significant volumes of biodegradable plastics with which it hopes to replace single-use plastics made from PE and PP. But biodegradable polymers such as PBAT and PBS are also on the ascent in Europe, North and South America. The reasons for this development are political measures and legal regulations – also including the



ban on non-biodegradable single-use plastics such as those in single-use packaging, for example.

If the product volumes increase as predicted, prices could fall, demand could further accelerate and PBAT could replace PE and PP products. Oerlikon is following this development with interest, as its subsidiary Oerlikon Barmag Huitong Engineering builds and distributes polycondensation systems for PBS and PBAT. 2021 saw the commissioning of a system with a daily production capacity of 100 tons at Chinese customer Yingkou Kanghui Petrochemical Co. Ltd., which uses it to manufacture high-viscosity chips for biodegradable films. The company has meanwhile ordered a comparable follow-on project with a considerably greater system capacity from OBHE. Further inquiries from across the globe demonstrate the huge interest in this polymer, for which Oerlikon supplies manufacturing technology throughout the world (see also p. 18).

PLA: wide-ranging application potential

One polymer with even broader application potential in terms of its properties is PLA. This bioplastic is produced from lactic acid and is also known as polylactic acid. Its natural raw material is derived from sugar or starch. PLA is completely bio-based, simultaneously biodegradable and has been manufactured on an industrial scale for quite some time now. This material is used in the packaging industry, as spunbond rolled goods, in filling fibers and in apparel worn directly on

the skin. PLA can absorb and release more water than PET. It therefore controls the moisture balance better and is also antimicrobial. Leading PLA producers such as NatureWorks and Total Corbion, for example, are manufacturing in the US, the Netherlands, Germany and China. This biopolymer offers potential in many areas, including 3D printing and even in medicine. Experts therefore anticipate rapidly growing production capacities.

PA 5.6: also overtaking polyamide classics

PA 5.6 is a further bio-based material offering potential for the textile industry. This biopolyamide is in no way inferior to such classics as PA 6.6 and PA 6. PA 5.6 fibers can be spun with ease, have good mechanical properties as well as a high degree of textile wear comfort. They are even more heat-resistant than their fossil counterparts and can absorb more moisture. They can be used to manufacture sports apparel, underwear and even carpets. Oerlikon is collaborating, for example, with Cathay Industrial Biotech and Kaili in China in order to create optimum production processes for manufacturing fibers with bioplastics such as PA 5.6.

PTT: already successful within the market

The partially bio-based, non-biodegradable polytrimethylene terephthalic (PTT) also promises growth potential. PTT can be used for

Bio-plastics are often produced using plant biomass sourced from maize and sugar cane, for example.



textiles – with successful products such as Sorona from CovationBio already available. This polymer fiber comprises 37 percent annually re-growing plant-based raw materials and offers the properties of polyester (PET) and nylon. Sorona is very soft, hard-wearing and highly stain-resistant. Its applications include carpets, apparel and automobile textiles, among others. According to CovationBio, their manufacture requires 30 percent less energy and emits 63 percent fewer greenhouses gases than the production of polyamide 6. Furthermore, it is understood that Sorona polymer fabrics can be added to recycling streams made from 100 percent polyester without any compatibility issues.

PEF: a polymer of the future

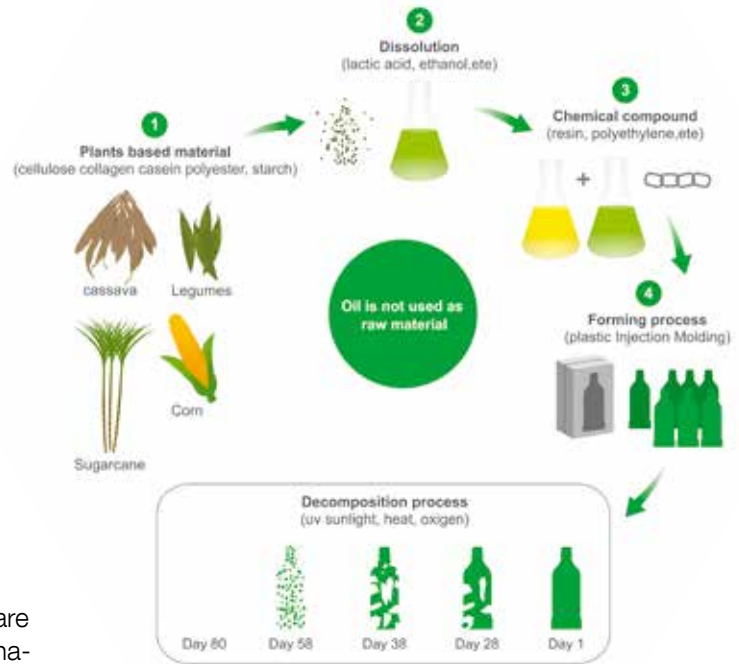
Polyethylene 2,5 furandicarboxylate, also known as PEF, is considered a polymer of the future with excellent properties and numerous applications. Its chemical structure is very similar to that of PET. To this end, PEF is – due to its outstanding gas barrier properties – well-suited for manufacturing bottles and food packaging. PEF has never been manufactured on a large scale, as its key monomer FDCA has to date not be produced in commercial quantities. Businesses such as the Dutch biopolymer specialist Avantium are meanwhile working on this. If successful, this will pave the way

for PEF as a substitute for crude oil-based plastics in the manufacture of (industrial) textiles and high-performance applications. Initial yarn results were presented by Avantium and filament yarn manufacturer Antex at this year's Heimtextil (International Trade Fair for Home and Contract Textiles) in Frankfurt.

Fluff pulp: more sustainable products thanks to the Phantom technology

There are also sustainable innovations for the nonwovens market: here, Oerlikon is deploying its cutting-edge Phantom technology to make products with fluff pulp even more environmentally-friendly. In a first step, fluff pulp is produced by shredding cellulose fibers from long-fibrous soft woods using hammer mills. It is used as an absorbent material in hygiene products such as diapers, sanitary towels and tampons. Plastic is added for adhesion. To date, this polymer content has always been considerably greater than 10 percent. As a result of processing using the Phantom





technology, the polymer content can be reduced to around 5 percent – and hence utilize more sustainable pulp.

Every innovation is a small step

The examples mentioned in this article show that there are ever more sustainable alternatives to manmade fibers produced using fossil raw materials. But can these really solve the major challenges relating to plastic waste and climate change? Currently, the answer has to be: every innovation is a small step. Every product must be viewed individually in terms of its environmental impact. For instance, a specific biodegradable polymer decomposes faster in certain environments and more slowly in others. If, for example, it reaches the ocean, studies have revealed that in many cases it makes very little difference compared to conventional plastic.

