

fibers^{and} f!laments

the experts' magazine

No. 30 | september 2018



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yarn factory 4.0

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of digitalization

page 8

Dear Customers, dear Readers,

You have probably already noticed that 'Fibers & Filaments' – which has been providing you with informative contributions from the world of textile technology for more than ten years now – has undergone further refinement recently. In terms of design, we are now using a style more reminiscent of modern magazines with an easier-to-read layout. With regards to contents, we want to more frequently take you on (not only) our journey into the future of textile technology.

To kick things off, we are focusing on the current magic word within the industry: digitalization. And we are planning to make this magic not only a reality. As the leading manufacturer of manmade fiber systems, we are now also endeavoring to become an Industrie 4.0 technology leader – in other words: offer you, our customers, digital solutions with superlative benefits. This also demands the digital transformation of our own company. For this reason, we have been establishing new methods and ways of thinking for many years now. Here, we are working beyond disciplines, divisions, departments and the company itself. In a nutshell: we are doing everything in our power to further develop our 'digital DNA'.

This focus will also be shaping our attendances at this year's ITMA ASIA + CITME 2018 and the ITMA Barcelona 2019. For this reason, we are also using the double-helix DNA model in this edition as a distinguishing feature of our new campaign. It is a feature and symbol of vitality and communicates our corporate and trade fair motto for the Digital Age: Bring it to Life! With this, we want to signal that Oerlikon Manmade Fibers is repositioning itself – as a systems manufacturer that is now also using artificial intelligence to create pioneering solutions and value added for its customers along the entire 'From Melt to Yarn, Fibers and Nonwovens' process chain.

But more on that in this edition of 'Fibers & Filaments' – enjoy reading!

Yours sincerely,



Georg Stausberg
CEO Oerlikon Manmade Fibers Segment



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Bring it to Life

ITMA ASIA + CITME 2018 **'Bring it to Life!'**

Bringing life to the transformation into a digital company – this is the mission of the Oerlikon Manmade Fibers segment. This also requires the manmade fiber sector innovation leader to make changes – in other words, to practically redevelop its own DNA. “Bringing systems competence and artificial intelligence together, the smart merging of hardware and software for the entire ‘From Melt to Yarn, Fibers and Nonwovens’ process – that is what makes us us”, acknowledges CEO Georg Stausberg.

And this year's ITMA ASIA + CITME 2018 marks the starting signal: with the motto 'Bring it to Life', the Oerlikon Manmade Fibers segment will be presenting its clientèle with very real, hugely beneficial digital solutions and products. The current edition of 'Fibers & Filaments' offers a pre-taste of what the international audience can expect to see in Shanghai. » (bey)

Oerlikon Manmade Fibers will be welcoming its visitors from 15 to 19 October in hall H2, stand B24.



Filtration

October 2 - 4, 2018, Philadelphia, USA

www.inda.org

ITMA ASIA + CITME 2018

October 15 - 19, 2018,

Shanghai, China

www.itmaasia.com

Outlook

October 17 - 19, 2018, Dubrovnik,

Croatia

www.edana.org

Hofer Vliesstofftage

November 7 - 8, 2018, Hof, Germany

www.hofer-vliesstofftage.de

ITMACH Africa

November 27 - 29, 2018,

Nairobi, Kenya

www.ITMACH.com

Irantex

December 2 - 5, 2018, Teheran, Iran

irantex.com

Domotex 2019

January 11 - 14, 2019,

Hanover, Germany

www.domotex.de

Techtextil North America

February 26 - 28, 2019, Raleigh, USA

techtextil-north-america.us.messefrankfurt.com

Domotex USA

February 28 - March 2, 2019,

Atlanta, USA

domotexusa.com



30 years of Oerlikon Barmag in Shanghai

Along with around 100 customers from the Chinese manmade fiber industry, the event was also attended by numerous colleagues from the German headquarters in Remscheid, from Beijing, Suzhou, Wuxi and from Oerlikon Barmag Huitong Engineering. Many came to celebrate this milestone in the history of Oerlikon Barmag over lively discussions on the Pujiang pleasure (see photo).

The management had prepared an anniversary plaque for the team in Shanghai, while also presenting them with the 'Oerlikon Manmade Fibers – China's Best Regional Sales Award', the 'Oerlikon Manmade Fibers – China's Best Executive Award' and the 'Oerlikon Manmade Fibers – Iron Man Award'.

June 30 was also the last workday for Ernst Keller, who has been responsible for Chinese sales at the headquarters in Remscheid for the last 20 years and now enters his well-earned retirement. During the event, the Oerlikon Barmag Shanghai team thanked Ernst Keller – attending the celebration accompanied by his wife – for his many years of loyal commitment to the Chinese market. » (jli)

Polyamide process chains complemented

Polyamide is used in countless everyday items – from apparel, toothbrushes, carpets and automobile fittings all the way through to PC housings, dowels and pipes. For manufacturing extremely flexible, high-performance products from polyamide 6 (PA6), Oerlikon Manmade Fibers offers a broad range of machines and systems that the company has now further expanded. At the end of March 2018, the group segment acquired the decades-long tried-and-tested technology of PE Polymer Engineering Plant Construction GmbH, based in Thuringia, Germany. This includes the entire polyamide 6 polycondensation systems division and its PA6/66 co-polymer and the patented dimer-hydrolysis procedures for feeding recycled-lactam with the very highest end-product quality. With this expansion of the product range to include the melt preparation process step, Oerlikon Manmade



Nylon is the trade name, polyamide the material for such stockings. With its special properties, polyamide has become indispensable in the textile world.

Fibers now covers the entire polyamide process chain for fibers and filaments – from the melt to the granulate through to the finished yarn. This guarantees the necessary knowledge base for entering the high-end PA6 granulate market for the engineering plastics and film packaging industries. Customers also benefit from an internationally tried-and-tested implementation concept that covers everything from sourcing investment through to securing operational availability throughout the entire lifespan of a system.

» (jda)

Digital: new website

In time for the ITMA ASIA + CITME 2018, the Oerlikon Manmade Fibers segment is presenting itself with a new website, which will include a shop function. With this, the company will from now on be offering its customers an innovative platform that caters to the growing level of digitalization. Come and pay us a visit by going to www.oerlikon.com/manmade-fibers and www.myoerlikon.com. » (bey)



Barmag Teknik Servis celebrates 20th anniversary

The service station was established in 1998 in response to the demand for services. It is superbly located at its site in the industrial region in Bursa, as this is home to many filament yarn manufacturers. This close proximity enables the service station staff to provide customers with fast and reliable support.

Services include commissioning texturing systems, after-sales services and problem alleviation for texturing and spinning machines. Technical support for spare parts procurement is also offered.

To keep their knowledge up-to-date and to further train themselves, the service station employees regularly attend workshops at the Oerlikon Barmag headquarters in Remscheid.

In Turkey, Barmag Teknik Servis provides service support for 56 polyester, polyamide and polypropylene manufacturers and their POY and DTY processes. » (ara)



Since 1 April this year, Efe Arabacigil has been in charge of the service station in Bursa. He took over from Abdülmecit Karadag, who has gone into well-deserved retirement.

imprint

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The challenge of digitalization

Revolution or evo

Today, Industrie 4.0 is already making its mark at many companies across the globe – and is there to stay. The Age of Digitalization has also arrived in the textile sector – manifesting itself in the production of customized apparel within a mere few hours in microfactories or in the form of cost-optimized, self-controlled production based on networked systems and data analysis. At the same time, there are challenges that are slowing down the advent of digitalization. Data protection and data security being just two of these.

