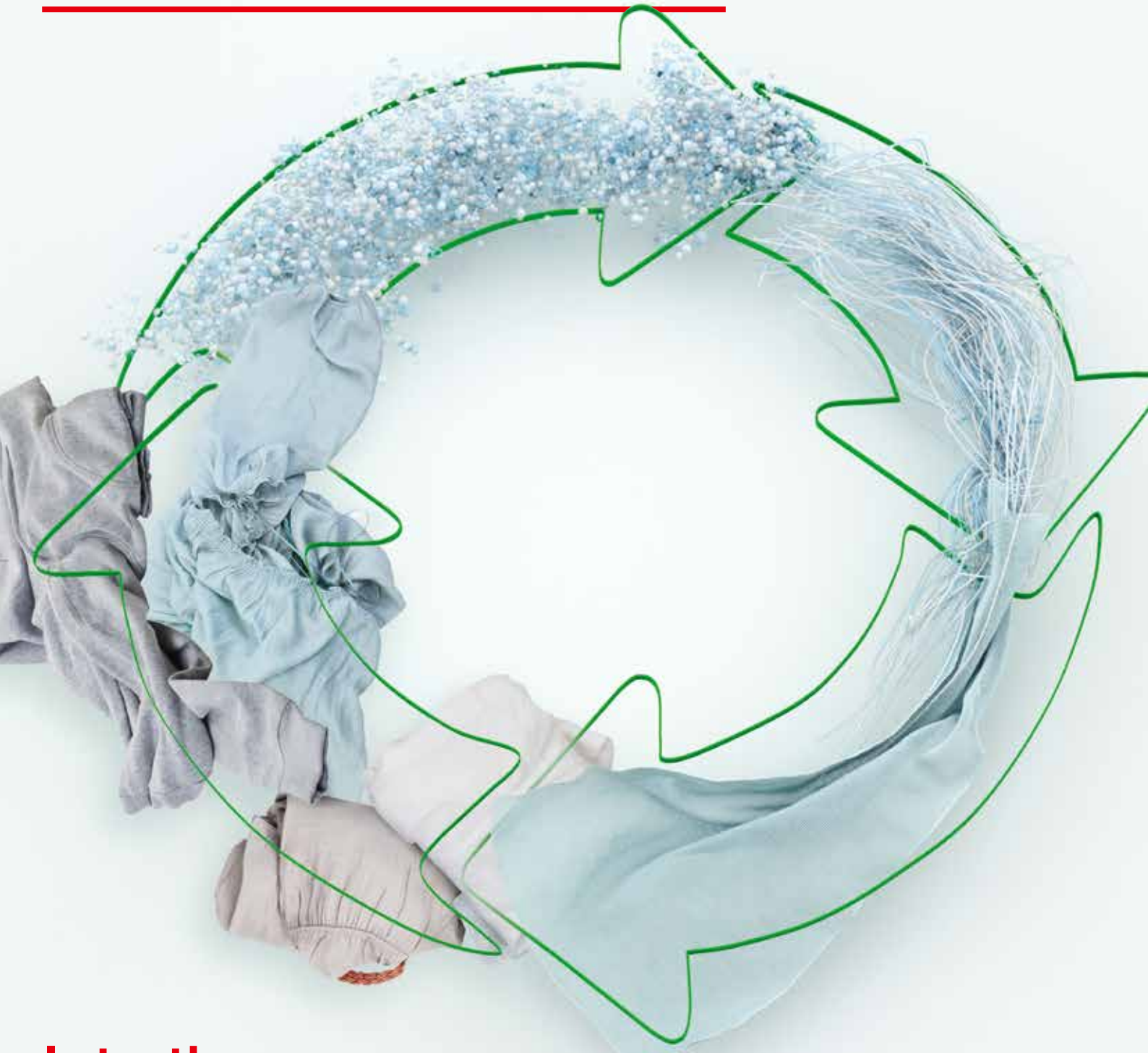


fibers^{and} f!laments

the experts' magazine

No. 39 | june 2023



Into the circular world

page 8

Putting an end to PET fiber waste

page 27

Dear Customers, dear Readers,

The circular economy has finally reached the textile industry. The pending plans of the European Union alone mean lots of regulation and legislation that will demand more from all market players – technologists, manufacturers, traders and services providers (Page 15). And this will radiate across the globe. For good reason: all planned measures are aimed at reducing the ecological impact of textiles worldwide, at increasing recycling, sustainability and ecology and at being more caring about our world and its inhabitants – people, animals and also plants.

This resolve is also behind the 'Transforming the world of textiles' motto of the ITMA 2023, at which we are once again exhibiting sustainable solutions. This idea is meanwhile also driving countries and textile companies, including our customers, partners and – I very much suspect – also you, esteemed Readers. This issue showcases exceptional and innovative examples and projects: promising solutions for fiber-to-fiber recycling of blended fabrics, initial demonstration systems for industrial upcycling and the piloting of a digital product passport. Here, many individual links in the textile value chain are working together. This is hope-inspiring, as the circular economy can only function as a collaboration.

Oerlikon regards itself as a pioneer when it comes to sustainability. Among other things, we offer technologies focusing on homogenization (Page 22) and fiber-to-fiber recycling of PET materials (Page 27). With our systems and equipment, we not only want to help our customers manufacture better products, we also want them to consume less energy and generate less waste and fewer emissions. We are investing 73% of our R&D expenditure in sustainable products, with a commitment to invest 100% in the future. And – as the Group Chief Sustainability Officer – I am hugely proud that we are in the top 10 percent of the best-rated companies in the industrial sector in terms of sustainability. Read more on this in our latest Sustainability Report for 2022.

I very much hope you enjoy reading this latest issue of Fibers & Filaments.

With my very best regards,



Georg Stausberg
CEO Oerlikon Polymer Processing
Solutions Division



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Oerlikon Nonwoven at the INDEX 2023 **Environmentally-friendly into the future with innovative nonwovens systems**

Everybody's talking about sustainability – and Oerlikon Nonwoven showed us how it's done at the globally-leading INDEX nonwovens trade fair in Geneva, Switzerland (April 18-21, 2023). Its product portfolio for nonwovens applications for numerous technical, hygiene and medical solutions focuses on sustainability, quality and efficiency.

“When developing our technologies, we not only focus on system efficiency and product quality, but also on sustainability, energy efficiency and preserving resources”, explains Dr. Ingo Mählmann, Vice President Sales & Marketing at Oerlikon Nonwoven. Our declared objective is to be the leading partner for manufacturing sustainable and environmentally-friendly solutions in the nonwovens industry. “There are many future-oriented bio-based and biodegradable polymers that can be used to produce nonwovens”, adds Ingo Mählmann. “Here, we want to support our customers in becoming pioneers in processing such polymers.” Alternatives to the standard polymers widespread today are

required and Oerlikon Nonwoven is able to offer the competence and the technologies for processing these new polymers.

Two examples: Bio-based polylactic acid nonwovens

The bio-based polymer PLA (polylactic acid) may be an alternative for those wanting to manufacture sustainable nonwovens. And the Oerlikon Nonwoven meltblown and spunbond technologies are ideally suited for processing PLA, for example. At the INDEX, the company showcased a sample application: medical masks manufactured entirely from PLA nonwovens.

Ecological wipe manufacture with the Phantom technology

The Phantom technology is an innovative coform technology for manufacturing wipes – including wet wipes made from pulp and polymer fibers, for instance. Here, the properties of pulp and polymer are combined in a manner that perfectly unites the characteristics of the starting materials. The material mix can comprise up to 90% cellulose fibers, which is a renewable raw material. Choosing a bio-based and biodegradable polymer enables the entire wipe to be manufactured in a ‘plastic-free’, and hence environmentally-friendly, manner.
» (che)

Organizational change **Service Sales under new management**

Michael Rübenhagen draws on in-depth sales experience, having been the face of Oerlikon Neumag's BCF machines for decades, particularly in the US. “Michael Rübenhagen is very well-networked within the manmade fibers industry and has a knack for understanding and predicting the needs of our customers. With this appointment, a real personality is taking over Service Sales, a department that always focuses on the concerns and interests of our customers”, states Dr. Wolfgang Ernst, talking about his successor. Michael Rübenhagen will be supported by the local Service teams in Remscheid and Neumünster, along with the subsidiaries in Beijing, Baroda and Charlotte. » (bey)



Handing over the 'baton' to Michael Rübenhagen (left): Dr. Wolfgang Ernst will from now on focus on new tasks in Sales.



The Oerlikon Nonwoven technologies enjoyed great popularity at INDEX.

Oerlikon Nonwoven at the FILTECH hycuTEC the focus of many discussions

Oerlikon Nonwoven hit the perfect note among visitors at this year's FILTECH trade fair in Cologne with its hycuTEC hydrocharging technology for efficiently charging filter media. Following the market launch of hycuTEC last year, we have now for the first time been able to discuss initial experiences acquired in industrial utilization. Being presented with the EDANA FILTREN Innovation Award confirms the innovativeness and the success factors of this technology.

"We premiered hycuTEC in front of an international audience at last year's FILTECH", reminisces Dr. Ingo Mählmann, Vice President Sales & Marketing at Oerlikon Nonwoven. And the hycuTEC technology has lost none of its attractiveness since then. "Interest remains extremely high", adds Ingo Mählmann. The hydrocharging solution for meltblown systems is most convincing with its superlative filtration efficiency with simultaneous lower pressure loss. This innovative concept dispenses with an additional drying process when manufacturing most highly-separating electret filter media. As a result, it saves water and, above all, energy compared to alternative processes. Furthermore, meltblown producers can make raw materials savings of up to 30% as a result of the improved efficiency of the media, while simultaneously lowering the basis weights.



Raw material savings of up to 30% can be easily achieved with the hycuTEC technology.