The most prudent approach would be bio-based polymers, of course, which are easy to recycle and therefore do not pollute the environment as waste. This is working in some cases. However, textile recycling has by no means reached the stage where it could be considered a real circular economy. According to the most recent studies, just one percent of clothing manufactured in 2015 was recycled into new fibers for the apparel industry. Conversely, bio-based materials are – contrary to what some say – not manufactured at the expense of the food sector. According to European Bioplastics, just 0.02 percent of globally-available arable land was used for cultivating biomass for the

production of bioplastics in 2018. To ensure that this remains so, there are increasing efforts to use organic agricultural waste for this. For example, attempts are being undertaken to generate cellulose using waste from food crops, food, algae and non-food crops. Beyond biopolymers, the demand for ecologically-sustainable products is also catered to with activities focusing on viscose. These include viscose fibers produced by the Lenzing Group, which throughout their entire lifecycle comply with high environmental standards and which can be identified – and hence tracked and traced – from the raw materials production phase all the way through to their manufacture, distribution and disposal.

Overall, bio-based and biodegradable polymers are helping us on our journey to greater sustainability. Just how supportive they are depends on their production volumes and the price development. Here, there are some important helpers: because how manufacturing costs or the utilization of environmentally-harmful materials can be reduced is also a perennial topic for such technology companies as Oerlikon.

» (tho)

Institut für Textiltechnik of RWTH Aachen University

Synthetic polyester waste textiles - the material source of tomorrow?

The rising demand for recycled materials, new legislation and increasing volumes of waste offer high innovation potential for the recycling industry. However, only few textile recycling processes are used in industrial practice and the majority of textiles are still incinerated or landfilled at the end of their life. Due to their high material diversity, textiles are a challenging material to recycle. The ecological and economical sustainability for different mechanical and chemical recycling processes strongly depends on the purity of the input stream. This article focuses on challenges and opportunities for recycling textile polyester waste.

In many countries, clothing and home textiles are collected at the end of their use phase. Separate collection of used textiles from other waste is necessary because the textiles need to be as clean and dry as possible for reuse or recycling. In Germany, the majority of used clothing and home

textiles is collected in containers that are installed by commercial, non-profit and public actors. In sorting hubs, the collected clothing and home textiles are sorted according to their reuse value, optical characteristics, sizes and textile type. Sorting is carried out manually. Even though it is possible to separate

ester



Collection points for old clothes are a common sight in Germany.



textiles, for example by near infrared spectroscopy (NIR), into different material fractions, automated sorting processes are not yet carried out on a large scale due to high investment costs and a current lack of customers for sorted fractions.

Synthetic clothing and technical textiles often have a high diversity of materials. With the help of such material mixtures, products are functionalized and/or the properties

of, for example, different fiber materials are combined. The functionalization can take place at any step of the textile production: from melt spinning when particles or additives are introduced into the polymer, the blending of fibers into the yarn all the way through to the coating of the textile surface. The variety of materials in the final product can also be increased during manufacture by sewing together different layers or adding haberdashery.

| Process type | Operating principle | Desired input material | PET product | |
|------------------|--|---|---|---|
| Mechanical | Material Tearing | Tearing of the textiles, partial dissolution down to the individual fibre | Textilies made of natural and/or syntetic fibres | Torn fibres |
| | Thermomechanical regranulation | Fibres/textiles are melted down and regranulated | Synthetic, very material-homogeneous textiles | Regranulate |
| Physico-chemical | Solvent based separation | Desired polymer is separated by means of dissolution and precipitation | Mixed material of synthetic/natural fibres, depending on solvent | Regranulate |
| Chemical | Depolymerisation (back-to-oligomer: glycolysis) | Polymers are broken down into short polymer chains (oligomers) | (Shredded) textiles with a polyester content of >90 %, maximum impurity content depending on the process | Oligomers, e.g. Bis(2-hydroxyethyl) terephthalate, short: BHET |
| | Depolymerisation (back-to-monomer: hydrolysis, methanolysis) | Polymers are broken down into their basic components (monomers) | (Shredded) textiles with a polyester content of >70-80 %, maximum impurity content depending on the process | Monomers, e.g. Monoethylene glycol, short: MEG, and Terephthalic acid, short: PTA |

Overview of existing recycling processes for PET textiles

Material mixes can pose challenges by making

recycling unecological and uneconomical and/or technically virtually impossible. Depending on the material composition, textile waste streams have to be pre-processed to increase the share of the desired material in the material flow as well as increase the bulk density for transportation. Depending on their material composition, the textiles can then be allocated to an appropriate recycling process.

Recycling technologies for synthetic textiles

Today, used textiles that cannot be reused end up in waste incineration and landfills or are cut and used further as cleaning wipes. Furthermore, used textiles are mechanically recycled into insulation or filling materials, which are used in other sectors of industry. Although this type of recycling has ecological and economic advantages, this does not solve the final disposal task, it merely postpones it. With a share of 78% of the global manmade fiber market in 2020, polyester fibers are the most produced fiber type¹. Various chemical recycling technologies have been developed for textile polyester waste, namely hydrolysis, methanolysis and glycolysis. Table 1 shows various textile recycling processes based on the example of polyester (PET) textiles. Thermochemical processes such as pyrolysis and thermal energy recovery, which are both further options for textile utilization, are excluded

The ecological and economical sustainability for different mechanical and chemical recycling processes strongly depends on the purity of the input stream.

from this overview, as it is difficult to include the products manufactured in this way in the textile PET loop.

Mechanical recycling processes are already used for post-industrial and post-consumer waste due to their low input material requirements, whereas thermomechanical recycling processes are almost only used for post-industrial textile waste due to their high input material requirements. Thermomechanical

recycling is also used to recycle PET bottle flakes into fibers. Various chemical recycling technologies for textiles and plastics are being developed for textile waste by start-ups, companies and research organizations. Although chemical recycling

technologies show ecological and economic potential, the processes are often uneconomical due to insufficient throughputs and misdirected, undefined waste flows. The high-quality recovery of raw materials from textile waste will be a major task for the textile industry in the coming years, which requires the involvement of actors along the entire value chain – from sorters to the textiles designers and producers. » (amb)

Polymer Recycling Industry Research Group (IRG)

The Polymer Recycling IRG is a consortium of different companies along the textile value chain as well as the Institut für Textiltechnik of RWTH Aachen University (ITA). In addition to Oerlikon, the consortium comprises ten companies interested in the collection, sorting and recycling of textile waste – from component and plant manufacturers to material, fiber, textile and end-product manufacturers.