Analysts at the consultancy PricewaterhouseCoopers (PwC) were astonished: its 2016 study 'Industrie 4.0: Building the digital enterprise' revealed that many companies across the globe are already taking digitalization seriously. The more than 2,000 participating companies from nine sectors of industry in 26 countries were planning to increase their degree of digitalization in 2015, the year of the survey, from an average of 33 percent to 72 percent within the five following years leading up to 2020. To achieve this, these enterprises are planning to invest around five percent of turnover – equivalent to US\$ 907 billion a year. In return, they expect cost savings of 3.6 percent and average annual sales growth of 2.9 percent.

Huge investment in digitalization

This tendency is not only evident within companies in industrialized countries, but also in emerging economies and developing countries – however, the PwC study is able to filter out differing targets. In Germany, Scandinavia and Japan, it is primarily about expanding operational efficiency and product quality. In the US, businesses plan to develop predominantly new digital business models and to expand digital product and service ranges. China is hoping to benefit as a result of automating and digitalizing labor-intensive manufacturing processes.



At its virtually fully-automated Speedfactory, Adidas is able to design, and in part manufacture by means of 3D printing, trainers in a matter of a few hours rather than over several months.

lution?



The study anticipates that the challenges for companies will above all lie in digitally qualifying staff or recruiting expert employees and in establishing an appropriate internal organization and 'digital culture'. This is necessary in order to use data analysis to improve and optimize planning and hence exploit the full potential of Industrie 4.0.

Textile Industrie 4.0: the status quo

Digitalization is also creating a revolution within the textile industry: clients can today already configure and order customized apparel online and have it delivered with very short lead times. This form of manufacturing is also becoming increasingly profitable for manufacturers, as production and logistics processes will in future be extensively automated and self-controlled. However, some textiles experts are viewing the revolution more as an evolution: there is frequently currently still a lack of qualified manpower, reciprocal networking and interdisciplinary co-operation to realize these visions. When looking at digitally covering the entire value chain, not all links are in place yet for Industrie 4.0: they might be in sewing factories in China, but not at those in Ethiopia or Hungary. And the textile industry therefore requires sector-specific solutions above all.

The fact that these are possible is meanwhile being showcased by ever more Industrie 4.0 pioneers. At its virtually fully-automated Speedfactory, Adidas is able – after a treadmill analysis of the customer at the point-of-sale – to design, and in part manufacture by means of 3D printing, trainers in a matter of a few hours rather than over several months. With their microfactories, companies under the auspices of the Deutsche Institute für Textil- und Faserforschung Denckendorf (DITF/ German Institutes for Textile and Fiber Research Denckendorf) are demonstrating how an integrated production chain for apparel works, manufacturing sweaters and T-shirts using 3D simulation patterns in half a day – customized and profitably even for batch sizes of one. The project can be viewed as a fantastic example of the exchange of knowledge and technology transfer that Industrie 4.0 solutions require. And it enables more flexible, more customer-focused business models away from conventional mass production. The well-known elite German university RWTH Aachen is pursuing a similar approach. In a Learning Factory 4.0, the so-called Digital Capability Center (DCC), the Institut für Textiltechnik (ITA/Institute for Textile Technology) housed

'There is frequently currently still a lack of qualified manpower, reciprocal networking and interdisciplinary cooperation to realize these visions'

there is showcasing how digital transformation can be successful on the basis of a networked textile process chain and using assistance systems, among other things.

On the way to the fully-networked textile factory

And with that, we move from the consumer product to the actual production and ultimately to the textile machine manufacturers. They are also focusing on digitalization and are intensively driving the development of an entire industry forward. But even the manufacturers of textile machines for mass production are looking at digitalization. The scenario of the future: textile production – from the supply chain through to dispatch – is autonomously controlled in the fully-networked Factory 4.0. The product being created controls and monitors the processes itself using embedded sensors. The manufacturing or order status is known at all times, raw materials are automatically reordered, wear and maintenance are planned as integral parts of the production process and error processes are identified, alleviated or displayed. This should cut costs, convert production lines more flexibly and help reduce downtimes and waste. For this, the machine construction sector has to provide



Oerlikon Barmag's texturing machines are digitally networked to ensure smooth production of quality yarns.

correspondingly intelligent and web-enabled production systems, capable of communicating using wired or wireless connections. No easy feat, as this requires interfaces between all systems involved and the collation, channeling and evaluation of tremendous volumes of data in real time.

The first steps on this journey have already been taken – with Oerlikon in the very vanguard. With its Plant Operation Center (POC) for process monitoring, Oerlikon Barmag, for instance, enables the collation of existing production data in a central location and to make these data available. On the occasion of the ITMA ASIA + CITME 2018 in Shanghai, China, the company also showcased the prospect of a development designed – on the basis of machine data – to identify error patterns or deviations as well as provide diagnosis support and help using artificial intelligence (see p. 16). An assistance system based on mixed-reality glasses (Microsoft HoloLens) has already been launched by Oerlikon – supporting predictive maintenance concepts and enabling virtual 360-degree tours through spinning systems. “The market is increasingly looking for more intelligent machine technology in order to more speedily and profitably collate and evaluate production data. And we are addressing this trend and are presenting solutions in a new, digital dimension”, comments Markus Reichwein, Head of Product Management for the Oerlikon Manmade Fibers segment.

Digital visions require the qualifying of employees


Digital visions indicate a future in which consumers are able to codetermine their textile products to a considerably greater extent. New business and production models are emerging that will also make smaller batch sizes profitable. This will once again make high-wage countries attractive manufacturing sites. But experts do not anticipate that intelligent, extensively-automated factories will not be able to dispense entirely with people. People will, however, assume other tasks – in part within the context of newly-created professions. Against this backdrop, qualifying employees and their positive (or negative) view of the opportunities offered by digitalization will be decisive in how swiftly the textile industry embarks on its digital future. And data protection and data security open up many questions that could slow down the speed of the revolution that is Industrie 4.0. Ultimately, many things depend on the textile companies themselves and their ability to embrace – and prepare themselves and their employees for – the opportunities offered by digitalization. » (tho)



How does a manmade fiber systems world market leader with currently more than 3,000 employees successfully undergo digital transformation? This first and foremost requires an economically solid foundation and numerous digital change modules such as organizational adaptability, agility and the qualifying of employees. Georg Stausberg, CEO, and Jochen Adler, CTO describe the exciting path the Oerlikon Manmade Fibers segment is embarking on to create new digital products and services with superlative customer benefits.

Talking to Georg Stausberg, CEO,
and Jochen Adler, CTO

En-route to becoming a digital trendsetter



Mr Stausberg, do you remember taking your first steps into the new Digital Age?

This was more of a creeping process than a conscious step. It started with me using the Internet and e-mail – first on PCs, then on mobile end-devices. Meanwhile, digital technology has invaded every aspect of our lives, be this in our homes or in our modern cars. About four years ago, the latter resulted in our company starting to consider how we could create additional customer benefits using artificial intelligence. And automobiles are today increasingly differentiating themselves from each other more by means of digital assistance systems than through classical transmission or chassis technology. We want to become the textile machine construction trendsetter for technologies of this kind.

What have you done to successfully achieve this in collaboration with colleagues and customers?

Even in economically difficult times, we had the courage to invest in the future. Following detailed strategy discussions within the management team, we decided to set up an international project group two years ago. In discussions with research institutes, companies from various sectors, in-house experts and numerous

“Agility is an absolute prerequisite for an organization to be successful in digitalization.”

Georg Stausberg, CEO

customers, the group developed concrete ideas and analyses on which digital products and solutions could be interesting for our customers and what customer benefits could be generated with these. The result is numerous ideas that are meanwhile being marketed or are currently being trialed as prototypes. When putting together and organizing the project team, we also tested new forms of collaboration, which have proven to be effective and are now being rolled out in other divisions of the company.