In addition to the meltblown technology featuring hycuTEC, Oerlikon Nonwoven's spunbond technology also proved to be of great interest to visitors. Spunbond media are becoming increasingly important in filtration applications – as backing materials for filter media and as the filter media themselves. The fact that the nonwoven structure can be tailored to specific tasks enables targeted, customer-specific requirements for various functions to be realized. And combining various functions, various fiber cross-sections and polymers in a single layer is also possible. Both classical standard polymers and bio-based or recycled polymers can be used as raw materials. » (che)

imprint

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WINGS POY HD

Longer parking times for greater efficiency

The market's only currently available concept for high-end home textile applications using the POY and DTY process has been optimized in order to meet customer's requirements even better. The spinning concept with the WINGS HD winding unit in conjunction with an automatic eAFK Big V Multispindle texturing machine manufactures excellent-quality high-titer yarns with maximum machine efficiency.

"We have modified WINGS HD in order to once again better align the increased requirements of these special yarns to the spinning process and make everyday production even simpler for our customers", comments

Stephan Faulstich, POY Process Technology Manager. "The parking times are extremely short when winding high titer. We have increased the parking times by up to three times in the case of the new WINGS HD models." To this end, the parking time for a 300d/384f yarn, for example, has been increased from a standard 6.5 min. to 15.7 min. – and, in the case of a 400d/192f yarn, from 4.3 min. to 10.3 min. This makes the doffing process more even, hence increasing doffing reliability.

At the same time, the draw unit now has a more flexible design, meaning that two-godet operation is also possible in the case of products with lower titer and/or filament count. This has a positive impact on the winding unit's energy consumption.

WINGS HD – superb efficiency and functionality

12 POY packages of up to 600d/576f (final) are produced in the spinning process using WINGS HD 1800. This is made possible as a result of an additional godet, which ensures that the high yarn tensions developing in the process are reduced to the yarn tensions common in the case of the winding process to date. At the same time, the newly-developed suction unit with the accompanying yarn cutting device (yarn collecting system) ensures – both during string-up and in the event of a yarn break – reliable handling of the yarn with an overall titer of 7,200 den (final).

The concept's decisive benefit: whereas DTY yarns up to 1,200 den and with up to 784 filaments have in the past, as standard, been plied from four POY 300d/192f bobbins using DTY machines, high titer can also be manufactured directly using the WINGS HD take-up machine. And combining the WINGS HD and the eAFK Big V is ideal, as this allows all available winding positions to be utilized during texturing.» (bey)



Superbly suited to the efficient production of high-titer yarns: the Oerlikon Barmag WINGS HD with extended parking time.

Oerlikon Barmag at the PU TECH India Metering with superlative precision



The eccentric screw pump - tailor-made for conveying high-viscosity, abrasive and highly-filled media.

Greater productivity, increased lifespan and tailored solutions for the most demanding technical tasks in PUR applications and in the paints and lacquers industry – these were the convincing arguments with which Oerlikon Barmag presented its precision metering pumps at this year's PU TECH India, the international polyurethane industry trade in New Delhi, India, in April.

High-tech components for high-performance compound materials

Polyurethane is conquering ever more areas of modern life – automobiles, furniture, footwear, medical technology and packaging. However, processing it is extremely complex and demands tailored solutions for the respective applications. Oerlikon Barmag metering pumps are responsible for the precise metering of the various liquid materials in the numerous chemical processes carried out during the production of the components. In addition to the high quality of the end products, they ensure highly-efficient production – something that is reflected in shorter product conversion times and lower waste rates.

Eccentric screw pumps – robust all-rounders convey any medium

The requirements for pumps are considerable, as the demand for customized solutions for increasingly complex processes is rising. This is particularly true for Oerlikon Barmag's new eccentric screw pump range. High wear-resistance, increased durability and robust operation – the pump is tailor-made for conveying highly-filled, high-viscosity and abrasive media. Customers benefit from considerably greater productivity, as the pumps' maintenance intervals and hence machine downtimes are significantly reduced.

Drum pumps – conveying and metering in a single unit

Oerlikon Barmag's drum pump has been designed specifically for conveying and metering high-viscosity materials from drums. Karl-Peter Warda, responsible for pumps used in industrial and chemical applications explained: "The drum pump not only removes high-viscosity materials from the drum, it also meters the medium to the mixer head without any additional interim stops." » (wa)

Dates & Events

ITMA Milano 2023

June 8–14, 2023,
Milan, Italy
www.itma.com

World of Wipes

July 17–20, 2023,
Atlanta, GA, USA
www.worldofwipes.org

DOMOTEX Asia / CHINAFLOOR 2023

July 26–28, 2023,
Shanghai, P.R. China
www.dacf.cn

Techtextil India 2023

September 12–14, 2023,
Mumbai, India
www.techtextil-india.in.messefrankfurt.com

ITM Uzbekistan

September 12–15, 2023,
Tashkent, Uzbekistan
www.itmexhibition.com

62. Dornbirn Global Fiber Congress

September 13–15, 2023,
Dornbirn, Austria
www.dornbirn-gfc.com

RISE

September 26–27, 2023,
Raleigh, NC, USA
www.riseconf.net

FiltXPO

October 10–12, 2023,
Chicago, IL, USA
www.filtxpo.com

ITMA Asia + CITME 2023

November 19–23, 2023,
Shanghai, P.R. China
www.itmaasia.com

Into the Circular World

Textiles are becoming an increasingly big polluter. To tackle the growing mountains of used clothing, it is above all European politicians who are developing a comprehensive strategy for a regulating circular economy. And the textiles industry is also making its mark with innovative technologies for recycling manmade fibers. However, there is still a long way to go before we have a sustainable textile world.

According to the European Environment Agency, the consumption of textiles is already the fourth-largest source of negative environmental and climate change impacts within the European Union (EU). A major reason for this is relentless textile growth: the Ellen MacArthur Foundation states that the global production of textile almost doubled between 2000 and 2015. And the annual consumption of apparel and shoes is expected to further rise by 63 percent by 2030 – from currently 62 million to 102 million tons – adds the European Environment Agency.

This development will further exacerbate the waste problem. Today, around 5.8 million tons of textiles are disposed of in the EU every year. In China, for example, approximately 22 million tons of textile waste were accumulated in 2020, according to information provided by China's State Council, of which only around one-fifth is being recycled. In the US, it was – in accordance to the EPA (Environmental Protection Agency) – about 17 million tons of textile waste in 2018, of which only 15 percent was collected for recycling. The vast majority always ends up in landfill sites or is incinerated. Across the globe.

The causes of this are population growth and rising affluence, particularly in Asia, the dominant fast fashion business model in the fashion sector and overproduction and overconsumption. Cheap, lower-quality apparel is always only worn for shorter periods of time and then disposed of – in line with the linear 'take-make-consume-waste' principle. This has been identified by the textiles industry, with counter-movements meanwhile emerging across the entire value chain. Increasingly, the objective

is to reconcile consumers' fashion interests with the future needs of a sustainable world worth living in. To this end, the major clothing brands are taking initial steps towards a circular economy and are increasingly including eco collections made from recycled fibers or take-back systems into their programs. Growing numbers of textile collection and recycling concepts are being established, with new business segments emerging – such the reuse and repair of used clothing.

"The companies in our area of business are monitoring the current market activities and trends as well and are increasingly expanding their capabilities with regards to a textile closed-loop. Oerlikon is also developing corresponding technologies and supporting its customers' efforts to create the circular economy", comments Markus Reichwein, Head of Product Management at Oerlikon Barmag. What is driving these activities is not least the extensive legislative amendments that the EU is currently initiating.

EU: predominantly recycled fibers by 2030

With its sustainable and closed loop-compatible textiles strategy, the EU plans to become a pioneer for the global circular economy as well. By 2030, textile products marketed within the EU are to become more durable and recyclable, predominantly comprise recycled fibers, contain no hazardous substances and be manufactured in compliance with social rights and in a manner that protects the environment. Concrete measures for 2023 and 2024 are:

- **The introduction of binding eco-design requirements:** even during the product design phase, fibers and other com-

ponents should be chosen and combined in such a way that textiles are more durable and can be repaired, their materials are easier to separate for fiber-to-fiber recycling and they have less of an impact on our climate and the environment.

- **The introduction of a Digital Product Passport and amendment of the European Textile Labelling Act:** to implement the closed-loop principle and other important environmental demands, players along the value chain must also comply with new information duties relating to the composition of textiles.
- **Measures for banning the destruction of unsold and returned textiles.** Major corporations must disclose how many products or items of textiles they have disposed of or destroyed and/or reused and recycled.

- **Tackling pollution caused by microplastics** with measures such as product design, manufacturing processes, and washing of synthetic textiles.
- **The expanded producer responsibility regulations** also for textile waste with environment-related fee scales and commercial incentives to create closed loop-compliant, more sustainable products. According to the EU waste legislation, different textile waste must be collected separately from January 1, 2025 at the latest.
- **Restrictions on textile waste exports** in non-OECD countries and the development of criteria for distinguishing between waste and used textile goods.
- **Empowering consumers and tackling greenwashing** by means of new requirements for reliable environment-related product information.

Yarn made from recycled polyester can be easily spun and textured on Oerlikon equipment.



Circular revolution

Europe is showing considerable initiative. But where else is progress being made with regards to the circular concept? China, which produces half of all global textile fibers, is planning to expand its textile recycling capacities. According to the State Council, the country is planning to recycle a quarter of its non-biodegradable textile waste and turn it into 2 million tons of recycled fibers annually by 2025. Five years later, it is planned that there will be a relatively complete system for recycling 30 percent of textile waste and 3 million tons of recycled fibers annually. This plan includes statutory guidelines and directives aimed at motivating businesses to orient their product design on recycling as well as removing obstacles relating to reuse and the recycling of textiles, better networks for collecting textile waste and also tightened export controls for used apparel.