The aim of the consortium is to systematically address technological, economic and strategic issues along the entire value chain of the textile recycling economy. The long-term goal is the exploration of processes to gain high-purity recycling fractions of textile waste made of mixed textile waste by analyzing and researching different methods. The focus is on used textiles containing high fractions of PET and PA. Beside other 'mini projects', trial experiments have taken place to deconstruct textile materials to remove, for example, zippers and buttons. Furthermore, the bulk density was increased in these trials, which makes the waste easier to transport and feed into a recycling process. Interested companies from industry and research will be able subsequently join the project consortium.

Synthetic staple fiber production with Oerlikon Neumag technology

The right solution for every need

Synthetic fibers and yarns have dominated the market for years compared to natural fibers and yarns.

In 2020, their market share was around 75%. And studies indicate that there is no trend reversal in sight in the foreseeable future. While polyester leads in raw materials and apparel leads in applications, many other applications and polymers still play a major role. Let's take a look at the staple fiber plants supplied by Oerlikon Neumag between 2010 and 2020:

1,482

spinning positions sold between 2010 – 2020 resulting in

8,069

tons/day capacities

Application

| | |
|--|--|
| Cotton type | Textile applications; combined with cotton or as a substitute |
| Wool type | Textile applications; combined with wool or as a substitute |
| Nonwoven | Mainly spunlace nonwoven, e.g. wipes |
| PET hollow | Self-crimping fill fiber |
| R-PET | Various |
| PP | Automotive, carpet backing |
| PP high tenacity | Reinforcement |
| PP geotextile | Geotextile nonwoven |
| Bico PP/PE, PET/PE & PET/PP | Hygiene applications |
| PET/PET hollow & hollow 3D | Self-crimping fiber, more voluminous than mono PET hollow fibers |
| PA6 & PA6.6 | Flame resistant, durable fibers for functional and work wear |

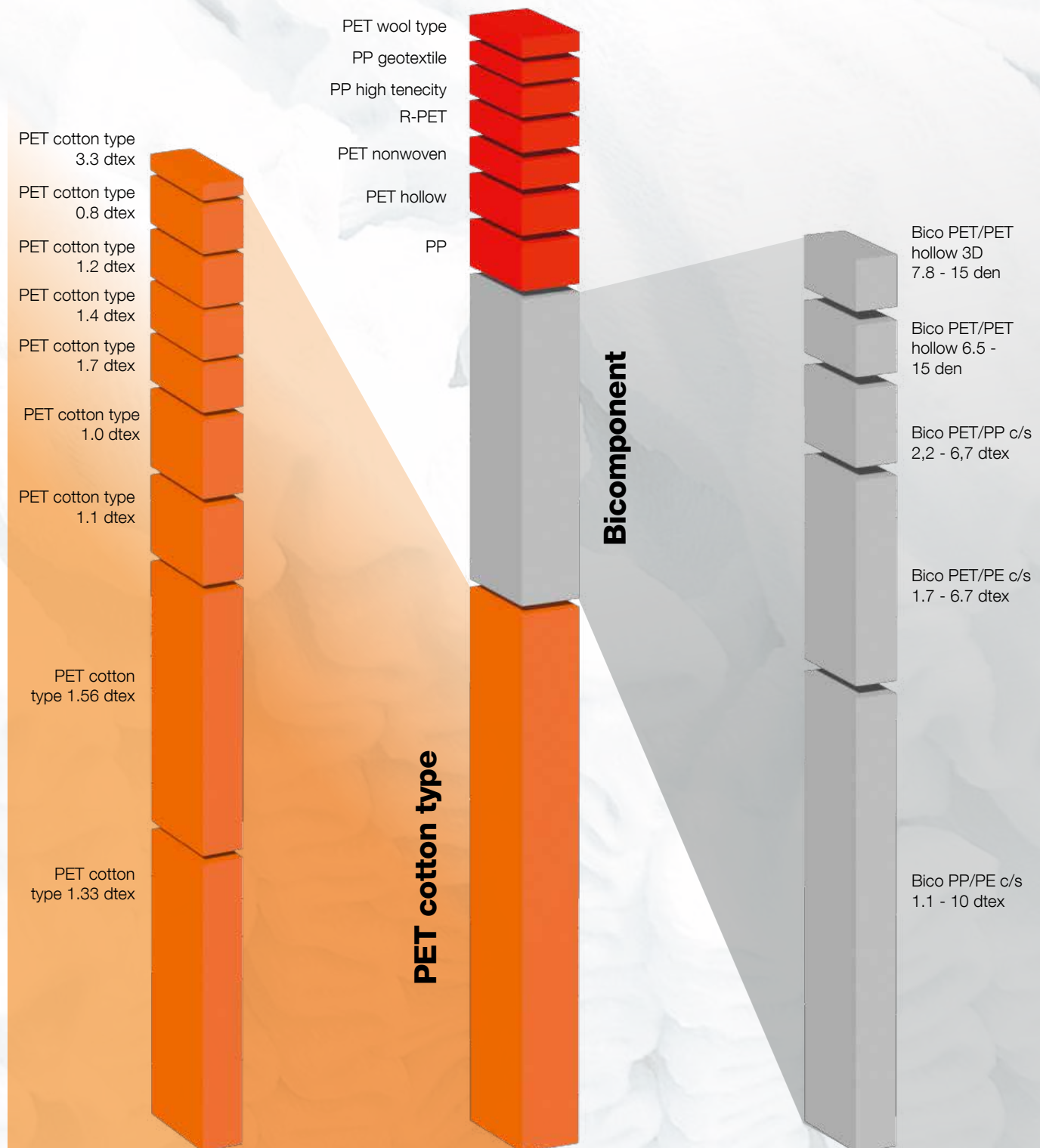
PET cotton type

is the preferred process

Bicomponent fiber types

- Core/sheath
- Side-by-side
- Side-by-side hollow
- Orange type
- Island-in-the-sea

Staple fiber plants supplied by Oerlikon Neumag by fiber type



Asia, North and South America, the European Union – in ever more regions of the world, concern for the environment and political resolve are leading to more stringent regulations aimed at getting the problem of plastic waste under control. According to the 2019 United Nations of Environment Programme (UNEP), 187 countries are already restricting trade with plastic waste (source: Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal). 27 countries have banned the single use of non-bio-

degradable plastics, also known as single-use plastics (SUP). There are, however, exceptions for biodegradable plastics.