Can you elaborate a little on these new forms of collaboration?

The speed and dynamism of the development of digital products and solutions is breath-taking. Agility is therefore an absolute prerequisite for an organization to be successful here. Our project group has been able to organize itself and – without any clear hierarchies – only had to interact with a functional steering committee. It was important that we also had representatives from China and India, two of our most important markets, on board. To this end, we were able to include local aspects early on. Departmental boundaries also have to disappear when developing digital products. The Development, IT, Customer Services and Operations departments can only develop multifunctionally-interesting digital solutions if they work together.

Mr Adler, you have been our CTO since 2017.

What have you done to master digital transformation?

Very much in line with our ‘We drive the markets’ maxim, we are once again ramping up the speed. This means that we have established and expanded digital pacemakers on the basis of our product and service portfolio and tried-and-tested innovation processes.





Georg Stausberg, CEO of the Oerlikon segment Manmade Fibers, has been driving the digital transformation at his company since 2015.

This has resulted in agile organizational units, innovative work methods such as design thinking and scrum and also in the utilization of virtual reality and augmented reality at the customer.

What can your customers now expect ‘digitally’ from Oerlikon?


I would say the digital refinement of our machines and production systems for manufacturing yarns, fibers, nonwovens along the textile value chain. Here, our pledge is: value-added beyond our excellent hardware. We want to further optimize the efficiency of the systems and the quality of the end products with digital solutions. True to our e-save philosophy, our mission is to protect the environment and to promote the sustainability of our solutions. For this, we are deploying the know-how of our newly-integrated partner AC-Automation – which specializes in large-scale systems automation, transport, packaging and warehouse logistics and end product automated quality control. We combine this with our process competencies and digital data handling using our Plant Operation Center, or POC in short. This has created innovative Industrie 4.0 solutions for our customers – with integrated storage and communication capabilities, wireless sensors, embedded actuators and intelligent software systems. In turn, this allows us to build bridges between data and material flows and between the virtual and real worlds.

Mr Stausberg, what aspects of this will your customers already be able to see at the ITMA ASIA + CITME 2018?

At our trade fair stand in Hall 2, B24, we will be offering our visitors a digital experience that allows them to intensely discover and understand our machines, systems, components and services. Here, we will be deploying playful solutions to present the topic of artificial intelligence. We will be taking our 360-degree and augmented-reality applications as well as our virtual showroom with us, to allow visitors to experience complex systems live in 3D. The ‘digital factory’ is already in part becoming a reality in conjunction with our machine exhibits.



With his team of more than 200 experienced engineers, Jochen Adler, CTO of the Oerlikon segment Manmade Fibers, is focusing on future-oriented technologies with high customer value.



“We are building the bridges between data and material flows and between the virtual and real worlds.”

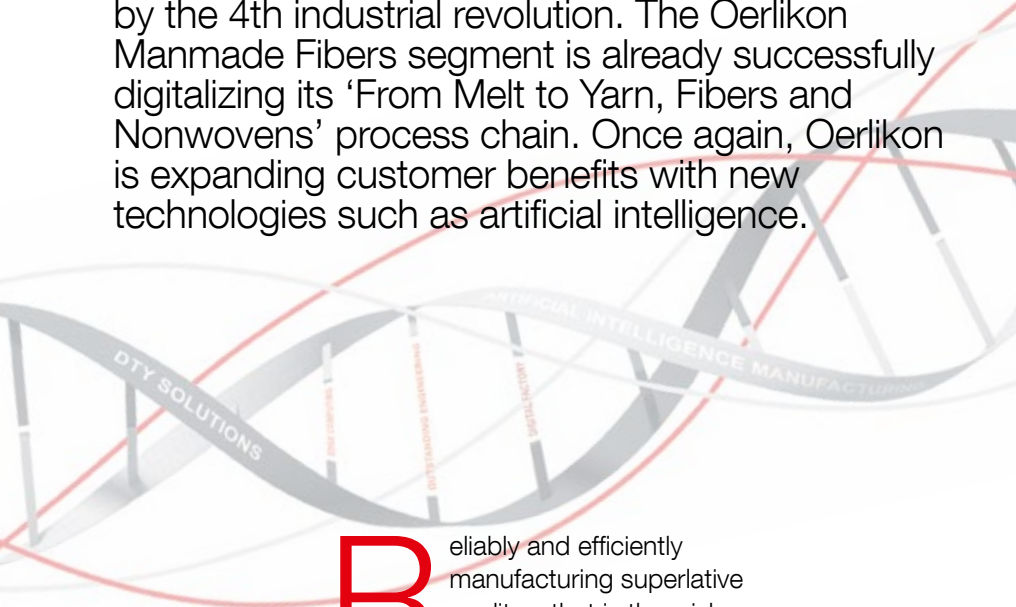
Jochen Adler, CTO



Artificial intelligence (AI)

Creating the digital yarn factory

Manmade fiber manufacturing is not being spared by the 4th industrial revolution. The Oerlikon Manmade Fibers segment is already successfully digitalizing its 'From Melt to Yarn, Fibers and Nonwovens' process chain. Once again, Oerlikon is expanding customer benefits with new technologies such as artificial intelligence.



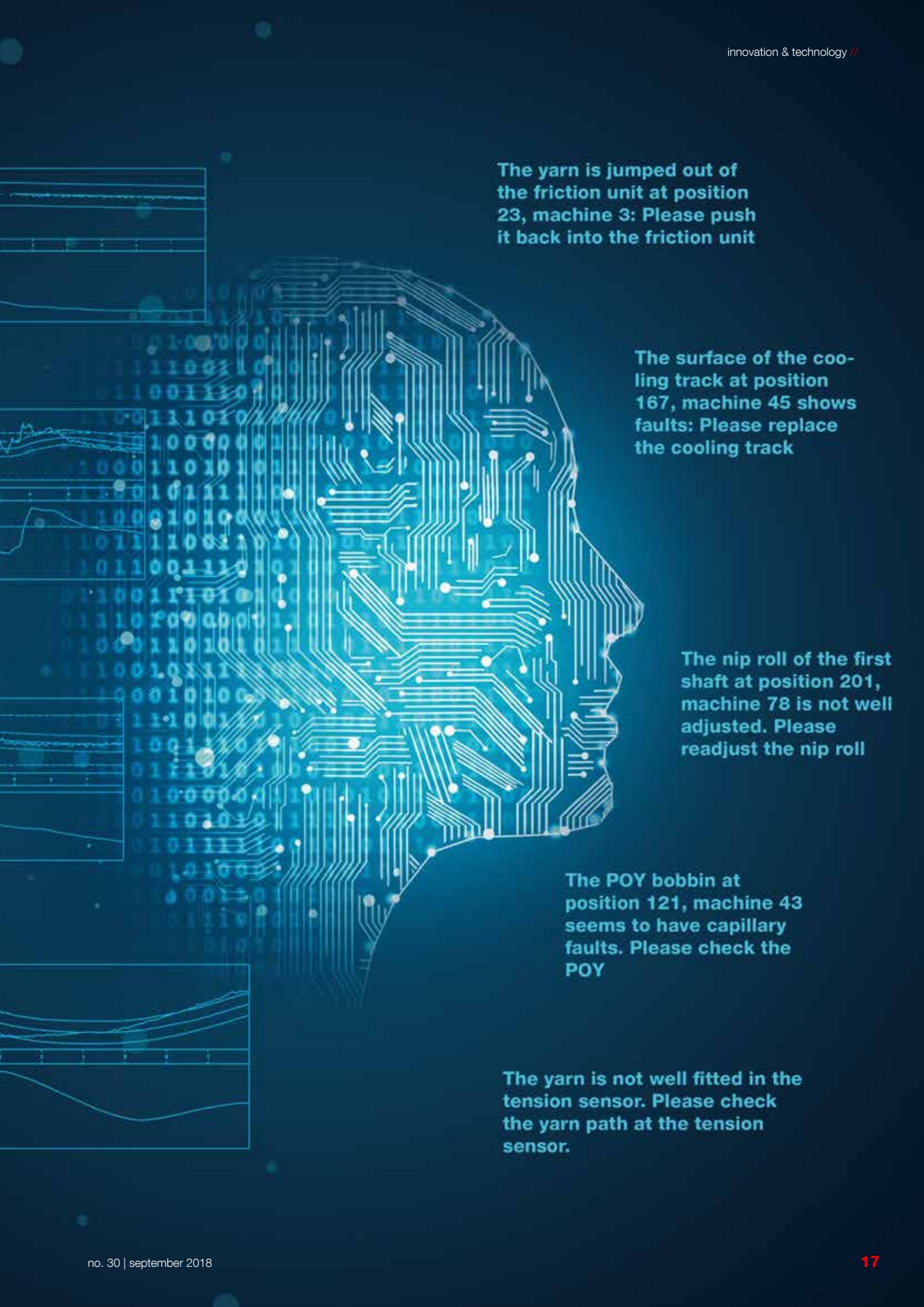
Reliably and efficiently manufacturing superlative quality – that is the wish of every yarn, fiber and nonwovens manufacturer. However, optimally adjusting manufacturing with constantly-changing products is a huge challenge: because even small deviations can have a massive impact on the quality of the end product.