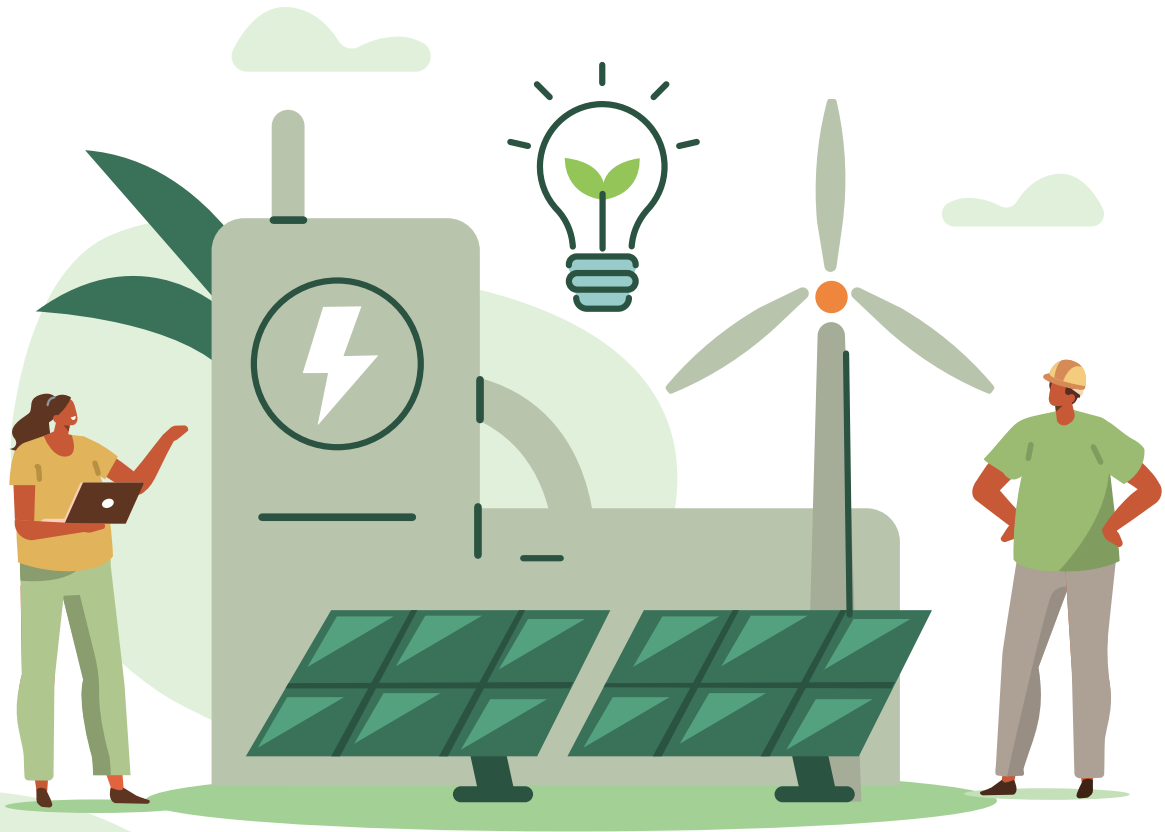
In the US, the federal structure and the relative autonomy of the individual states are proving to be stumbling blocks. A report issued by the National Institute of Standards and Technology (NIST) and the U.S. Department of Commerce dated May 2022 and entitled 'Facilitating a Circular Economy for Textiles' refers to the fact that the state and local governments are responsible for topics such as dealing with solid waste. It also notes that just one US state is aiming to ban the disposal of textiles, while others are focusing on programs targeted at collecting old carpeting. To date, California has the only fiber recycling law in the US. No expanded producer responsibility laws have so far been introduced. As legislation still re-



wards waste and not recycling, the circular economy is viewed more as an add-on rather than a substitute for the linear model. For this reason, the EU strategy is being monitored with interest and is expected to have an influence on the US market as well.

And developing manufacturing nations will have to face challenges on their journey into the textile circular economy. Bangladesh, for example, is increasingly manufacturing recycled products, with ever more local manufacturers in foreign ownership in particular demanding recycling systems. The 'Circular Innovation and Ecodesign in the Textiles Sector' study published by the Finnish innovation fund Sitra back in 2022 discloses that it is not just in Bangladesh, but also in Sri Lanka and Vietnam, that such companies hope to become more sustainable and lower the carbon footprint of their products and production. However, there is still not enough being done to make textiles themselves more closed loop-compatible with





recycling-oriented design. And there are still no government initiatives focusing on this either. As a result, these countries, whose textile and apparel exports are heavily dependent on the EU market, are not yet ready for a circular economy. According to the study, they require technology and investment support during the transition phase. Otherwise, trade and the implementation of the circular objectives will suffer. This particularly applies to the pioneering EU, which procures 44.9 percent of its apparel from developing countries.

On the way to fiber-to-fiber recycling

In addition to regulatory initiatives, technical innovation is required to connect the beginning and the end of the linear textiles industry and to close the loop. One decisive circular technology here is fiber-to-fiber recycling. Only a few years ago, this process was used to recycle around just 1 percent of used clothing worldwide into fibers for new apparel. McKinsey market researchers are now talking about 18 to 26

percent being recycled by 2030 – if the full technical recycling potential is utilized and more textiles are collected. For this, manual processes will have to be automated, clothing waste qualitatively sorted, buttons and zips removed and fiber compositions unambiguously identified – and all less expensively. Separating mixed fibers still represents an obstacle as well. Finally, the recycled materials must be suitable for the spinning process, provide a usable yarn quality and be able to be further processed, i.e. dyed. Despite these challenges, there are promising solutions on the horizon, even though some processes are not yet ready for commercial exploitation.

Thermomechanical processes are suitable for recycling PET fibers, for example – in a nutshell: the remelting and further processing of mono-materials. BB Engineering – a joint venture between Oerlikon Barmag and the Brückner Group – has, for example, developed an environmentally-friendly, economical and energy-efficient solution for the fiber-to-fiber recycling of various

types of fibrous PET waste – the VacuFil Visco+. With this spinning system, the recycled materials are already being further processed into high-end POY/FDY filament yarn (see also Page 27). The potential of such technologies is huge: PET fibers make up 52 percent of global fiber production. Using rPET instead of virgin PET will also reduce the carbon footprint by more than 70 percent.

The large Indonesian textile manufacturer PT. Kahatex uses the homogenization technology from Oerlikon Barmag Huitong Engineering (OBHE), a joint venture von Oerlikon Barmag and Yangzhou Huitong Chemical Engineering Technique Co.,

Ltd, to mechanically recycle prepared PET waste such as popcorn, bottle flakes and films (see Page 22). The chips manufactured from this are returned to textile production. Kahatex is also focusing on the 'Green Machine'

hydrothermal process for recycling polycotton blends. This chemical recycling was developed by the H&M Foundation and the Hong Kong Research Institute of Textiles and Apparel (HKRITA) several years ago.

Beacon of hope: chemical recycling

With chemical recycling, polyester fibers, for example, have the polymer components extracted using chemicals and processed into new fibers. These complex, frequently industrially still underdeveloped

processes are creating initial solutions for recycling mixed fabrics. These kinds of processes for chemically recycling polyester in used clothing and waste are also being utilized and researched by the Chinese company Zhejiang Jiaren New Material Co., Ltd., for example. Its 'Green Circle' unites well-known textile companies. And another promising newcomer is the German start-up RITTEC, which utilizes an energy-saving process to manufacture polyester-blend clothing from mixed textiles and is already using a Digital Product Passport.

And this group of players also includes the Worn Again solution. The British partnership, in which Oerlikon is also involved, is focusing on a solvent-based recycling technology, with which both

end-of-life textiles comprising polyester and polycotton blends and PET plastics can be converted into circular raw materials and fibers (polyester and cellulose). For this, a large demonstration system for upcycling 1,000 tons of textiles per annum is being created in Switzerland (see Page 20). Here, Worn Again is collaborating with partners along the entire value chain, including Texaid. The German-Swiss recycling specialist is working on a sorting system for scalable fiber-to-fiber recycling. There are also plans for an initial 'Sorting 4.0' system

“The time for closed-loop strategies and the corresponding technologies is now.”

Post-consumer textile waste made from pure polyester can be easily recycled on BB Engineering's VacuFil Visco+ solution.



with a capacity of up to 50,000 tons – to be established by the end of 2024. The project is part of the ReHubs initiative of the European Apparel and Textile Confederation (EURATEX, see also interview on Page 15), which plans to enable the fiber-to-fiber recycling of 2.5 million tons of textile waste by 2030.

“We are supporting technological innovators such as Worn Again because we believe

their solution is extremely promising and because the players are driving cooperation between the individual links within the value chain. Recycling only works when all players cooperate in a circular system”, emphasizes Georg Stausberg. The Oerlikon Polymer Processing Solutions division’s CEO is looking to the future: “The time for closed-loop strategies and the corresponding technologies is now.” » (tho)



Talking to EURATEX Director General Dirk Vantyghem about the EU's circular economy strategy

“Circular textiles are already a reality”

When the European Union rolls out its strategy for a circular economy, the European Apparel and Textile Confederation (EURATEX) will be monitoring the interests of its 143,000 member businesses affected by the planned changes with eagle eyes. In our interview, EURATEX Director General Dirk Vantyghem talks about when important EU legislation will come into effect and how the textile sector is preparing for this ecological revolution.

Mr Vantyghem, what is the impact of the EU's circular economy strategy on the textile industry?

The legislation revolving around the EU Textile Strategy may be disruptive for the value chain – and so bring around fundamental changes. EURATEX welcomes the goal of reducing the environmental impact of textiles and increasing the average quality of garments placed in the EU market. We are calling for policy makers to collaborate and design the best quality of legislation. If this is successful, the European textile value chain will of course benefit from the change and increase its competitiveness.

Which important legislation – and by when – will affected businesses have to comply with?