This kind of ecological trend is encouraging China, for example, to considerably increase its annual production of biodegradable plastics from an estimated 1.2 million tons at the end of 2022. This driver is designed to massively expand production capacities in China to 4 million tons, with the focus above all on alternative plastics such as PBS and PBAT. Due to their excellent physical

The OBHE polycondensation system also manufactures biodegradable plastics

The winner is
**sus-
tain-
ability**





and degradable properties, these aliphatic or aliphatic-aromatic polyesters have become the current development focus of biodegradable plastics. “We are observing a considerable increase in demand for PBAT”, states Michael Mächtig, Product Manager at Oerlikon Manmade Fibers Solutions. With its properties, the thermoplastic copolymer is able to replace conventional PE and PP and is suitable for food packaging and agricultural films, above all. And PBS, the basis for PBAT development, draws on these applications as well.

OBHE: a technology for manufacturing PBS and PBAT

Both biopolymers can meanwhile be extremely flexibly manufactured using polycondensation systems from Oerlikon Barmag Huitong Engineering. The Chinese joint venture focuses in particular on the polycondensation of PET bottles, PET films/BOPET, PBS/PBAT, PBT and PTT, it combines the upstream and downstream activities of partners Oerlikon and Yangzhou Huitong Chemical Engineering Technique and sells its systems, solutions and engineering throughout the world. January 2021 saw the commissioning of the first OBHE for manufacturing PBAT at Yingkou Kanghui Petrochemical Co. Ltd. in Dalian in the Chinese Liaoning Province. It has a production capacity of 100 tons per day, with high-viscosity chips for biodegradable films being produced.

Technologically, the OBHE polycondensation system stands out with its stable reaction and simple operation. It has a low raw material and operating resource consumption, generates little waste and enables flexible production with fast product change-over. For this, OBHE supplied a technology package from a single source – a polycondensation system, including all utilities. The supplier promises high quality both in terms of the components and the engineering. As a result of swift implementation, customers profit from the company’s global Service network and its deployment of experienced members of staff. The system at Yingkou Kanghui Petrochemical, for example, commenced production less than 14 months after contract signing. By expanding its portfolio to include the manufacture of PBS products, the Chinese business is positioning itself as a pioneer of biopolymer production.

Such producers are currently benefiting from the increase in demand for biodegradable plastics in a market with still scarce offerings of products that are expensive compared to PE and PP. Although the announced expansion of capacities for PBAT for example could put profit margins under pressure, if this were to lower prices to an acceptable level, it could make substituting PE and PP products for PBAT easier and further boost growth in demand. “With this, the winner is sustainability – something that Oerlikon as a technology partner loves to support”, summarizes Michael Mächtig. There are currently also other projects: Yingkou Kanghui has ordered a further PBAT production system from OBHE. In addition, the company is processing enquiries for PBAT and PBS systems from Asia and South America. » (tho)

TPU

Industry, agriculture, textiles, outdoor equipment – the applications for thermoplastic polyurethane elastomer-based (TPU) nonwovens are extremely diverse. Each of the numerous TPU elastomer types has very specific properties in terms of elongation, tenacity, wear abrasion resistance and hardness as well as varying resistances to oils, lubricants, oxygen and ozone. TPU can be used to manufacture nonwovens that have high elastic flexibility and durability with simultaneously astonishing softness and a pleasant handle.



One of the leading manufacturers of high-tech polymer materials, of which thermoplastic polyurethane is one, is Covestro, a company headquartered in Leverkusen, Germany. In comprehensive research work conducted in collaboration with Covestro, Oerlikon Nonwoven has acquired expertise covering the properties

and processing of various types of TPU. Because manufacturing nonwovens from TPU is not always without its problems. The various types of TPU elastomer do not always react in the same way in the spinning process.

TPU elastomers respond very sensitively to temperature fluctuations. As even the tiniest tempera-



Consumer demand for sustainable plastics is also increasing in the nonwovens segment.

an exciting raw material for manufacturing nonwovens

ture changes have a huge impact on the viscosity, a consistently even temperature distribution across the entire width of the spinning beam is absolutely essential. The special CFD-based (Computational Fluid Dynamics) spinning beam constructions supplied by Oerlikon Nonwoven Meltblown and the Spunbond systems ensure consistent melt dwell times and are perfectly suited for processing TPU elastomers. The distinctive melt pipes prevent depositing of the, in part, extremely sticky TPU melt.

TPU also bio-based for greater sustainability

Consumer demand for sustainable plastics is also increasing in the nonwovens segment. Covestro is working on making TPU sustainable by using in part bio-based plastic

content, recycled materials and ISCC-certified mass balance resources. The result: the Desmopan® CQ range. Some types of TPU in the Desmopan® CQ range contain ingredients that are produced up to 60% from biomass. And, compared to fossil-based TPU, total CO₂ emissions can be reduced by more than 20% without any concessions in terms of quality and performance. Other types comprise up to 100% recycled material, which reduce the consumption of fossil resources and the amount of plastic waste.

With Covestro Desmopan® and Desmopan® CQ providing the unique elastic and tactile properties of TPU both for meltblown and the spunbond production, they are extending the application spectrum of nonwovens and simultaneously

enabling nonwoven manufacturers to improve their sustainability performance. To this end, nonwovens made from Desmopan® and Desmopan® CQ can, for example, be utilized as support layers for synthetic TPU-based leather or vegan leather. TPU nonwovens let air in and moisture escape and are therefore excellently suited for using in items such as jacket linings. Or as TPU geotextile sandbags – which are more durable than those manufactured using woven yarns. And Oerlikon Nonwoven supplies the appropriate spinning technology for this. » (che)

Wellknown manufactures WINGS-quality POY yarn –
with upgraded ACW winders

ACW on powerful WINGS

How can an upgrade increase POY yarn manufacturing process quality while simultaneously cutting energy consumption, waste, time and personnel? Wellknown Polyesters Ltd. now has the answer to this question: one of India's largest filament yarn manufacturers used an Oerlikon Barmag upgrade to modify 60 double-positions with 120 ACW winders. These received long-awaited upgrade: ACW WINGS drawing fields.



Good things can always be made better. When the Advanced Craft Winder (ACW) was launched in 1998, it was truly convincing with its sophisticated modifications for initial string-up and yarn transfer. WINGS replaced it as the new benchmark in 2007. However, because Oerlikon Barmag technology frequently lasts for decades, many ACW and WINGS winders are being

operated practically side-by-side in some places. A comparison clearly showed the development – and led to customers asking Oerlikon Manmade Fibers Solutions: please build WINGS drawing fields over our ACW winders!