To better monitor and control production across all systems against this background, globally technologically-leading machine and systems constructor Oerlikon has expanded its Manmade Fibers segment portfolio to include new digital products and services.

By integrating the know-how of the recently-acquired German industrial automation solutions specialist AC-Automation, Oerlikon now offers Industrie 4.0 systems solutions from a single source: the entire manmade fiber manufacturing plant is – step by step – being automated, digitalized and expanded to include new functions.

The digital system AIM⁴DTY is being 'trained' using trend charts and their respective errors. The result is a digital customer service that determines the probable causes of quality impairments.





The yarn is jumped out of the friction unit at position 23, machine 3: Please push it back into the friction unit

The surface of the cooling track at position 167, machine 45 shows faults: Please replace the cooling track

The nip roll of the first shaft at position 201, machine 78 is not well adjusted. Please readjust the nip roll

The POY bobbin at position 121, machine 43 seems to have capillary faults. Please check the POY

The yarn is not well fitted in the tension sensor. Please check the yarn path at the tension sensor.

This starts with human-machine interfaces (HMIs), which have enabled hugely interesting services – whether process monitoring via a service online app (see edition 29 of fibers&filaments) on smart phones and tablets or customer care and maintenance using the Microsoft HoloLens solution. The possibilities range from expanding the ‘From Melt to Yarn, Fibers and Nonwovens’ process chain to include upstream and downstream steps. Because it makes sense in the future to include those processes – such as automatic labeling or yarn package, fiber and nonwoven bale logistics – to date covered by means of third-party solutions.

Edge computing and cloud solutions

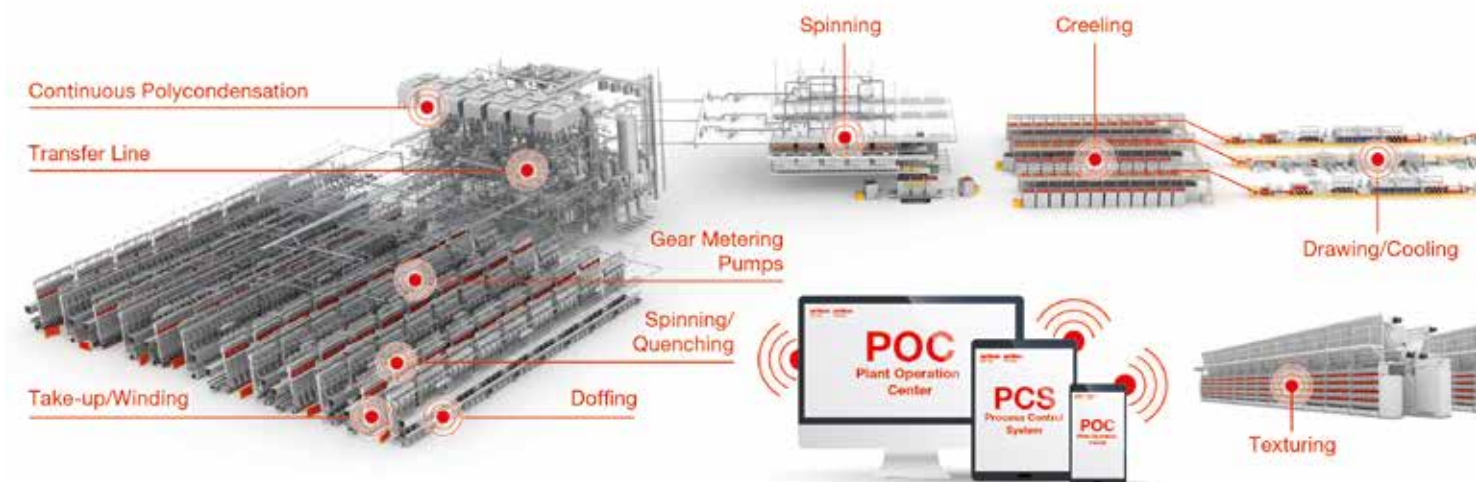
All these functions and services are – together with the Plant Operation Center (POC), which at Oerlikon assumes the function of a manufacturing execution system (MES), including the link to superordinate ERP systems – provided by the Oerlikon Digital Services platform. The machines, systems and third-party systems are networked and integrated by means of power edge computing and cloud solutions based on the OpenStack industry standard. This means that the data

are utilized at the customer site as far as possible and only transferred to the central Oerlikon central customer data center if required – and only following customer approval. Here, data security, data minimization and transparency are extremely important: “Needless to say, we process all data in accordance with the new European General Data Protection Regulation (GDPR), taking all further international data protection standards into account. Our customers always know which data we use and why”, explains Mario Arcidiacono, Business Intelligence & Data Warehouse specialist for the Oerlikon Manmade Fibers segment.

Scalable IT architecture

This IT architecture guarantees infrastructure management without operational downtimes – while the system and virus protection are always automatically updated. A further significant benefit is the scalability of the hardware and software, which can be adapted as needed in the event of changing requirements.

Sensors in the polycondensation system, the spinning plant and the texturing unit generate huge volumes of data (see graphics below), further increased by additional



information such as drive data and target values, for instance. Collating such a mass of data however only makes sense if they are also automatically, swiftly, intelligently and reliably processed.

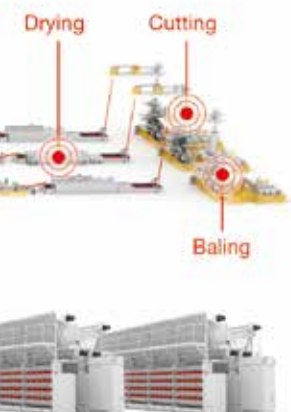
An example: In the texturing machine, the UNITENS¹ monitoring sensor continually measures the yarn tension at all positions. An error is generated if a measurement value does not lie within the prescribed tolerances – easily creating 125,000 graphs or more a day! In ever more cases, the form of the graphs can provide information on the error causes and ultimately provide targeted and efficient response to these. However: “Analyzing the graphs is currently carried out manually, which is very time-consuming. Hence, comprehensive data analysis and optimization of the production is in principle not possible using manual means”, states Jörg Huthmacher, Senior Manager Digital Transformation for the Oerlikon Manmade Fibers segment.