In the case of one of the most important laws, the Ecodesign for Sustainable Products Regulation (ESPR), we can expect the law to be passed by the second quarter of 2024. Only at that time will we know more precisely how much time the industry has to prepare for compliance. Based on currently available information, we expect legislative provisions which will define minimum quality parameters for products marketed within the EU and for utilizing contents in textile products. This would be an important push for incentivizing the use of

“We need to create a high-quality legal framework, which is coherent, resilient and SME-friendly. Furthermore, we need to ensure investment support for the industry in terms of skills, innovation and energy supplies. And we have to develop a market and greater demand for sustainable textiles.”

recycled materials, addressing the waste issue and establishing a textile recycling value chain. With the ESPR, the EU is also introducing the so-called Digital Product Passport – and hence the mandatory exchange of important information across the value chain and vis-à-vis consumers and the authorities.

You represent many European member associations and hence a large number of textile manufacturers. Is the topic of a circular textile economy already omnipresent?

Circular textiles are already a reality and an important goal not only for the ‘front runners’, but also for growing circles of companies across the whole value chain. Many large fiber producers and newcomers have strategic goals on circular textiles, e.g. recycling. On the opposite side, several fashion brands and retailers have made commitments towards recycled contents or even business models based on reuse. And corresponding pressure is increasingly being applied within the textile industry and by legislators. The EURATEX ReHubs initiative itself aims to foster cooperation across the value chain.



Fast fashion and associated overproduction are leading to more waste, increasing ecological pollution and wasted resources. Are there any incentives that could make the sector change its mindset or even initiate alternative business models?

On the one hand, legislative incentives create the regulations on extended producer responsibility by practically taxing apparel on the basis of sustainability aspects. On the other hand, an environmentally-friendly public procurement would provide incentives to choose sustainable textiles on the part of the authorities. And there is a clear sign that some major fashion companies and SMEs are already focusing on recycling and exploring reuse-based business models. However, it is still too early to foresee how the fashion industry will transform.

The EU imports textiles mostly from third countries, which however lack road maps for introducing a circular economy and regulatory policies. Is the EU planning supporting measures here?

The EU is rolling out its Global Gateway initiative, which should help textile manufacturers in third countries to understand and comply with our new regulatory framework. This should help to establish a level playing field within the global textile industry. Of course, some local manufacturers are already being encouraged by Western and European clients to adopt circular models. We see business-driven closed-loop initiatives in Bangladesh and several examples of national circular strategies emerging globally – from Turkey to Japan, from Nigeria to Chile. It is expected that the larger Asian players will follow suit at some point.

From EURATEX's point of view, what is the most important thing about the textile industry today?

EURATEX has a clear vision for the European textiles and clothing industry. We need to create a high-quality legal framework, which is coherent, resilient and SME-friendly. Furthermore, we need to ensure investment support for the industry in terms of skills, innovation and energy supplies. And we have to develop a market and greater demand for sustainable textiles. This is being achieved through environmentally-friendly public procurement and changing consumer behavior – all within a global context. Otherwise, it would fail to secure the intended results. ▶ (tho)

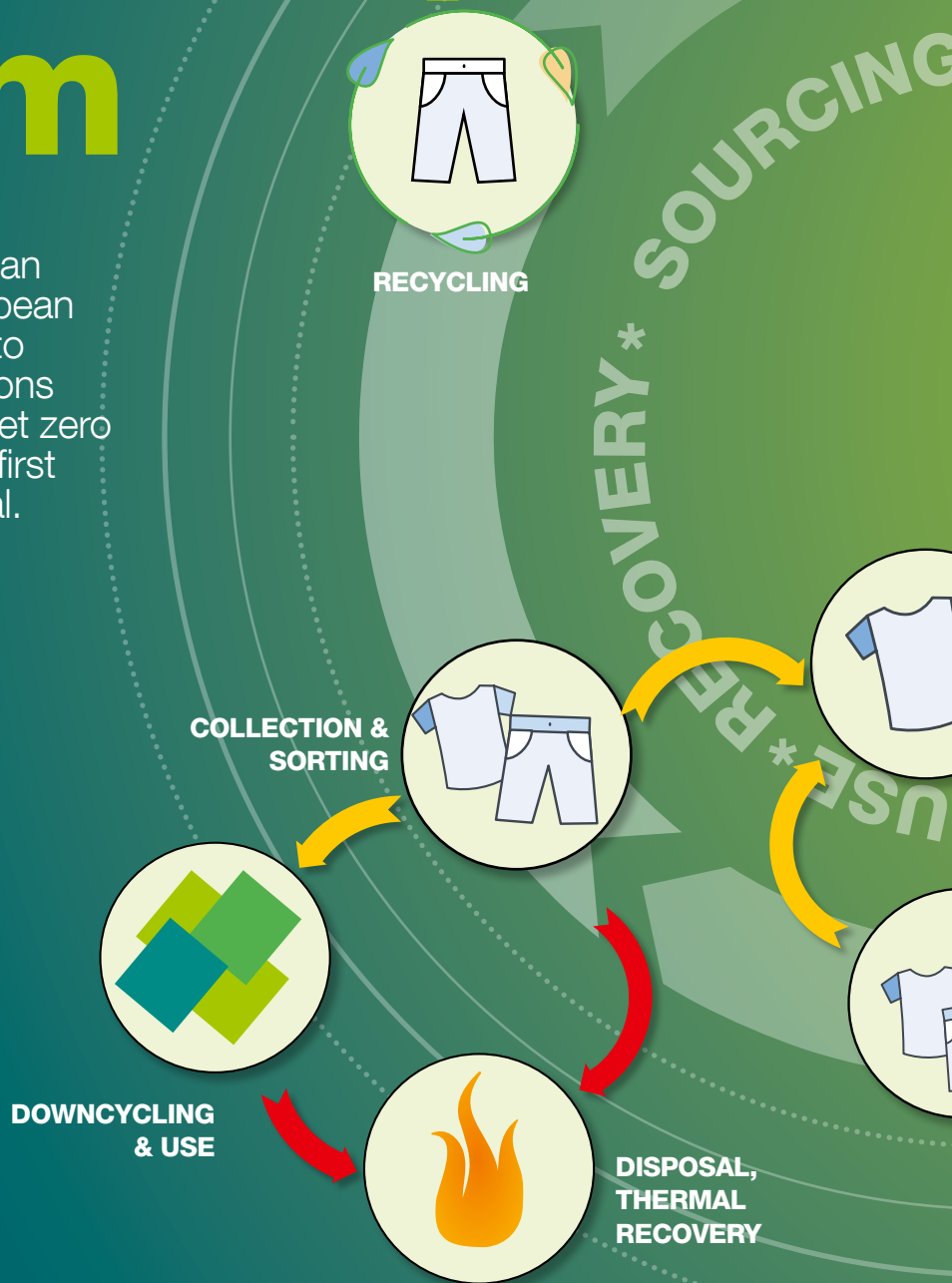
Dirk Vantghem

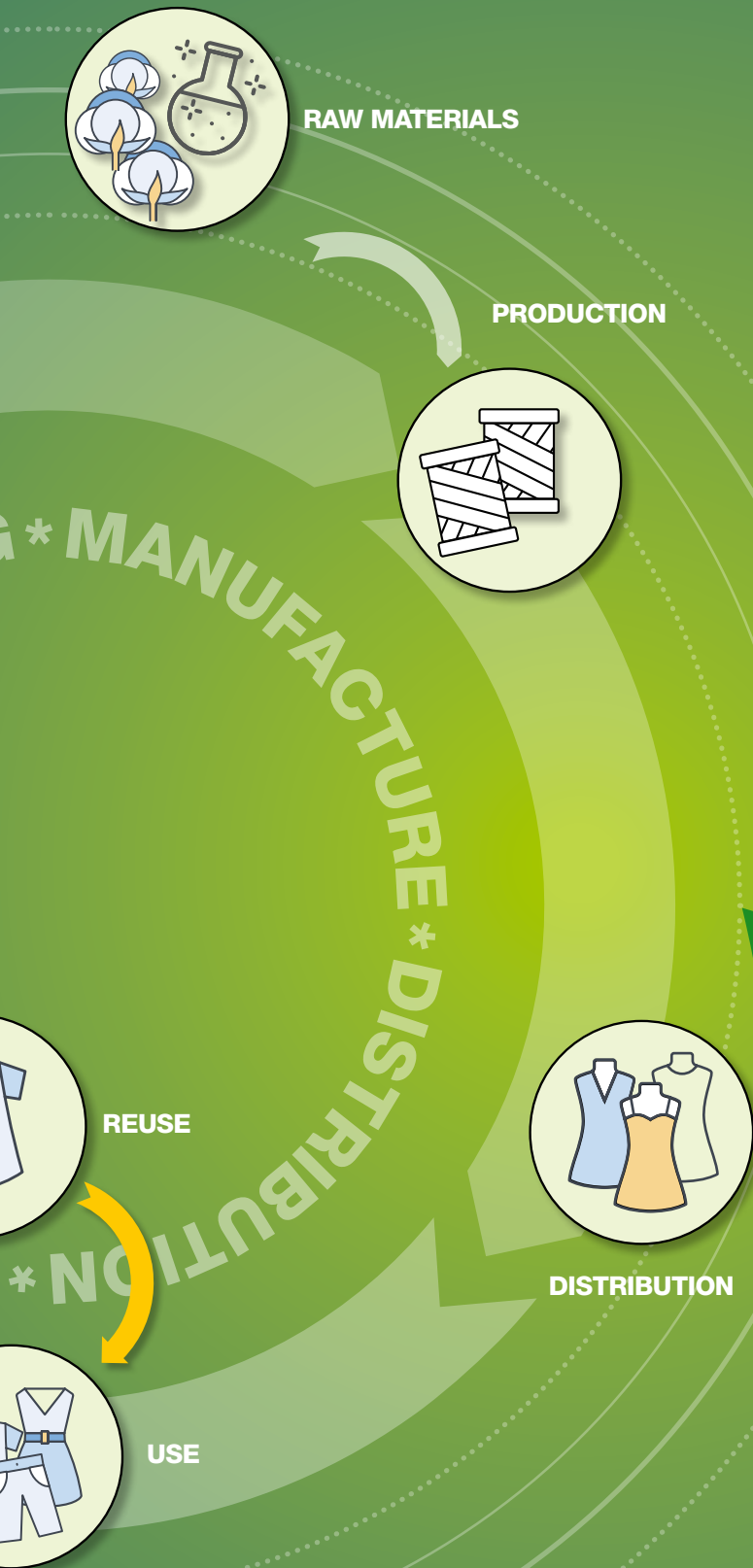
is the Director General of the European Apparel and Textile Confederation (EURATEX). EURATEX represents the interests of the European textile and clothing industry at the level of the EU institutions. EURATEX member federations represent in the EU some 143,000 companies with a turnover of €150 billion, employing 1.5 million workers. EURATEX was officially created in 1996 with the merger of three organizations present in Brussels: COMITEXIL (Coordination Committee for the Textile Industries of the EC), ECLA (European Association of Clothing Industries), ELTAC (European Largest Textile and Apparel Companies). In 2010 EURATEX became an international non-profit organization (association internationale sans but lucratif/aisbl).