Ralf-Peter Urmersbach, Senior Product Manager Customer Services at Oerlikon Manmade Fibers Solutions, thought that it

should be possible. And came up with the idea for a meanwhile patented design solution in 2018, with which the customer request could be fulfilled. Its logical name: ACW WINGS drawing field. Combined with ACW modifications, this plug-in unit now offers ACW customers access to the benefits of the POY WINGS technology: lower operating costs thanks to the

around 16,000 winders could take advantage of this system upgrade. A renowned Indian client is Well-known Polyesters Ltd., one of the top five manufacturers of polyester filament yarn on the Indian sub-continent. In 2021, it had 60 POY positions, each with two ACW winders, upgraded line-by-line at its production site. Initially two 12-position machines, then two 18-position machines. The difference the ACW WINGS drawing fields make is immediately obvious: before, a spinning position with a ACW winder was more than four meters high, with the drawing field and godets only accessible on a second level via stairs. Now the entire design is less than 2 meters high, with both operation and string-up taking place on the same level.



ACW WINGS drawing fields offer ACW customers access to the benefits of the POY WINGS technology.

compact design, as well as simple and time-saving operation. "In addition, the conversion to an ACW WINGS drawing field brings higher yarn quality due to the extremely gentle yarn path and thus optimizes downstream processing," specifies Ralf-Peter Urmersbach.

The solution has been used in China since 2019: with it, the polyester yarn manufacturer Zhejiang Rongsheng achieved excellent yarn values (AA grade) with its POY ACW winders just 4 days following commissioning, upgrading a total of 184 positions. And other ACW customers in Asia, Europe, North and South America have commissioned this kind of conversion. Worldwide,

The benefits offered by the ACW WINGS drawing fields are already convincing. Where once two operators were required, one for each of the two levels, only one is now needed. The one operator can carry out string-up more easily and more ergonomically than to date – more than twice as fast – without the need for repeated string-up attempts. Needless to say, this also

Modifies an ACW winder into WINGS: the ACW WINGS drawing field modification kit comes as a plug-in unit.





Superior yarn quality is the most important advance when converting to an ACW WINGS drawing field.

shortens the downtimes until the machine commences production again. This not only saves time, but also reduces waste and resources, as shorter string-ups result in fewer produced filaments being suctioned off. And talking of suction: the air intake and suction unit, or the compressed air supply, is now also much more resource-friendly and efficient, with the energy consumption and the running costs for this decreasing substantially. The benefits also include HSE (Health, Safety, Environment) considerations: the compact, closed design – in part with encapsulations such as the tangling units – makes the process much cleaner. Ambient air and the working environment remain free of oily spray-off, hence improving safety for operating staff.

The most important advance though is undoubtedly the superior, and simultaneously more even, yarn quality. Particularly with regards to its dyeing properties, the yarn is considerably superior to products manufactured using conventional winder technology. Responsible for this increase in quality are the installed, extremely low-friction premium ceramic components as well as further improvements ensuring an optimum yarn path. Special (double-eye) yarn break sensors cut phantom yarn breaks and subsequent string-up processes to zero. And optimizations in the case of package build and

take-off performance increase the string-up and transfer reliability and the full-package rate. Their ratio has increased considerably, as has the ratio of AA-grade packages. This, in turn, has a significant impact on the downstream process.

“The superior yarn quality and increased production efficiency will undoubtedly generate additional market potential for us, making us even more competitive. This is also underlined by the responses from our clients”, comments Anil Gupta, CEO of Wellknown, talking about the successful upgrade to ACW WINGS, which was accomplished in the shortest possible time. It took only three weeks from the installation kick-off in June 2021 until the first yarns were being produced. The machines started operating very well, immediately performing superlatively. The conversion package is also particularly interesting as a result of its fast ROI (return-on-investment) of less than one year. ACW WINGS is available for all ACW-type POY/HOY winders for polyester, polyamide 6 and polyamide 6.6. And it can also be used to wind rPET. And, who knows – maybe the new-and-improved good will soon become even better? Ralf-Peter Urmersbach: “We are working on developing the next innovation stage for existing ACW technology for POY/HOY in the 2,500 – 6,300m/min. range.” » (tho)

Upgrading to ACW WINGS results in...

greater yarn quality:

- 20% less friction, hence far superior yarn quality
- Premium ceramic parts for less friction
- New, optimized yarn guide rollers for simple take-up
- Superlative yarn path as a result of extended interim floor channels
- Superlative yarn handling performance (no yarn angle of more than 7°)
- Double-eye yarn break sensors minimize phantom yarn breaks
- Considerably more stable winding process
- Superior package build and take-off performance
- Greater string-up and transfer reliability and hence a superior full package rate

lower operating costs:

- Considerable energy savings for electrics and compressed air
- 50% less staff (1 instead of 2 operators)
- 2.6 times faster string-up
- Considerably less waste
- Clean, environmentally-compatible process, greater occupational safety
- New EFI inverters and electrics for new godets (D85 mm x L55 mm)

Sasa Polyester invests in fully-automatic staple fiber and filament y

Intelligent

Smartwool



Yarn manufacturing plant



The vision: to become the world's largest polyester polymer manufacturer outside of China and India and – as such – become one of the world market's leading players.

How can this be achieved? Well, General Manager & Executive Board Member Dr M. Kemal Öz has a very clear idea. Here, he is being supported by Oerlikon Manmade Fibers Solutions. Together with Sasa Polyester San. A.S., the Swiss technology group's business unit designed an intelligent yarn factory of unprecedented complexity. Following several years of planning and engineering work, the plant of the future is being built across an area of 140,000 m² in the Turkish city of Adana.

Fully-automatic – from the melt to the finished yarn package

And the project is not only complex with regards to the process technology: the polycondensation system is connected to an Oerlikon Neumag staple fiber production system with a capacity of 1,000 tons per day. Furthermore, 16 POY spinning machines equipped with the WINGS concept produce around 1,000 tons of yarn a day, which are then textured using automatic eAFK machines.

Of the up to 80,000 POY packages manufactured here each day, around half are forwarded to the in-house texturing facility. The rest is packaged and transferred to the warehouse. To get a feel for the scale: every day, around 1,100 pallets of POY and almost as many pallets of DTY are packaged.