¹UNITENS is an internationally registered trademark exclusively owned by Saurer Fibrevision Ltd., Macclesfield, UK.



‘Our AIM is your success’

How can these data now be sensibly processed? Here, new technologies such as machine learning reveal opportunities that have to date been locked. “In future, our latest digital solution – we are calling it ‘artificial intelligence manufacturing’, or ‘AIM⁴DTY’ for short – will provide help for texturing machine and systems solutions”, says Jörg Huthmacher. AIM⁴DTY is a digital system that is being ‘trained’ using trend charts and their respective errors. The result is a digital customer service that determines the probable causes of quality impairments. The information is instantly available to customers, therefore allowing them to immediately optimize the quality during running production.



Glossary

A **manufacturing execution system (MES)** is a production control system directly linked to process automation systems. It enables the controlling, steering and monitoring of the production process in real time. It includes classical data acquisition and processing – such as operating, machine and personnel data acquisition along with all further processes – that have an immediate impact on production processes. At the Oerlikon Manmade Fibers segment, we call it the Plant Operation Center (POC).

Edge computing is the relocation of computing power, applications, data and services to the logical margins of a network. Data processing can take place in various places – in real time, or using central servers in networked factory halls.

OpenStack is an open cloud operating system (open source) with which companies can create flexible and scalable private clouds based on standard hardware. OpenStack allows large pools of computing, storage and network resources to be controlled in a computing center using a dashboard or programming interface.

The General Data Protection Regulation, abbreviated to **GDPR**, unifies how personal data is processed by private companies and public offices EU-wide for the protection of personal data within the EU as well as ensuring free data communication within the European domestic market.

New information is acquired by linking the most diverse production data. This allows not only the continual optimization of the production process, it also ensures that predictive maintenance is now a reality – for superior yarn quality, greater process reliability and improved system efficiency. » (gut)

Made simple

Flexible staple fiber p

Economical, flexible and compact – this is the motto with which Oerlikon Neumag will showcase the Staple FORCE S 1100 at the ITMA ASIA + CITME 2018. The staple fiber system excels at two things in particular: it produces small batches (up to 15 tons per day) and can be swiftly reconfigured for various requirements, including polymer, dye and titer changes. Its process control system for easy operation is absolutely unique. And all this for a modest initial investment.

Large-scale staple fiber systems are only conditionally suitable for manufacturing smaller volumes of fibers.

This is because frequent stopping and restarting of the system in order to switch raw materials and operating parameters results in expensive downtimes and high wastage. Nevertheless, small batch manufacturing is in demand – for instance, in the case of staple fiber products with changing fashion colors or various titers. And new fiber materials are initially tested and launched in small volumes. “For this reason, manufacturers already producing staple fibers in large volumes are also interested in additional systems for smaller flexible production”, reports Stefan Schäfer, Sales Director Staple Fiber at Oerlikon Neumag.



The Staple FORCE S 1100 spins, draws, crimps, cuts and bales in a single process step. Here, the fiber tow is drawn using godets in a highspeed process. Sets of godets positioned above each other form a stretch duo with its own hood.

roduction



The installed Staple FORCE S 1100 is 30 meters long, 12 meters wide and manufactures up to 15 tons of staple fibers of extremely even quality a day.

The Staple FORCE S 1100 fulfills these requirements and also offers a special highlight: its innovative process control system. Operators are able to steer the system using just five buttons – ‘stop’, ‘back’, ‘next’, ‘pause’ and ‘acknowledge’, ensuring that operating errors are virtually ruled out. Parameters for the various operating modes are preset to ensure easy start-up. To this end, the operator now only needs to jump from one operating mode to the next using the control unit. And the process parameters for the various fibers manufactured are also stored as a recipe, allowing operators to access them at any time without reentry. This results in a fiber quality that can be reproduced more accurately.

The Staple FORCE S 1100 is a one-step plant, which spins, draws, crimps, cuts and bales in a single process step. Here, the fiber tow is drawn using godets in a high-speed process. Sets of godets positioned above each other form a stretch duo with its own hood. This simultaneously provides several benefits: each

duo has its own temperature zone under the hood. To this end, the temperatures remain more constant, with no drop in temperature between the two godets of each duo. Furthermore, the hoods act as steam chests, hence dispensing with the water and steam baths used for steaming the fiber tow in the conventional process. This ultimately also reduces energy costs.

Those investing in the system with its relatively low procurement costs benefit from the simple system commissioning: it is delivered as modular, preinstalled components and a spinning beam with integrated, low-maintenance HTM (Heat Transfer Medium) system. This means that an external boiler with all the corresponding pipes is no longer necessary, dispensing with expensive, time-consuming welding. The installed Staple FORCE S 1100 is 30 meters long, 12 meters wide and manufactures up to 15 tons of staple fibers of extremely even quality a day.

» (ffr)



Wiping robot makes operator's life easier

More intelligence,

A prime example of an automated solution: cleaning spinnerets. Thanks to its intelligent control system, the Oerlikon Manmade Fibers wiping robot not only saves production time, work and operating costs, it also generates benefits for HR and health management.

Sure, manual work also has its benefits. However, nobody – and particularly not operators – look forward to manually wiping the spinnerets in the spinning head. In a fiercely hot environment, it involves using a brass tool to remove residual melt from the extruded filaments from the spinneret. Here, lots of silicone oil is atomized from aerosol cans. In view of this overall extremely elaborate measure and the costs involved, production managers are hardly thrilled by the prospect of carrying out this task.

Because a maintenance job of this nature practically cries out for automation, Oerlikon Manmade Fibers has now developed a wiping robot. And a smart one at that, as its control unit is able to communicate with the production system. “This intelligent control system



The wiping robot is suspended on a track system under the ceiling.

less work

contains the solution's actual expertise, which networks machines and processes – very much in line with the Industrie 4.0 concept", explains Stephan Faulstich, POY Technology Manager at Oerlikon Barmag. Initially, this means: the information relating to all wiping positions, cycles and times can be saved in the management system. The robot accesses the saved wiping intervals in an automated and safety-relevant manner – without manual intervention, but accompanied by a whole range of advantages.

To this end, the robot can cope with up to 48 positions, corresponding to one entire production line. Both the wiping quality and the oil application remain constant around the clock. Furthermore, the silicone oil from canisters deployed here costs just a fraction of the manually-utilized 500-milliliter (ml) spray cans, which contain merely 12 ml of oil, as the lion's share is made up of propellant gases that are harmful to health and environment. So, applying oil from canisters saves costs for the procurement, storage and disposal of spray cans.

However, more decisive here is the impact of the intelligent control system, with whose help the spinning pump can be moved up and down in an automated and 'in-time' manner. To this end, pump stops can be kept to the absolute minimum using a robot, considerably reducing the impact of the wiping on both the polycondensation system process stability and on the yarn data of the spun yarn. And production times can be increased between two cleaning cycles as well: whereas repeated wiping is required after 48 hours in the case of the manual process, utilizing the robot extends the interval between two wiping processes to up to 60 hours. Customers have already been benefiting from such optimized times: Oerlikon Manmade Fibers wiping robots have been operating at two major yarn manufacturers in China for well over a year now. » (tho)



The wiping robot can cope with up to 48 positions, corresponding to one entire production line.