Textiles in a constant closed-loop system

In December 2019, the European Commission unveiled the European Green Deal; the concept aims to reduce greenhouse gas emissions within the European Union to net zero by 2050, hence becoming the first 'continent' to be carbon-neutral.

Just over two years later, in March 2022, the EU showcased its new sustainable and closed loop-compatible textiles strategy, which is based on the Green Deal. The focus is on measures for closed loop-oriented product design – for example, with regards to recycled material ratios. Furthermore, a Digital Product Passport will provide environmentally-relevant information on the affected textiles. A challenge for companies within the textiles industry, but a challenge that also offers a series of opportunities in terms of innovative concepts.





Of the
7 to 7.5 million tons

of textile waste produced in the EU and Switzerland, about one-third is collected.

Of this, **60%** is sorted for resale and **40%** is available for recycling.

Currently, only **1%** of non-reusable textiles are recycled into new textiles.

Recycling of mixed textiles is the challenge of our times. The British company **Worn Again Technologies** has developed a recycling concept that can recapture raw materials from non-reusable textiles and packaging materials. The focus here lies on mixed fibers such as polycotton, for example, and packaging waste. The end products are split into their reusable raw materials and returned to the production cycle. Here, polyester and cellulose are extracted from the textiles and packaging materials using a chemical process and cleaned. In addition to other innovative enterprises, Oerlikon is also a shareholder in Worn Again Technologies. ▶ (bey)

More information



Scan me →



Textile recycling with Worn Again Technologies

Closing the textile cycle

There are still some important links missing for returning end-of-life materials to the production process and for transforming the linear supply chain within the textile industry into a closed-loop system. Here, the British company Worn Again Technologies has developed a solution that has been able to crack a really tough nut: chemically recycling textile polycotton waste into polyester and cellulose. Collaborating with partners, including Oerlikon, along the entire value chain, there are plans to set up a demonstration plant in Switzerland capable of recycling 1,000 tons of textiles per annum.

This was a vision of the company founders back in 2005 – almost 20 years later, it is hoped that an initial important milestone for its real-life implementation will be set: in 2024, Worn Again Technologies – headquartered in Nottingham, United Kingdom – is planning to recycle textile waste on a larger scale and help keep resources in a constant closed-loop system. The announced plant in the Swiss city of Winterthur, for whose construction a total of £27.6 million (GBP) is already available, will be utilized to demonstrate some ambitious technology for the closed-loop recycling of textiles.

The solvent-based process converts end-of-life apparel made from polyester and polycotton blends into circular raw materials and fibers. Ultimately, polyester and cellulose are produced from to date non-reusable, non-recyclable consumer textiles and from industrial sources. For this, the chemical process draws on the textile modules at a molecular level. With this process, dyes, foreign particles and contaminants are also removed – a decisive advantage when compared to mechanical recycling procedures.

Partners from across the entire value chain

Three partners have bundled their respective strengths to develop the complex, multi-step technology for separating the individual starting materials: Worn Again brings to the table its competencies in the dissolving of polyester, in the cleaning process and the removal of dyes, Sulzer is supplying its degasification technology, drawing on more than 35 years of experience in the chemical industry, while Oerlikon is providing its know-how in melt preparation and in further processing of polyester, in liquid state polycondensation (LSP) and in homogenization (see also Page

22). Worn Again is planning to scale the technology as swiftly as possible and is collaborating with well-known, financially-powerful companies along the entire value chain. These include fashion retailers but also technology companies such as Rieter, filament producers such as Monosuisse, retailers such as Coop, textile manufacturers such as Sallmann (ISA) and Serge Ferrari and recycling specialists such as Texaid. To bring these and other players together, Worn Again launched the ‘Swiss Textile Recycling Ecosystem’ initiative in the summer of 2022.

The company is planning to expand the commercialization of the recycling technology with license business models for global systems operators. This is designed to stimulate a closed-loop economy and ensure price stability for the recycled raw materials in the long term. Here, the potential is huge: of the 63 million tons of polyester fibers and filaments produced each year and 25 million tons of cotton produced each year, 15 million tons alone are used to manufacture polycotton products.

“The time is now”

And this prospect is also extremely promising for Oerlikon, which has been a partner of the aspiring company’s network since 2020. Georg Stausberg, CEO of the Oerlikon Polymer Processing Solutions division, views the cooperation with confidence: “The time for circular strategies and their enabling technologies is now. This is why cutting-edge projects, such as Worn Again Technologies’ demonstration plant, are so valuable and are advancing at pace alongside current market trends and demands. We are excited to support this start-up in its next steps, driving the creation of a collaborative, circular economy for textiles.” » (maec)

Mechanical recycling using homogenization technology

A portion of popcorn, please, recycled!

It is already operating at PT. Kahatex – one of Indonesia's largest manufacturers of woven and circular-knitted fabrics: OBHE's homogenization technology for mechanically recycling prepared PET waste such as post-industrial waste (popcorn), bottle flakes and films. This key component ensures an evenly-homogeneous melt, influences the increase in viscosity and hence enables the production of defined rPET preliminary products for further processing such as melt, chips and fiber materials for direct spinning.



Reusing waste is increasingly becoming a trend within the textile industry as well: in May 2022, PT. Kahatex commissioned a system with a daily capacity of 25 tons for recycling popcorn and bottle flakes into textile-quality chips for manufacturing POY and DTY. Traditionally, Southeast Asia's largest family-run business is committed to ecological responsibility and is focused on manufacturing high-end textiles for the Asian, US and European markets. Here, the Indonesian fiber manufacturer is utilizing the homogenization technology provided by Oerlikon Barmag Huitong Engineering (OBHE), a joint venture between Oerlikon Barmag and Yangzhou Huitong Chemical Engineering Technique Co., Ltd.

Using the corresponding thermomechanical recycling process, the waste material is extruded and the larger, more solid components filtered out before the homogenizer swings into action. It is in this reactor that the actual mechanical recycling and polycondensation take place. The technology generates a high surface area and – in conjunction with the precisely-defined dwell time – provides more options for influencing the melt. This creates an even, homogeneous melt, while the technology also simplifies the removal of volatile components. In turn, this enables targeted adjustment of the

viscosity, which is necessary as the waste material to be processed does not always have the same viscosity. In this way, spinning system yarn waste – in the form of knotted balls or tangled threads, for instance – is processed into popcorn-shaped agglomerates for extrusion. This popcorn can have viscosity values of 0.6, but also lower values of 0.4. No problem: the homogenizer's increase in viscosity adjusts this.

Also operating in China

After exiting the reactor, the melt is once again filtered and finer, gel-containing components are removed. Subsequently, it can be further processed as required: in the form of chips or – using a direct-spinning process – in the manufacture of filament yarns, staple fibers and nonwovens. Applicable to all applications: the recycling result can only be as good as the processed starting material, as mechanical recycling processes are unable to improve the starting materials. And chemical recycling is still in its infancy.

For this reason, the homogenization technology remains attractive and is already being utilized by both Kahatex and Chinese fiber manufacturers recycling bottle flakes and yarn waste into staple fibers and filament yarns by means of direct-spinning processes. And the more the industry focuses on recycling systems, the greater the interest: "We are currently registering enquiries from Bangladesh, but also from China", states Michael Mächtigt, Product Manager at Oerlikon Barmag. For the purpose of more intensive global marketing, the OBHE technology has therefore been integrated into the Oerlikon Polymer Processing Solutions product portfolio. » (rei)



Homogenizer

- Viscosity for textile & film = 0.64 – 0.69*[dl/g]
- Temperature ~ 283 [°C]
- Viscosity adjustment up to 0.2 [dl/g]

Vacuum Jet System

- ~ 150 [Pa]

*acc. GB/T14190-2017 / 5.1.1.3.1 (phenol/tetrachloroethane=1:1)

The homogenizer showcases its potential at PT. Kahatex in Indonesia.