And the staple fiber bales are also automatically transferred from the baler to the warehouse. By means of an autonomously-operating, rail-bound shuttle, the bales are collected from the baler and transferred to the transport line, along which they are conveyed to the adjacent warehouse. In response to specific orders, the automatic bale warehouse is able to transfer the requisite number of bales to the 5 truck ramps at any time.

Just don't touch!

The no-touch principle is consistently adhered to as a result of the systematic supply and packaging technology. Concretely, this means that all manufacturing and quality assurance steps are closely interlinked. Seamlessly, right up to the finished yarn package ultimately arriving at the state-of-the-art company-internal warehouse. Unique features include the fully-automatic transport and warehousing of the triple-stacked staple fiber bales and the POY/DTY concept's extremely high degree of automation.

"The special challenge of this project lies, above all, in the sheer scale of the project and the associated engineering work and delivery scope", sums up Gunter Höfer, who – as General Project Manager – is responsible for the Industrie 4.0 factory's automation. "Three Project Managers were required to coordinate all the works. The individual work steps have to be closely aligned, otherwise the workflow can be compromised."

So, what makes this factory so intelligent? Marcel Bornheim, Head of Oerlikon Barmag's Automation unit, is able to answer this: "This concept allows us complete tracking and tracing of the product workflow. Above all, this helps yarn manufacturers to identify and alleviate potential quality issues early on and hence improve production considerably." A decisive factor in the case of systems of this scale and, above all, for yarn manufacturers who are at the top of their game.

A view also shared by Dr M. Kemal Öz, which is why he chose to go with the total solutions provider from Germany: "We have a long-standing and trust-based partnership with Oerlikon Manmade Fibers Solutions. I could never have imagined turning such a challenging, complex project into a reality with any other provider. Receiving everything from a single source through a competent partner – that we have always known as working in a solutions-oriented manner for the benefit of the customer – was ultimately the decisive argument in favor of purchasing." » (bey)



Fully-automatic from melt to warehouse: the smart factory concept allows the complete tracking and tracing of the product workflow.



Interested in how our fully-automatic factory concept works?

Scan me



www.oerlikon.com/polymer-processing/en/solutions-technologies/automation-solutions/

Stay connected – with digital services

Digitalization makes everyone a winner: BCF yarn manufacturers can considerably reduce downtimes, optimize their machine performance and hence structure their production process, quality and costs better. This is all made possible by the new service products, including the Secure Remote Service Contract and the Access & Analysis package for Oerlikon Neumag BCF systems.

Secure Remote Service Contract: say goodbye to downtimes!

Remote service has long been absolutely essential in the globally-networked textile industry. Remote access to systems permits pinpointed intervention, with a degree of accuracy that cannot be offered over the phone or by e-mail. This allows systems operators to improve their productivity. Partners such as Oerlikon Manmade Fibers are able to increase their service efficiency. And for good reason: unplanned BCF system downtimes and the associated production shortfalls swiftly drive the corresponding costs into the five-figure range. “Using our Remote Service, we are able to significantly reduce these downtimes”, explains Niels Herrmann, Head of Service Sales Customer Services at Oerlikon Neumag.

And this is also beneficial to IT security, as Oerlikon sets high standards, constantly keeping the corresponding hardware and software up-to-date. “When customers choose a Secure Remote Service Contract, the requisite hardware, software and all upgrades are included. With this, they no longer face additional purchasing costs and are no longer under pressure to continually update their technical security requirements. That is something that we assume for them”, comments Niels Herrmann, talking about the advantages.

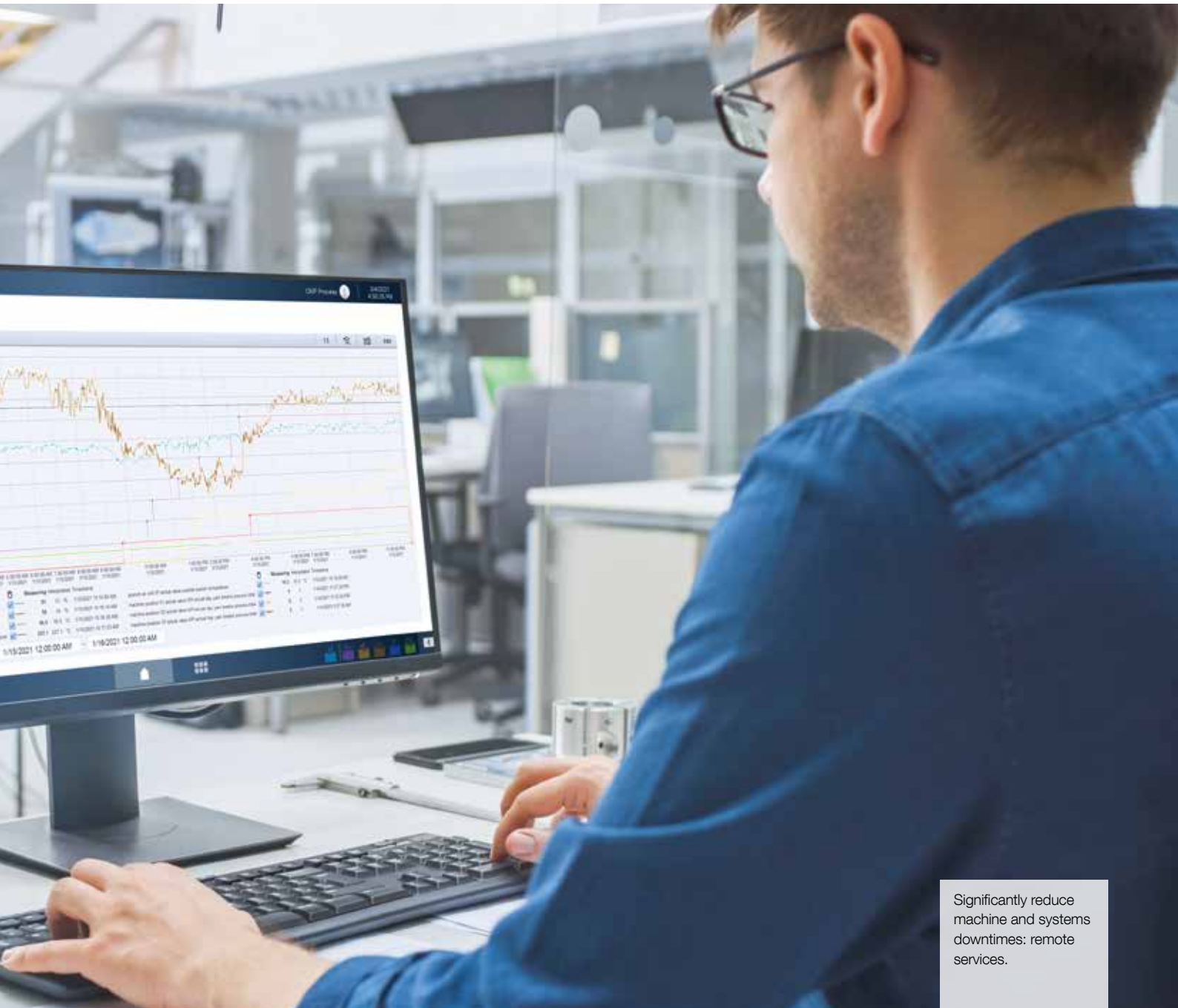


**Access & Analysis package:
the key to optimum operation**

The Access & Analysis package focuses on the optimum operation of BCF systems. This software provides systems operators with key performance indicators directly from their machines. The KPIs are automatically calculated, allowing concrete conclusions regarding