Dr. Ingo Mählmann on geotextiles

Significance and in everyday life

Geotextiles are already being used to provide various functions in penetration protection, drainage, reinforcement and separation. Once installed they are used to help secure dams and disposal sites but also increase the load-bearing capacity of the substrate in road, path and railroad construction, without even being visible.

volumes of geotextiles are required. This has led to a six-percent annual growth with regards to the use of nonwovens in geotextiles. Besides that, many manufacturers are continually developing new and innovative applications, in which nonwovens such as geotextiles are often replacing classical materials.

Why are classical materials being replaced by nonwovens and where can they be used?

Classical materials are being replaced by nonwovens because they are much more versatile. Nonwovens can be combined with other structures such as bubble films, geomembranes and geogrids to create so-called geotextiles. Those have the aim of being used as composites for fulfilling several functions at the same time.

Nonwoven geotextiles provide various functions but what is the special property of those diverse textile fabrics?

One special property is that geononwovens are voluminous and can very easily absorb tension. This for example can considerably reduce the required mineral substructure in road construction. The tenacity of nonwovens is one of the most important things in such industrial application. They need to be very extensible and also extremely

Fibers & Filaments had the opportunity to talk to Dr. Ingo Mählmann, Vice President Sales & Marketing for the nonwoven business unit at Oerlikon Manmade fibers, about the solutions for processes and systems for manufacturing high-end spunbond and fibers for carded nonwovens.

Dr. Mählmann, the demand for nonwovens has been rising since 2002. What is the reason for this ongoing growth?

Huge infrastructure programs, particularly in China and India as well as in other emerging countries, are being implemented, for which large



application

tear-resistant. Nonwovens should behave isotropically meaning that they show similar characteristics in the longitudinal and transversal direction.

How do you achieve the greatest possible product and which materials are used to produce this?

The polymer raw materials we use to achieve the greatest possible mechanical robustness and durability are either polypropylene or polyester. As polypropylene is long-lasting and its chemical resistance and hydrolysis is more advantageous to those of polyester, it is used for products that remain in the ground for more than 50 years while still being able to provide their load-bearing function. On the contrary, polyester is more suitable for solutions requiring shorter lifetime tenacity in the ground. It is used if the geotextiles are installed closer to the ground surface and are exposed to solar UV radiation over long periods of time since their UV resistance is superior to that of polypropylene.

Where does the Oerlikon Manmade Fibers segment come into play regarding nonwovens?

Decisively determining for the quality of nonwovens is the targeted transformation of the polymers into fibers



and filaments with the application-appropriate properties and we have decades of experience with these systems. Today more than 4.3 million metric tons of fibers per year are manufactured across the globe using systems from our company. And, we are growing!

“Today more than 4.3 million metric tons of fibers per year are manufactured across the globe using systems from our company. And, we are growing!”

Dr. Ingo Mählmann, Head of Sales & Marketing, nonwoven business unit

Is it possible for you to use your expertise in another field?

Our spinning expertise has successfully been transferred to spunbond technology. For this purpose, we have progressive technologies both for the manufacture of geotextile spunbonds and to produce fibers for geotextile carded nonwovens.

What is special about the carded nonwovens solution of Oerlikon?

Carded nonwovens are made from staple fibers, whereby the card web is generally doubled and flattened using a cross-lapper before it is needled. Nonwoven geotextiles are composed of staple fibers which can be manufactured on single-stage staple fiber systems where the spinning and subsequent drawing of the staple fibers are carried out in an in-line process. These particular systems can produce between 40 and 80 metric tons a day.

Although our extruder technology permits fibers that are spun-dyed and/or include additives such as a UV stabilizer to cater to the corresponding target applications, most fibers are manufactured in white.

Our solution provides the highest quality along with total reliability and offer superlative flexibility in terms of raw materials such as polypropylene, polyester, recycled polyester and polycaprolactam. Fiber quality requirements are very high which is why the flexibility of our systems is essential.

Critical fiber characteristics for geotextiles include high tenacities with simultaneously high elongation in terms of controllable nonwoven quality, carding and needling machines. What needs to be taken into consideration regarding further processing?

To ensure a reliable further processing of geotextiles, an excellent, even spin-finish application and the crimping of the fibers is required. The opening of the fibers in the carding system is faster and more even the better the crimping and the spin-finish application are. The production of geo-nonwovens generally involves the use of fibers with a so-called 2D crimp, at which the shape of the crimp is in 2 directions. As our Oerlikon Neumag Baltic Crimper ensures homogenous crimping and enables good opening of the fibers, it is excellently suited to this task.

Geotextile spunbonds are on the rise in many industrial nonwovens applications. Which benefits do they have compared to classical carded nonwovens?

The market is increasingly demanding more efficient processes and products which means the product requirements are often the same or greater but with a lower raw material input. Spunbonds are progressively replacing classical carded nonwovens due to their technical and commercial benefits.

Particularly in the case of polyester, the current generation of our spunbond systems have been able to achieve excellent nonwoven tenacities with low raw material input. The energy consumption has been reduced by 20 to 30 percent compared to the predecessor generation.

Higher nonwoven tenacities can be achieved at comparable base weights which general benchmark comparisons with standard products in Europe have shown.

Contrariwise, the required tenacities can be achieved with the reduction of base weights and



therefore with lower raw material input which alone allows raw material savings of more than five percent.

Why is Oerlikon's business unit nonwoven the ideal partner for manufacturers?

We at Oerlikon offer the entire process for manufacturing needed spunbonds for geotextiles, starting with the polymer granulate all the way through to the rolled product. Efficiency and productivity are combined in the single-phase spunbond technology. It offers a potential reduction of production costs of up to 20 percent with low wastage and maximum nonwoven quality compared to conventional spunbond processes. Depending on the product type and nonwoven weight, the production capacities can range from 800 to 1,500 kg/h.

Our unique spunbond technology enables high spinning speeds, which are essential when producing high-tenacity filaments. Polyester filament, which have very low shrinkage and are extremely strong can be manufactured on an Oerlikon machine. The spunbonds are traversal-drawn directly in-line following the needling to set the isotropy.

An outstanding price-performance ratio and excellent properties distinguish end products from our solutions like nonwoven geotextiles.

The interview was led by Anna Radig.

Huge infrastructure programs, particularly in China and India as well as in other emerging countries, are being implemented, for which large volumes of geotextiles are required.



Energy, Economics, Environment, Ergonomics

e-save

The Oerlikon Barmag godets with high-frequency induction heating technology consume more than **20% less energy** compared to conventional 50-Hz technology.

A WINGS POY with 24 ends per position is **twice** as efficient as an ACW.

For the last

14 years



Oerlikon Manmade Fibers has been heavily focusing on developing energy-efficient systems, machines and components featuring its e-save label. With this, the company is one of the first within the sector to systematically focus on the topic of **sustainability**.

Thanks to the WINGS technology, FDY systems consume between **30 and 50%** less energy to produce 1kg of yarn than two decades ago.



The round SP8x spinning beam saves more than **40%** of energy requirements compared to the square predecessor design, the SP4x.



A skilled operator can string up a latest-generation WINGS POY position in just **55 seconds**.



Currently, a kilowatt hour of electricity costs on average

0.062 euros

for industrial consumers in the Chinese coastal provinces of Zhejiang, Jiangsu and Fujian.

... In Germany, the average price for electricity lies at 0.17 euros, therefore almost three times as much as in China.

Exchanging old systems for the latest Oerlikon Manmade Fibers technology would reduce annual CO₂ emissions **by up to 45%**. This saving corresponds approximately to the annual CO₂ emissions generated by 20,000 cars.



By using

RoTac³

for tangling BCF yarns, the energy consumption for compressed air is reduced by up to 50%.

A WINGS FDY spinning system with 32 ends requires around

45% less space

compared to a conventional FDY system with an ACW winder.