Oerlikon Neumag presents new staple fiber concept at the ITMA in Milan

EvoSteam – revolution for polyester

According to international studies, global demand for staple fibers made from polyester will total 20,000,000 tons in 2025 – approx. 33% more than the production volume recorded in 2013. Climate change and its impact on people and the economy demand resource- and environment-friendly manufacturing methods. At the ITMA 2023 in Milan, Oerlikon Neumag is unveiling its new staple fiber concept – the EvoSteam process – as an enabler for more sustainable staple fiber production in the future.



staple fiber production

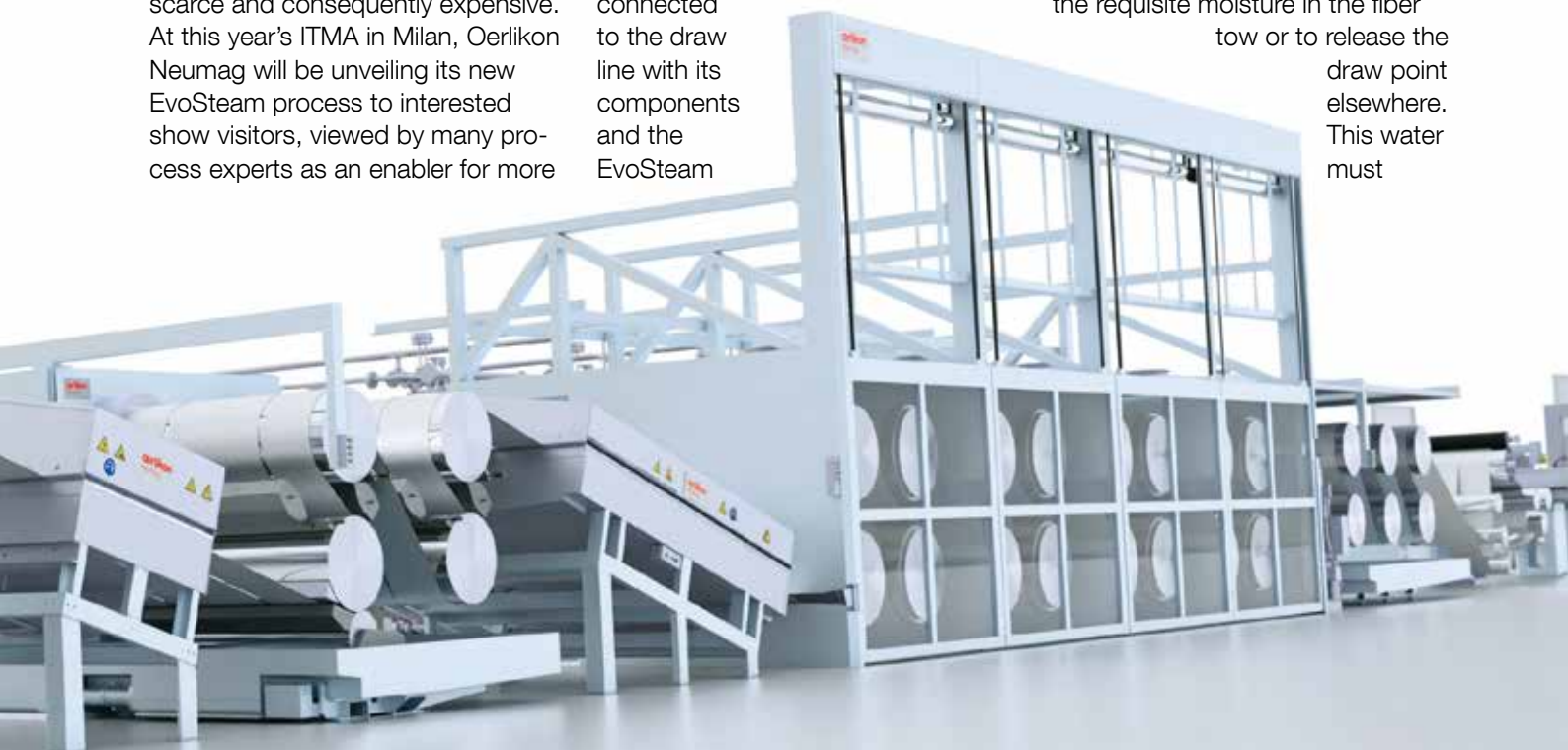
There is a huge demand for textile fibers: population growth of around 3% per annum, fast fashion and many other factors are fueling this demand. In view of noticeable climate change and its impact on people and the economy, resource- and environment-friendly manufacturing methods are absolutely crucial for the future. High production costs are currently eating up the margins of fiber producers. Noteworthy here are above all massively increased energy and polymer prices, but water is also an important resource today – very frequently scarce and consequently expensive. At this year's ITMA in Milan, Oerlikon Neumag will be unveiling its new EvoSteam process to interested show visitors, viewed by many process experts as an enabler for more

sustainable staple fiber production in the future. The objective of the new development is to lower both operating expenses (OPEX) and the carbon footprint with minimal consumption of energy, water and polymer – simultaneously with the excellent fiber qualities demanded by downstream processes.

It is precisely here that the new staple fiber concept with the EvoSteam process makes its mark. Next to the can creel, the modular spinning system – with its revised design and optimized energy consumption – is connected to the draw line with its components and the EvoSteam

process. Completely dispensing with liquid baths generates significant savings in terms of water, energy and finishes, while also increasing occupational safety and cleanliness at the production line. The function of the immersion bath is now assumed by a carefully-coordinated setup comprising godets and pulsed spray nozzles. Hereby, the moisture is metered precisely and added to the desired needs of the process.

“In conventional drawing processes, large liquid baths are used to control the temperature and provide the requisite moisture in the fiber tow or to release the draw point elsewhere. This water must



subsequently be removed repeatedly from the fiber – to date a very resource- and energy-intensive process which we have now changed. We anticipate that we can save considerable amounts of water”, states Technology Manager Tilman Reutter, talking about the innovative process’s development results. The economical use of water has an additional, direct influence on the requisite drying energy, which is significantly reduced.

Improving the fiber qualities by optimized draw point release

The fiber quality achieved with the EvoSteam process plays an important role for smooth-running downstream processes and is a decisive factor for fiber manufacturers’ margins. In addition to the fiber cross-section and the fiber tenacity, the uniformity of the fibers is also of great importance here. The Oerlikon Neumag process developers have catered to these requirements and optimized the release of the draw point. “The considerably dryer fiber tow undergoes the drawing process until the draw point is released, which is achieved by a vapor curtain

Spray nozzles replace immersion bath.

positioned exactly at a 90°-degree angle and precisely focused”, reports Tilman Reutter, talking about the accomplishment with great enthusiasm. “The fiber tow is handled more gently in this way, avoiding shearing of the filaments in the tow.”

Spotlight on reducing waste

The developers’ focus was not only on energy-efficient fiber production and improving the fiber qualities, they hope that the waste generated during manufacture can also be dramatically reduced with this system concept. Tilman Reutter comments: “With all the spinning system optimizations, the new line topology and the benefits of a well-adjusted EvoSteam process, we expect that production waste could be reduced by 50%. We are sure to prove the data so far achieved in our pilot trials with the first line in 24/7 operation.”



Production capacities of up to 250 tons per day

In addition to a considerably superior fiber uniformity, fiber tenacities of between 5.8 and 6.2 cN/dtex for cotton-type fibers with titers of 1.11–1.56 dtex are achievable – depending on the clients’ requirements and specifications. Upon its launch, the new staple fiber concept with the EvoSteam process will be available for capacity of 225 tons per day, later up to 250 t/d. In the case of 5.8 cN/dtex, the latter corresponds to the standard within the Chinese market.

The new EvoSteam process will be presented to an international audience for the first time at the **ITMA 2023 in Milan (Hall 1, Stand B211)**. » (che, hro)

Draw point release by vapor curtain.



Putting an end to **PET fiber waste**

Thermomechanical fiber-to-fiber recycling of PET fiber waste is environmentally-friendly and helps create a textile closed-loop economy – but also comes with challenges. The VacuFil Visco⁺ recycling system from BB Engineering overcomes these with an extremely promising concept – while simultaneously delivering a spinning system for high-end POY/FDY yarn.

PET fibers make up 52 percent of all fibers produced worldwide, correspondingly impacting the environment when they end up as waste. But this is precisely why they also offer opportunities. The better fiber-to-fiber recycling works, the better it is for establishing a closed-loop economy within the textile industry (see p. 18) – and for the environment: using rPET instead of virgin PET reduces the carbon footprint by 79 percent. Closed-loop recycling is also becoming ever-more important because used PET bottles – as the dominant starting material to date – are increasingly less available for fiber production. The reason: the beverages industry is being forced to recycle its waste materials as a result of legal recycling quotas.

In this situation, thermomechanical recycling holds great potential. Compared to other recycling solutions for PET fiber waste, this process is ecologically the best solution on the market. CO₂ emissions are 41 percent lower compared to chemical recycling with solvent-borne separation. The VacuFil Visco⁺ recycling system from BB Engineering (BBE), a joint venture between Oerlikon Barmag and the Brückner Group, operates thermomechanically and also caters to the special requirements of fiber-to-fiber recycling.



These begin with the starting materials: post-industrial waste and post-consumer waste differ widely in terms of properties, quality, composition and purity. This makes thermomechanical processing of these materials more difficult. Apart from the pre-sorting and treatment of the waste usually required, the recycling and also the melt spinning processes have to fulfill a range of requirements. These include reliable melt filtration, a sufficient increase and homogenization of the viscosity, a short melt dwell time and a low melt temperature for a good spinning performance and yarn properties.

It is in these decisive areas that the Visco⁺ reactor has revealed its strengths with regards to liquid-state polycondensation (LSP) and exceeds other LSP systems or solid-state polycondensation systems (SSP), which are unable to react as swiftly to changing starting material properties. The combined BBE system is therefore optimized for processes with very high viscosity requirements, offers three-stage filtration and enables the recycling of various types of fibrous PET waste into high-end POY/FDY filament yarn with low dpf values.