machine performance. This enables manufacturers to quickly identify optimization and cost-cutting potentials in order to secure or increase commercial success. "The Access & Analysis package offers our clients diverse options for analyzing production data. Complex correlations within the production process are visualized in an understandable

manner. And there is global access to the HMI (Human Machine Interface) and its data", summarizes Niels Herrmann. Analyzing processes can be carried out remotely and is hence location-independent. To this end, yarn manufacturers always have a complete overview of the production process, quality and costs. » (che)



Significantly reduce machine and systems downtimes: remote services.

Excellence Teams support customers

Bundled know- how for superlative quality

A photograph of a middle-aged man with grey hair and a beard, wearing a light blue button-down shirt. He is looking towards the right side of the frame, where a computer monitor is partially visible. The background is a bright, slightly blurred office or industrial setting.

Systems and machines are precious assets for manmade fiber manufacturers across the globe and high-quality hardware is absolutely essential as the foundation of successful business. But superlative performance is the result of the interaction of numerous other determining factors. Interdisciplinary, international Oerlikon Manmade Fibers Solutions Excellence teams bundle their knowledge in order to implement the best possible processes with the customer, hence securing long-term success. In our interview, Dr Wolfgang Ernst, Head of Customer Services and Service Sales, talks about the tasks and challenges that define the work of these teams.

Dr Ernst, many factors determine the quality of the manufactured yarns and hence the business success, not just the functionality of the machines and systems deployed. What else is decisive?

Even the best equipment is useless if it is not set up, operated, and serviced by professionally-trained staff. In addition to the system itself, operator know-how is a decisive prerequisite for successfully manufacturing high-end products. Currently, we are seeing our customers in many regions of the world losing their experienced, knowledgeable employees due to retirement, among other things – a trend that is also being accompanied by the fact it is simultaneously becoming increasingly difficult to recruit and retain young, qualified people. This is leading to production and quality problems. Furthermore, you have to understand that we are not just talking about the operation of a spinning or texturing machine itself, for instance. The machine is part of an environment requiring logistics, correct storage and the provision of operating materials as well as clear task and organizational structures.

What can customers expect in the case of these complex questions along the entire Oerlikon Barmag process chain?

We support our customers in virtually every area in which we have established Excellence teams for specific specialist areas. To this end, we have, for example, a DTY Excellence team that carefully examines the settings and the condition of the DTY machines and advises the customer, achieving a considerably greater level of efficiency and quality. Often, it is numerous small, not so obvious things that make a decisive difference. And it is precisely these things that we make visible, optimizing the machine settings and training the customer's staff. Ultimately, this enables the customer to succeed in operating such machines at >99% efficiency.

Even the best equipment is useless if it is not set up, operated, and serviced by professionally-trained staff. In addition to the system itself, operator know-how is a decisive prerequisite for successfully manufacturing high-end products.

What makes the work of these Excellence teams so unique?

The uniqueness undoubtedly lies in the fact that we can provide cross-process support. Let's stick with the example of DTY. Even if we are able to make improvements to the machines themselves, the product quality does, of course, depend on the 'raw material' POY. And this in turn is not about just the spinning of POY itself, but also about building good packages when winding or take-off during texturing. In the event there are problems here, the Winder Excellence team is able to ensure that package build, and hence the texturing performance, improves significantly. Ultimately, the Performance Excellence team – comprising experts with manufacturing experience, among others – can analyze the machine and process environment focusing on the actual spinning and texturing and provide invaluable suggestions for improving the processes along the whole production chain.

Are there differences the international markets?

The challenges are fundamentally similar. There are customers with huge levels of competence in all markets, but also some that have less expertise. In the case of the latter, the potential for improvement is by nature greater, but we have also been able to provide experienced customers with vital support in decisive areas. However, we see a general shortage of skilled personnel in some regions and we are able to provide valuable performance development help here with our Excellence teams and training offerings.

Where do you see future tasks and development potentials for the teams?

No two tasks are alike. Consequently, it is important for these teams to constantly take on new challenges and to continuously question themselves. What is needed here is curiosity, continual learning and interdisciplinary collaboration. On-site presence has been problematic over the past two years and not all problems and issues can be dealt with or solved remotely. Nevertheless, I am convinced that the assistance offered by the Excellence teams will continue to develop also by means of remote support.

As the availability of qualified operating staff is worsening both in general and apparently worldwide, I believe there will in future also be significant increased demand for fundamentals training for operating personnel. But we are in the process of expanding our skills here as well. Complementing on-site training seminars, our newly-developed 'Digital Academy', for example, is making lots of contents available online. As a result, the customers' staff on site has 24/7 access to certain learning contents.

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

Gala event at the Bosphorus

As part of ITM 2022 in Istanbul, Oerlikon took the opportunity to invite its Turkish customers to a gala event on the Bosphorus to celebrate the company's 100th anniversary together. In his speech, CEO Georg Stausberg, highlighted the importance of the Turkish textile industry in the past, present and future. Especially the proximity to the sales markets in the European Union offer great opportunities for the further expansion of a more sustainable textile industry. The long-standing partnership and friendship with all customers in Turkey is something he highlighted, as it is greatly appreciated, and he also shared his hopes of having at least another 100 years of further cooperations.

Georg Stausberg particularly emphasized the trustful cooperation of the representative Tekstil Servis, who has been active for more than 50 years, with Ömer San as the head of the company. He explicitly thanked him and the entire team for the extraordinary services that have enabled Oerlikon to comprehensively serve the Turkish market for decades. » (aw)



imprint

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Oerlikon close to its customers in India and Bangladesh

We look back with pride on exciting and interesting customer events in Daman, India, and Dhaka, Bangladesh. Two countries where the economic situation currently offers good opportunities for further polymer processing projects.