An ACW FDY system emits **223,560 tons of CO₂ per annum** to spin around 200 tons of FDY yarn per day. Optimized for semi-dull yarn, a WINGS FDY 32-end system in contrast emits just **161,673 tons of CO₂ per annum**.



15 years after its launch, WINGS – which focuses on Energy, Economics, Environment and Ergonomics – continues to redefine the standard, meanwhile being used to manufacture more than 20% of all filament yarn produced worldwide.

New polyester staple fiber plant

Wellknown deepens Oerlikon partnership

After years of working with Oerlikon Barmag, Chairman Anil Gupta is leading Wellknown into the polyester staple fiber market with a new Oerlikon Neumag plant in India.

Anil Gupta is a man who knows what he is looking for. As chairman and managing director of the Wellknown Group, one of the largest integrated Polyester Filament Yarn (PFY) producers in India, Mr. Gupta recognizes the importance of having a vision and a strategy.

“One of the reasons behind our success is strategic planning,” he says, reflecting on the company’s recent expansion. “This is the man-



agement process of creating and maintaining a balance between the resources currently available and the evolving market trends.”

Founded in Mumbai in 1987, Well-known has become one of India's leading exporters of textured yarn, delivering to satisfied customers in more than 50 countries worldwide. “Our company is in the process of expanding and consolidating its business activities,” he says, explaining the strategic vision moving forward. “We are experiencing solid demand for our products on a continual basis.” The company is now focused on creating additional value for its existing product lines while attracting new clientèle.

Building on established success while venturing into new business areas is of course a delicate process, but Mr. Gupta knows where to look for the right kind of partnerships. “Wellknown has always believed in working with global market leaders,” he says. “For more than 10 years, we have been very closely associated with the Oerlikon

“From my point of view, the availability of R&D infrastructure is the most important criteria for any technology and engineering company.”

Anil Gupta, chairman and managing director of the Wellknown Group

Barmag brand, with very positive experiences throughout.” When Wellknown set its sights on expanding into the Polyester Stable Fiber (PSF) market, it did not have to look very far for a new trusted partner in Oerlikon Neumag.

In particular, Oerlikon Neumag's Research and Development Division caught Mr. Gupta's eye. “From my point of view, the availability of R&D infrastructure is the most important criteria for any technol-

ogy and engineering company,” he says. “I was very impressed with the Oerlikon Neumag’s facilities and infrastructure. Furthermore, I was also impressed with the variety of Oerlikon Neumag’s active product lines. This gave me an impression of a very stable and broadly-based company – a pre-requisite for long-term sustainability.” In practical terms, Mr. Gupta realized that long-term sustainability would also require sound investment planning. For Wellknown, the question then became what kind of investment

would make the most sense for the PSF market. After deliberations and discussions, Wellknown and Oerlikon Neumag decided to construct a two-step plant in Daman, on the West Coast of India, which could deliver 225 tons per day – not a small task by any measure. “Our positive experience with Oerlikon Barmag has continued with Oerlikon Neumag as well,” Mr. Gupta says proudly. “The plant was delivered promptly and commissioned in record time, and we have been able to produce very good fiber quality.”

In a competitive global marketplace, quality is increasingly more important. “We mainly focus on the high-end market for blended cotton yarn,” Mr. Gupta says. “In this segment, customers are also very demanding. Quality is a given – without it, you cannot even enter the market – but above all else the most important demand is to have a high degree of consistency in everything we do.” Over the years, Wellknown customers have come to expect a high-level of quality in the company’s PFY products.



After years of successful filament yarns production, Anil Gupta (left) and his son Rahul Gupta (right) are now expanding their business into the polyester staple fiber market.

When it came to establishing new PSF product lines, Wellknown had to look for synergies. “The additional product line needed to be both complementary and supplementary to our existing product mix,” Mr. Gupta says. “This would create the most optimum use of our entire infrastructure and investments, stretching across three decades. Our industry is very cyclical, with strong peaks and valleys. Our focus has always been on adding new investments to our portfolio which will be in line with our existing capabili-

ties, while offering opportunities to balance out the business cycles of our existing lines.”

In order to achieve fiscal balance throughout the business cycles, Mr. Gupta knew the PSF lines would need to be global in outlook, which meant that the plant would need to function at a global level. “Our first criteria was that the plant should have a global scale in terms of the productivity per line,” he says. “At the same time, the technology should offer enhanced products and

value for our customers. In addition, the technology should also be able to guarantee the production of competitive products for our customers as future trends on the market surface.”

Looking to the future, Mr. Gupta is pleased with the direction Wellknown is heading. “We would like to become a trendsetter in whatever field we operate,” he says. Evaluating the progress of working with Oerlikon Neumag so far, Mr. Gupta reflects on the first time he stepped foot into the Neumünster premises: “Last but not least, the overall environment Oerlikon Neumag conveyed had a certain amount of warmth, be it the customer center or the greenery within the complex.” In the end, progress can only truly be measured by the way it helps people in their daily lives. » (wca)



Wellknown decided to set up an Oerlikon Neumag two-step plant in Daman, on the West Coast of India, which could deliver 225 tons per day.





Automation solutions made by Oerlikon

‘Where the future is coming together’



Oerlikon integrates the AC-Automation GmbH & Co. KG – which is headquartered in Bernkastel-Kues – automation solutions for large-scale systems into its technology portfolio. The company is thus taking an important step on its journey towards now being able to offer fully-automated factories digitally networked using Industrie 4.0 solutions from a single source.

For many, mechanical looms are the embodiment of the first industrial revolution. Today – following the introduction of production line manufacturing and the advent of electronics within the production chain – the textile and fiber industry is on the verge of entering the so-called fourth industrial revolution – or Industrie 4.0 for short. With the acquisition of AC-Automation in Bernkastel-Kues and Augsburg, Oerlikon Manmade Fibers – the leading solutions provider within the manmade fiber manufacturing sector – has now set a further milestone on its journey towards fully-automatic, digitally-networked fiber production. In the future, Oerlikon textile industry customers will receive production systems to-

gether with the automation logistics – including packaging and high-bay warehouse solutions – from a single source.

In the Oerlikon Manmade Fibers segment's new automation division, in excess of 80 specialists draw on more than 30 years of experience in manmade fiber production automation. Here, they have been closely collaborating with the Oerlikon Group as far back as the early-1980s. With the help of its highly-developed and tried-and-tested robot handling, packaging, transport and warehouse systems, Oerlikon is now creating turnkey, integrated production and logistics solutions for all customers across the globe.



On its way to Factory 4.0, Oerlikon has strengthened its position with advanced robot handling, packaging, transport and storage systems from AC-Automation.



“With the takeover and integration of the automation solutions from AC-Automation, we are creating new impetus for the manmade fiber business. In conjunction with our new digitalization solutions, it will also enable us to clearly position ourselves as a supplier of Industrie 4.0 solutions”, states Georg Stausberg, CEO of the Manmade Fibers segment, talking about the reasons for the acquisition.

The target is the so-called ‘digital factory’, where production systems monitor, control and optimize themselves with the help of collated data and information. Here, the manufacturing process is becoming increasingly flexible.

“Industrie 4.0 is not just a marketing buzzword”, explains Rolf Gänz, Managing Director of the Oerlikon Manmade Fibers segment’s automation division. “Imagine a company requires fibers for airbags. Even the fiber producer has to be familiar with the precise safety-relevant composition specifications. The same applies to the downstream quality control, with the finished yarn packages ideally tagged in such a way that the machines used for manufacturing the airbag fabric notices whenever the incorrect yarn package has been selected for producing the warp beam.”