FDY spinning trials convincing

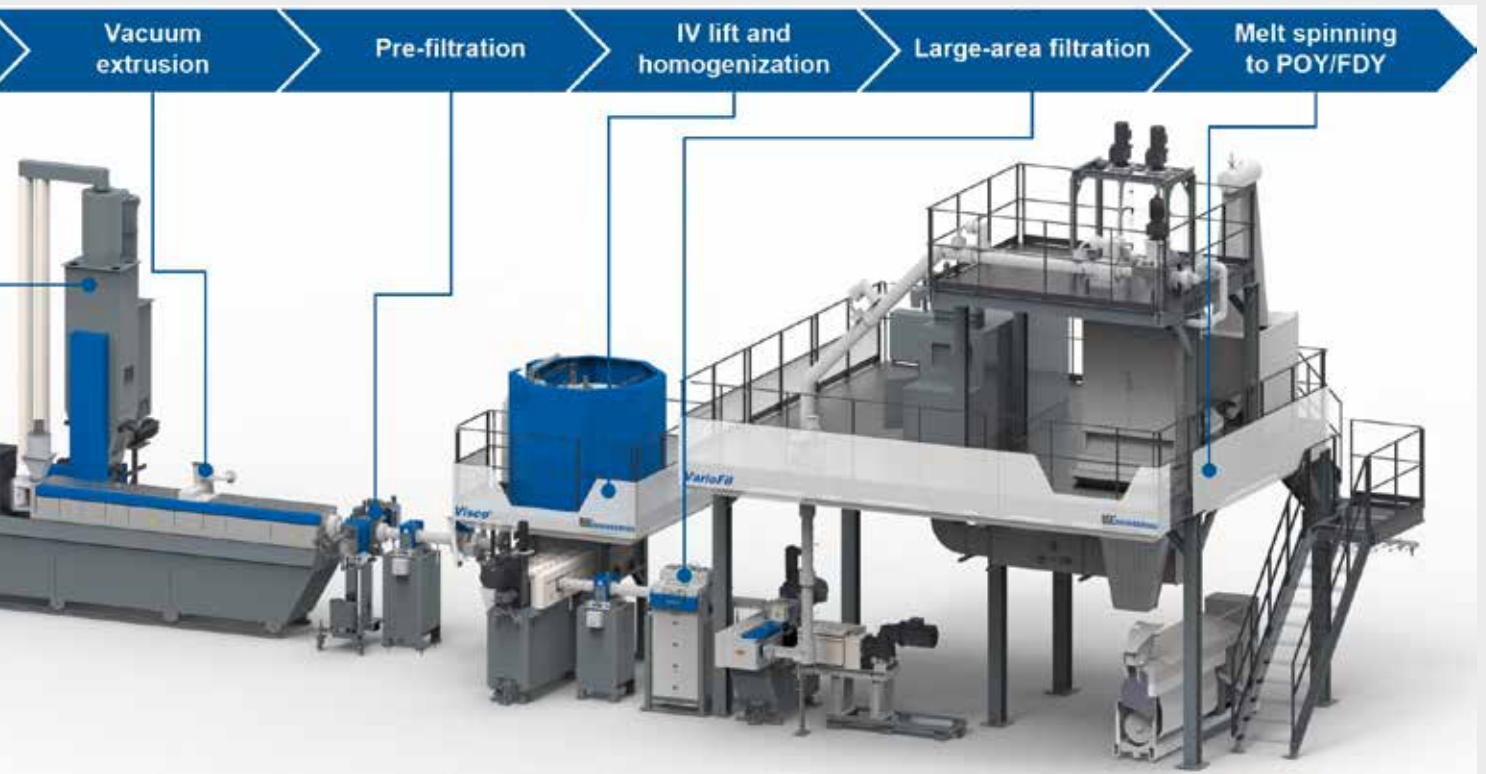
Add to this the fact that – in contrast to conventional thermomechanical fiber-to-fiber offline recycling processes – the VacuFil Visco⁺ does not require energy-intensive process steps such as agglomeration and SSP secondary-granulation. Agglomeration in particular causes degradation and yellowing of materials, along with an inferior spinning performance. As a result of the lower number of heating cycles in the VacuFil Visco⁺, the quality, the color values and the favorable mechanical and morphological properties of the material are retained. Compared to conventional technologies, this process also generates economical and ecological benefits such as lower energy consumption and lower investment costs,



Process steps of the VacuFil Visco⁺ inline fiber-to-fiber recycling line with connected VarioFil spinning line.

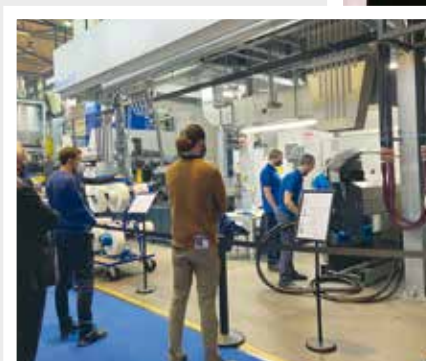
reduced space requirements and lower labor costs due to dispensing with several process steps.

To ensure very high product quality, BBE frequently conducts spinning trials with recycled materials using Oerlikon Barmag spinning technologies. To this end, the recycling of five different PET materials was tested using offline and inline systems and the FDY yarn products (2.2 dpf) manufactured compared to virgin PET. The starting materials included PET bottle flakes, post-industrial POY/FDY waste from untreated materials and already recycled post-consumer bottle flakes and post-consumer textile waste from mono-materials. The test results were most convincing: for example, the quality parameters of the yarns



made from bottle flakes and the two forms of post-industrial fiber waste were similar to those of virgin materials, with the quality figures for post-consumer textile waste slightly lower. All yarns featured excellent dyeing evenness, something reflected in the good evenness values. Furthermore, the lint formation values per 10,000 m in the case of all recycled fiber materials were actually lower than those for virgin materials and bottle flake materials. After all parameters were set, no yarn breaks were detected either. On balance, the materials recycled and the recycling process itself using the VacuFil Visco+ were of high quality. This means that there are no longer any obstacles when it comes to the closed-loop recycling of fibrous polyester waste. » (kue)

The inline fiber-to-fiber recycling process was demonstrated to numerous visitors at the Open House in October 2022.



Discuss with all our experts on site about:
Staple fiber, BCF, industrial yarn (IDY), continuous polycondensation, FDY, DTY and POY.

World Premiere:
Digital Twin – market launch at ITMA.

World Premiere:
JeTex from BB Engineering: new air-texturizing line for POY and FDY.

Ready for the smart factory with **digital solutions.**

Hydrocharging with **hycuTEC.**

On track for a sustainable future with competitive **recycling technologies.**



World Premiere:
EvoSteam – revolutionizing the polyester staple fiber process.

Oerlikon with world premieres at the ITMA 2023 in Milan

“Technology once again to create a better world”

This year's ITMA trade show appearance of the Oerlikon Group will focus on current challenges that the entire textile industry has to deal with: creating a circular economy within the textile value chain, providing energy-efficient technologies, using digital solutions to support a sustainable production, processing new materials, the tracking and tracing of all products and the recycling of the raw materials used.

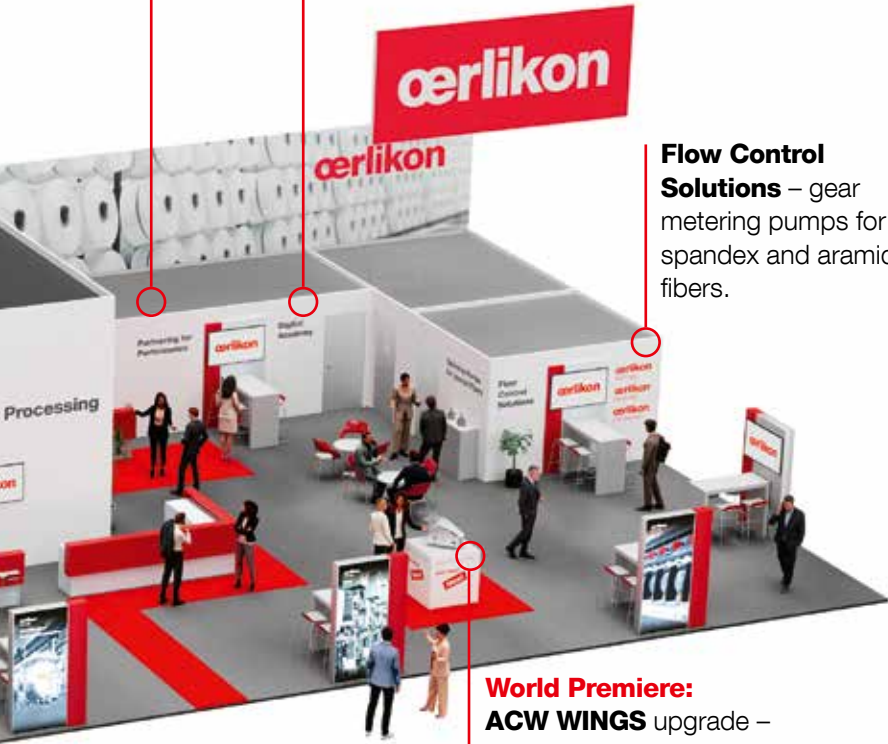
Partnering for Performance - customer services at your side.

World Premiere: Digital Academy – market launch at the ITMA.

Flow Control Solutions – gear metering pumps for spandex and aramid fibers.

World Premiere: ACW WINGS upgrade – shown for the first time at an exhibition in a hybrid manner.

Oerlikon Cafeteria – come and relax with us and refresh yourself for the challenges ahead.



Circular Economy?
Energy Efficiency?
New Materials?
Digitalization?
Traceability?
Recycling?

Oerlikon is the answer.

“At Oerlikon, we contribute with our innovative technologies for resource-saving use in almost all manmade fiber spinning mills in the world. Our promise for the future is to continue to expand the zero-waste production approach and thus ensure our customers’ and our own sustainability goals”, says Georg Stausberg, CEO of the Polymer Processing Solutions Division and Chief Sustainability Officer of the Oerlikon Group.

This sets out the claim of one of the world’s leading suppliers of machinery and plant solutions for manmade fiber production not only for this show: in the future, it will be solely a matter of sustainable innovations.

Scan the QR code and discover what you can experience with the technology leader in manmade fiber systems and equipment.



Or even better: come and visit us and immerse yourself in our world of experience!