India continues to have above-average economic growth with a 6.8% Gross Domestic Product (GDP) for 2022. Experts speak of 'a bright spot in a global gloom'. Some facts and figures:

- The textile industry in India is one of the largest in the world with a large raw material base and manufacturing strength across the value chain.
- India is the 2nd largest producer of MMF Fiber. India is the 6th largest exporter of textiles and apparel in the world.
- India became the second-largest manufacturer of Personal Protective Equipment (PPE) kits in the world.
- India is the 6th largest producer of technical textiles with a 6% Global Share (12% CAGR), the largest producer of cotton and jute in the world.
- The industry contributes to 7% of industrial output in value terms, 2% of India's GDP and 12% of the country's export earnings.
- The share of textile, apparel and handicrafts in India's total exports was 10.62% in 2021-22.
- The textile industry in India is one of the largest economic sectors that contributes the most to job creation in the country. It engages 16.73 lakhs of people consisting of 10.28 % of the total employment share.
- The domestic apparel and textile industry in India contributes 2.3% to the country's GDP, 7% of industry output in value terms.
- The domestic textiles and apparel industry stood at USD 152 bn in 2021.



“Major growth of textiles will come from Manmade Fiber industry”, said Shri Piyush Goyal, Union Minister of Textiles, Consumer Affairs, Food & Public Distribution and Commerce & Industry at the end of October in India. He suggested that the industry should understand each other and work in synergy to amicably resolve the issues among the producers and users of polyester in the entire value chain. Industry representatives responded that they are hopeful of achieving the export of 100 billion USD in the next 5 to 6 years.



The mayor of Dhaka Md Atiqul Islam (middle) together with Oerlikon agent Deepok K. Baral, Chairman & Managing Director of DSM Commodities (right) and Debrabata Ghosh, Vice President Sales & Marketing Oerlikon Manmade Fiber Solutions.

More than 250 participants discussed the technology and market analysis presentations held by Oerlikon experts, at the Oerlikon Technology Symposium in Daman. Afterwards, all guests celebrated the 100th anniversary of Oerlikon Barmag and the 75th independence of India with a big gala event.

Bangladesh still has huge potential, especially for the manmade fiber industry. In the so-called downstream (weaving, knitting, finishing, etc.), the country is already very advanced, but what is missing is its own raw material production (MEG, PTA) and its processing in a continuous polycondensation plant, as supplied by Oerlikon. With Modern Syntex, however, the first ‘From Melt to Yarn and Fibers’ plant is currently being built in Chittagong, Bangladesh, under our leadership. Some facts and figures:

- With more than 164 million inhabitants, Bangladesh is the eighth largest country in the world in terms of population. This makes it one of the most densely populated countries in the world.

- The economy of the up-and-coming country continues to grow rapidly, even during the Covid-19 pandemic, and the poverty rate has been halved since 2000. By 2026, Bangladesh will have officially left the status of a Least Developed Country (LDC), and by 2041, the country aims to become a high-income industrialized country (HIC).
- Bangladesh's economic success is primarily based on its textile industry, which accounts for 10% of the gross national product and 80% of the export earnings.
- Bangladesh is the world's second largest exporter of textiles.

With a colourful and informative event, held in the capital Dhaka, more than 200 invited guests celebrated the 100th anniversary of Oerlikon Barmag and the 50th anniversary of independence and liberty of Bangladesh. The Mayor of Dhaka, Md Atiqul Islam, emphasized the importance of the textile industry for his country and held out the prospect of further investments, especially in the field of manmade fiber production. » (aw)



In its anniversary year, Oerlikon Polymer Processing Solutions faces new challenges

Sustainable technologies for the plastics industry

Under the motto 'Feel the Flow. Keep Control.' the Polymer Processing Solutions division presented itself at K 2022, the leading international trade fair for the plastics industry, which took place in Düsseldorf from October 19 to 26.



Here, Oerlikon displayed a wide range of services in the field of plastics production and processing. Innovative solutions and technologies were presented on the topics of raw material preparation thanks to modern polycondensation and extrusion systems, the latest recycling technologies, efficient hot runner systems, innovative coating solutions, sustainable manufacturing processes for filtration applications and high-quality gear pumps.

Today, innovation means, above all, producing sustainably. Consequently, topics such as CO₂ reduction, waste avoidance and energy efficiency as well as the continuous expansion of a circular economy are also moving into focus at Oerlikon. And this is the case both in its own operations and in its offerings to customers around the world.

“We see our technology solutions as enablers for a better world,” says Georg Stausberg, who, in addition to his division CEO role, is also Chief Sustainability Officer (CSO) of the entire Swiss Oerlikon Group. “In the polymer processing industry, we need to move towards a sustainable closed-loop economy for packaging materials and textiles, for example, while intensively expanding the recycling of used recyclables. With our current technologies and future innovations, we are supporting manufacturers along the process chain to achieve their own sustainability goals.”

State-of-the-art facilities for recycling plastics

Oerlikon's joint venture company BBEngineering, also at the Remscheid-Lennep site, has been dealing with the topic of recycling for years and thus set a focus this year at the Düsseldorf trade fair. In addition to extruders, filters and mixers, BBEngineering offers VacuFil®, a complete system for an innovative and unique PET LSP recycling process. The modular system can be used for various recycling applications.

Well over 2500 visitors to the Oerlikon booth were able to experience the complete solution offering in an audiovisual 4D experience: a 15-minute simulator flight took participants on an exciting journey into the future of a sustainable circular economy with technology solutions from the Oerlikon Group. Parallel to the trade fair, around 100 international guests visited the site in Remscheid and experienced live how high-quality recycling yarn is produced from PET waste at the BBEngineering Recycling Technology Center.

New on board: Oerlikon HRSflow

The specialists for hot runner systems, which have been part of Oerlikon's Polymer Processing Solutions Division since June 2021, drew a positive summary of the trade fair. “We were able to record an extremely high number of visitors, which was significantly higher than at the last trade fair three years ago. A striking number of new contacts and a very high quality of visitors made this year's K a great success,” said Stephan Berz, Vice President Sales and Managing Director of the DACH branch at Oerlikon HRSflow. Live projects on 8 partner stands showing innovations from automotive, recycling and thin-wall technology rounded off the exhibition concept. The ‘hands-on technology’ was just as well received by the trade audience as the interaction with group sister Oerlikon Balzers, specialized in surface coating. » (bey)



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