All this is now possible as a result of the expanded product portfolio because Oerlikon is offering seamlessly-coordinated production, quality assurance and packaging systems without malfunction-prone and maintenance-intensive interfaces. All customers receive optimally planned, flexible systems from a single source from the very outset.

» (grl)



The automation solutions will be an integral part of an Oerlikon Manmade Fibers segment Industrie 4.0 solution. This will create a coherent production chain – from the raw material through to final delivery.



Rolf Gänz, Managing Director of the Oerlikon Manmade Fibers segment's automation division:



Here, what will become the new standard in future-oriented manmade fiber manufacturing is coming together. The automation solutions will be an integral part of an Oerlikon Manmade Fibers segment Industrie 4.0 solution. It will assume the yarn product precisely at the point at which spinning plant solutions have extensively completed their work. This will create a coherent production chain – from the raw material through to final delivery. We are now offering all stages – from production planning, production tracking, quality control, packaging and palletizing – on a single, new Oerlikon platform. So, there are now no longer any annoying data interfaces. Yes, we can now also take all automation considerations into account when designing the systems, which means that our customers can now acquire the entire process chain from a single source.



Godet coating as customer service

The positive aspects of orange peel skin

The quality of the manufactured yarns is also determined by the surfaces of all components coming into contact with the yarn – such as godet jackets, for example. It is here that Oerlikon Barmag provides support with special repair coatings and – often even more important – know-how of how these are deployed.



Plasma spraying provides spinning components with thread-friendly surfaces that are precisely matched to the application.

Depending on the process, yarns also acquire their properties through accurately-defined godet and separator roll temperatures and running speeds. Furthermore, this requires a defined, yarn-friendly surface in order to ensure there is no damage to the filaments. For this, the components in all newly-sold machines come with a chrome-oxide coating as standard. But plasma-coated godets are also used. “In the case of plasma spraying, the aim is to create a so-called orange peel skin with a defined layout of indentations and supporting surfaces. What may sound negative in other contexts can have a positive impact on the yarn quality here”, explains Marcus Köhler, Customer Support Service Manager at Oerlikon Barmag.

Although the surfaces of such coatings may be precisely tailored to the respective processes and products, they do however deteriorate sooner or later – depending on the polymers, spinning processes and process speeds in question. And aggressive alkali cleaning agents can soften the coating over time. To this end, the result can be under-surface corrosion with blistering, which may cause flaking in the worst case.

In such situations, Oerlikon Barmag offers repair coatings, for which it has been collaborating with surface specialist Oerlikon Metco for more than 30 years now. The affiliate has a presence in the primary Oerlikon Barmag markets across the globe. “Together, we restore the original surfaces with all the required tolerances. Depending on the customer request and market requirements, we can also add different qualities or surfaces – for example, hard plasma coatings”, states Marcus Köhler.

Whichever coating solution is chosen – it is important that this is implemented in good time, because it is not just the yarn quality that suffers if not. Faulty surfaces are also associated with higher yarn break rates and more waste per ton of finished yarn. And because wear is usually a slow, gradual process, the reasons for fluctuating or slowly-deteriorating production quality initially often remain unidentified.

This is when Oerlikon Barmag Service can provide decisive and invaluable know-how. “Our experts have the necessary experience and specialized measurement devices to identify and assess wear. They know which surface profile with which roughness depth each godet requires”, explains Marcus Köhler. Here, it becomes clear that there can be many error sources. To this end, the yarn requires different surfaces depending on its position within the production process. If this is not right in the respective position, this will also adversely affect the yarn quality with, for instance, differing diameters or insufficiently balanced jackets and units.

“In co-operation with Oerlikon Metco we restore the original surfaces with all the required tolerances. Depending on the customer request and market requirements, we can also add different qualities or surfaces – for example, hard plasma coatings.”

Marcus Köhler, Customer Support Service Manager at Oerlikon Barmag

Oerlikon Barmag is able to provide service life guarantees for its repair-coated surfaces – although only if the company’s own chemical godet cleaner is used. The service also includes the alignment and calibration of the components. And it is particularly popular among customers: to date, Oerlikon Barmag has repair-coated

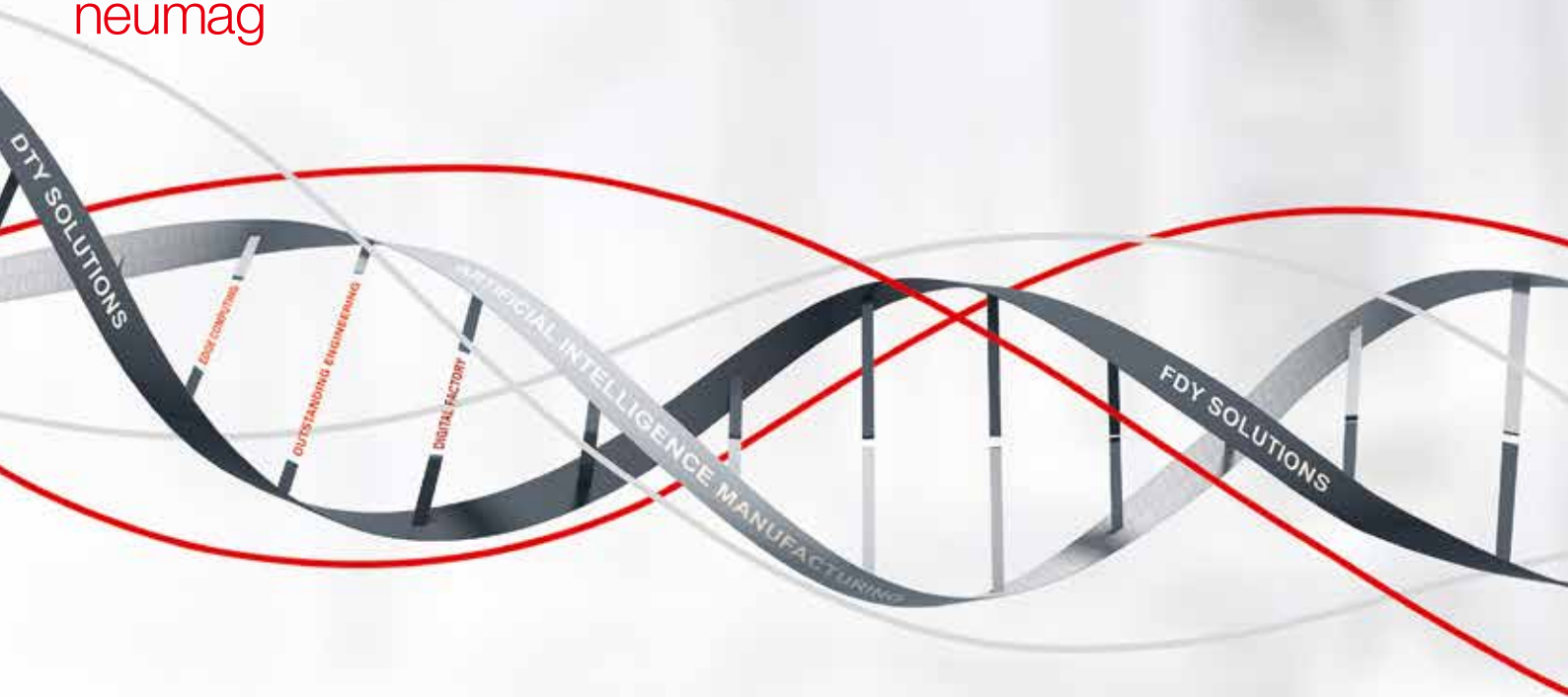
around 4,000 godets – without any subsequent client complaints. » (tho)

Godet or grooved roller shells can benefit from a repair coating.



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