ITMA 2023 Hall 1, B211

...in enables us ...d”

And there are certainly many more subject areas that the visitors of the ITMA will have questions about. Oerlikon therefore invites all trade fair visitors to come and chat with all its experts at its **booth in Hall 1, B211**.

Across more than 500 m², Oerlikon will be providing initial answers to the pressing questions of the present and the future and will present its technology solutions in an innovative way within its inspiring experience center. » (aw)

Customer Service: uniform contact center for customer enquiries

Finding help even

Wherever they might be in the world, Oerlikon Manmade Fibers Solutions systems should preferably operate continually and with as few downtimes as possible. This is the basis for Customer Service's self-imposed objective: providing support as quickly as possible.

Crucial for this is fast response times in the case of customer enquiries. To improve this, the Manmade Fibers Solutions business unit's Customer Service had created a new, uniform contact center. Because: the numerous contact options that customers were able to use to address potential issues to date had one major disadvantage: different time zones are a considerable obstacle when processing enquiries. The new contact center remedies this and is open to all customers worldwide. Customer Service can be contacted in two ways: via **myOerlikon.com** or alternatively using the **Service hotline**.

Troubleshooting using myOerlikon

Customers looking for support enter their service enquiries in ticket form using the established myOerlikon Manmade Fibers Solutions business unit's service portal. The benefit for Service customers is that they have an overview of the status of their enquiries at all times and are automatically informed of the solution. Mandatory fields in the troubleshooting tickets increase the information content of enquiries, making Customer Service processing faster.

This is how it works

1 Troubleshooting / Emergency !
Case Title *
Product information
Machine / Order No. *
Error description
Problem Type *
Problem Description *

2 Troubleshooting / Emergency !
Product information
Error description

Nummer	Beschreibung
106880300	FU-PLANETARY EAR PLUM
106880400	FU-SPIN FINISH PLUM
106880600	ACCESSORIES WINDING MACHINE
106880700	WINDSACT-1300/10
106880800	WINDER TOOLS
106880900	EL-WINDS-PDV
106881000	TESTING DEVICE FOR WINDER
106881500	ACCESSORIES ELECTRIC

3 Troubleshooting / Emergency !
Case Title *
Product information
Machine / Order No. *
Error description
Problem Type *
Problem Description *

4 Troubleshooting / Emergency !
Case Title *
Product information
Machine / Order No. *
Error description
Problem Type *
Problem Description *

n faster

Troubleshooting using the Service Hotline

In urgent cases, telephone enquiries can be made via the Oerlikon Manmade Fibers Solutions Service Hotline. The corresponding hotline numbers are listed both in the project documentation and in myOerlikon.

If the contact person in charge cannot be reached because the call is made outside office hours or on a public holiday, information is provided about the possibility of creating a ticket via myOerlikon or – as an alternative – leaving a voicemail. “If our customer would also like telephone support, this is provided in accordance with the ‘follow the sun’ principle by means of intelligent forwarding to the corresponding service partner worldwide. This speeds up reaction times and means our customer receive support faster”, explains Service Manager Tim Schulte, talking about the future process.

» (bey)



Customer Contact

The selection person will be contacted, if we have further questions.

Company: [Expand](#)

The contact above is the feedback receiver. * Ja Nein

5

cerlikon barmag

MY ACCOUNT MASCHINEN eCOMMERCE MEDIA Digital Academy Contact Center

Request confirmation defective yarn break sensors

Thank you for your request!

6

cerlikon barmag

myOerlikon-Portal

Dies ist eine automatisch erzeugte E-Mail.

A new request is being processed

Ticket Number: 1041

The request is currently being processed. We will inform you again, as soon as the status has been changed.

The ticket will be processed during regular office hours. In case of any urgency, please call our Troubleshooting Service Hotline.

Please inform the service agent about the already created service ticket then.

7

Digital Academy

Learning – a

Interactive and customized, modular and flexible in terms of time – all features of a modern training concept. Adapted to the needs and general conditions of the respective student, training sessions should be independent of time and place and the contents should be tailored.

This concept is being implemented within the Digital Academy at Oerlikon Manmade Fibers.

The digital online training center, available through the myOerlikon.com e-commerce platform, comprises a collection of role based e-learning modules on such topics as operation, maintenance and repairs – currently for the Oerlikon Neumag BCF S+ and S8 machines. Training is targeted at operating staff, process engineers and technicians, and quality assurance officers.

From generation to generation, the respectively latest machine generations increase performance and enable manufacturers diversification of their product ranges. Achieving maximum production system performance on a daily basis requires operating staff to be optimally trained – and to OEM standard.

High staff fluctuation rates, which have further increased since the COVID-19 pandemic, are heightening the demand for new training concepts that do not require face-to-face trainers. According to client surveys, 95% of customer production staff – from operators through to supervisors – receive ‘on-the-job’ training. Just 18% of their staff receive any additional training. Here, face-to-face training comes with a considerable logistical effort, results in travel costs and impacts operations more sensitively than individually plannable online training courses. “For face-to-face customer training, at least one of the groups needs to be mobile – either the training staff or trainees”, comments Tilmann Seidel, Vice

President Customer Services. “Homogeneous groups have to be organized for joint, face-to-face training. In turn, this means that more members of staff carrying out the same tasks are simultaneously out-of-action.” So it seems hardly surprising that 86% of those surveyed would like an online platform to support the training of their employees.

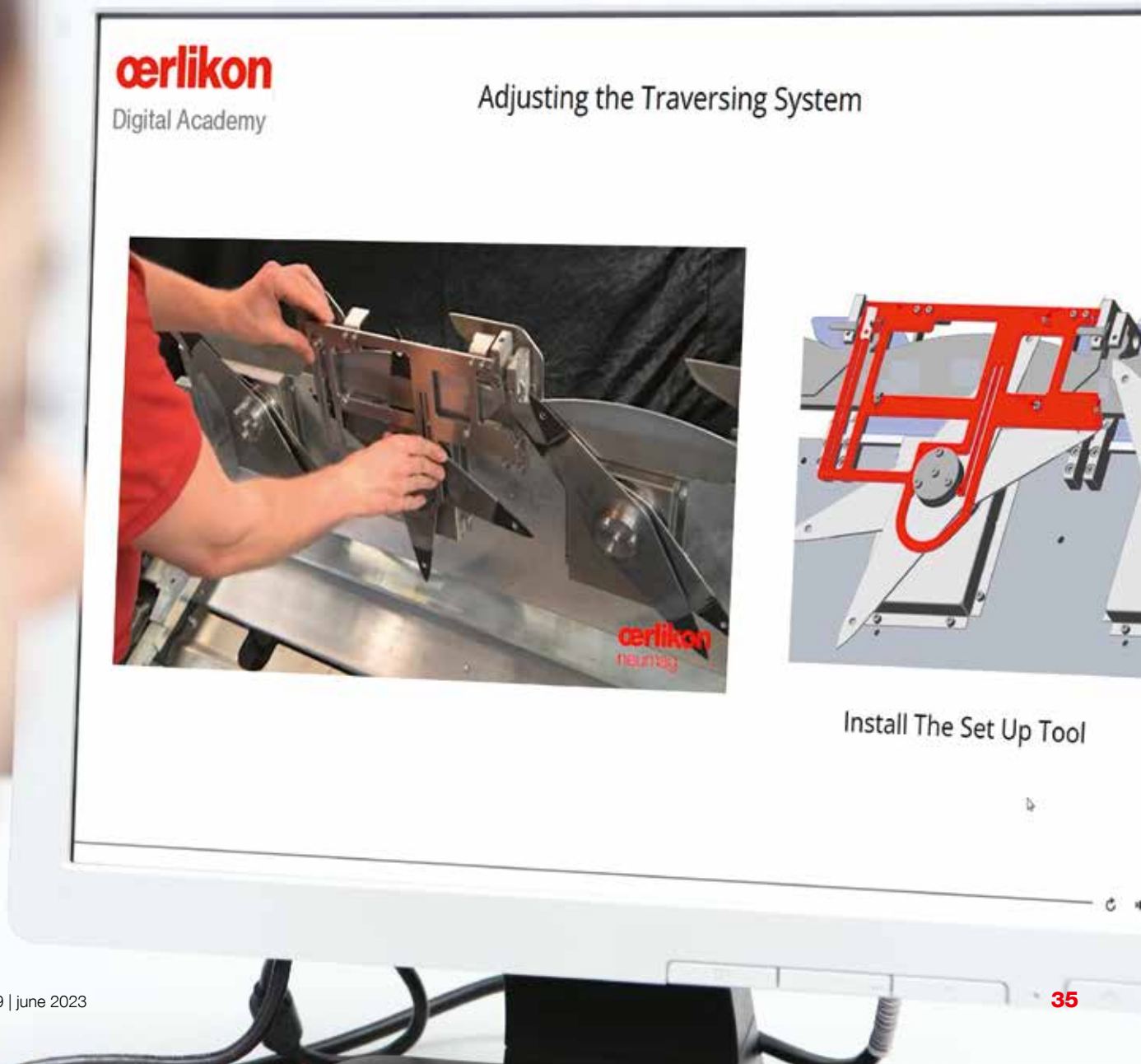
anywhere, any time

This is where the Digital Academy concept reveals its strengths: compact, role based learning contents that are accessible via mobile and stationary devices allow contents to be swiftly utilized by users. Here, success monitoring helps users internalize the contents and consolidate what they have learned. Feedback functions can clarify

comprehension questions at any time. Access to the Digital Academy is site- and company-dependent. The result: "We are able to train a far greater number of staff at the customers' sites – 24/7, to OEM standard and in an extremely efficient and resource-friendly manner. This benefits the performance of the systems and helps our custom-

ers to be more successful with our equipment", states Tilmann Seidel.

The Digital Academy learning contents are expected to be available for the Oerlikon Neumag BCF S+ and BCF S8 systems from June onwards. Contents will be continually expanded and made available to customers. » (bey, che)



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