

# nextlevel

by Voith Paper — N° 05

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Winning formula:  
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Vote of confidence:  
Sun Paper orders machine for graphic papers

Sustainability

Digitalization

## New perspectives for paper

Efficiency



# Editorial nextlevel N° 05



Paper is not a thing of the past but of the present, and it has very good prospects for the future. This is not just the view of the paper industry; the potential of paper is also recognized by society and policy makers. Paper is highly rated as a renewable, biodegradable alternative to petroleum-based products. This represents a huge opportunity for all paper manufacturers. We believe it is our role to support them – with solutions for the digital transformation of existing processes that enable efficiency improvements along the supply chain and reduce energy requirements. And with research that addresses not only major issues of the future but also helps to incrementally improve sustainability today – through a large number of product improvements. In this issue of nextlevel, we will be sharing with you some prominent examples. First and foremost, the game-changing major board machine project in Gruvön and the order for two new machines from our long-standing customer Sun Paper. I hope you find it an interesting and informative read.

*Andreas Endters*

Andreas Endters  
President & CEO, Group Division  
Voith Paper



## 20

**Technology benchmark:**  
The BM 7 board machine is setting standards.

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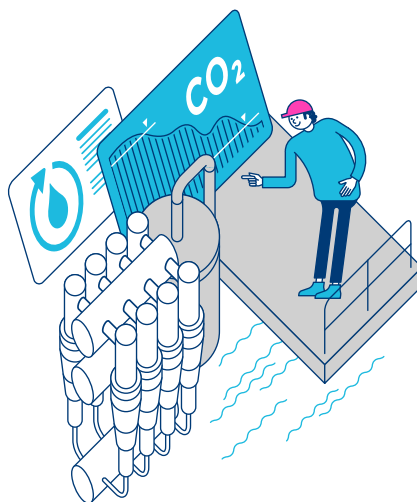
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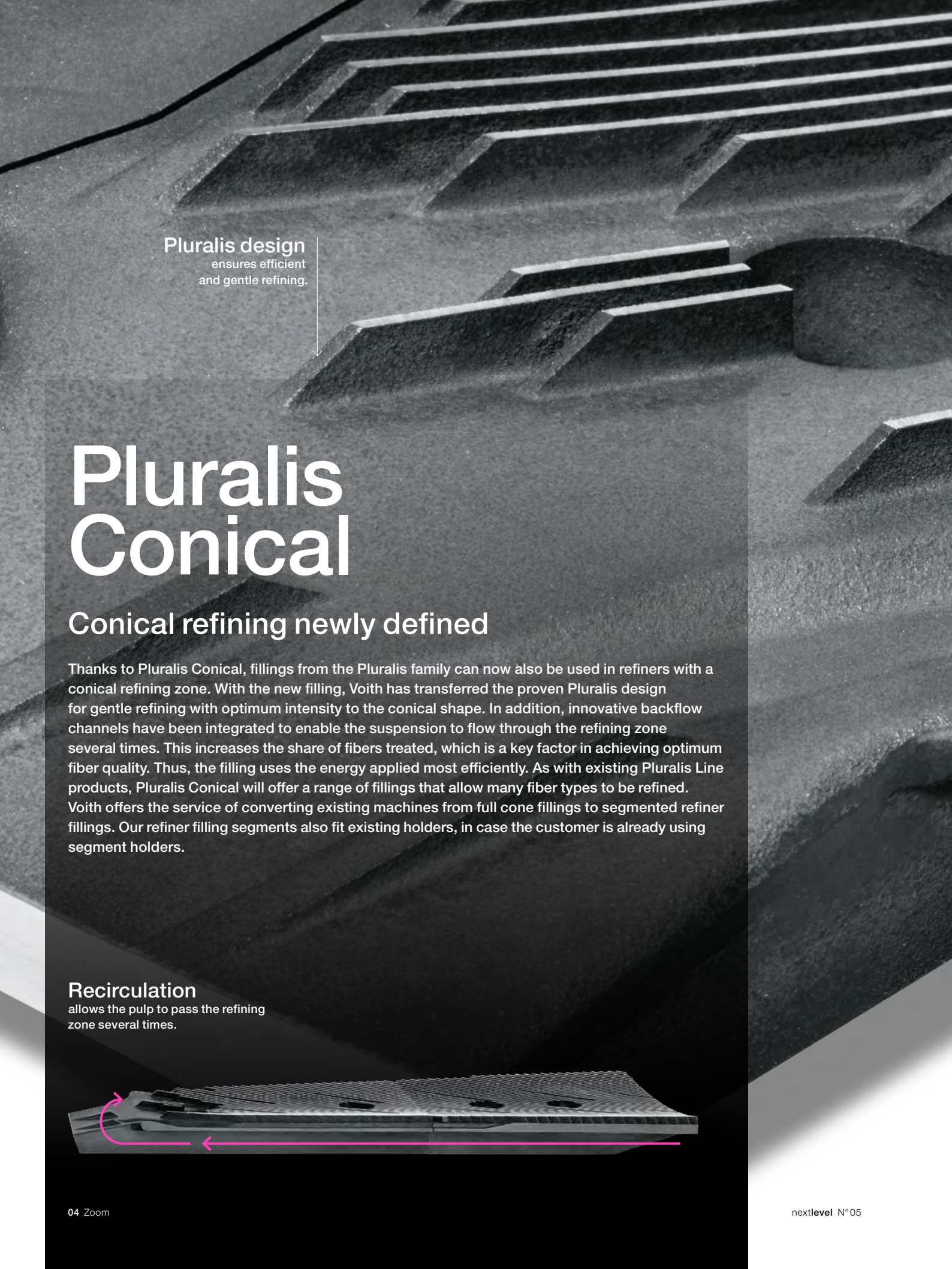
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**15**  
SmartBasket helps monitor screen basket inventory efficiently.



**Pluralis design**  
ensures efficient  
and gentle refining.

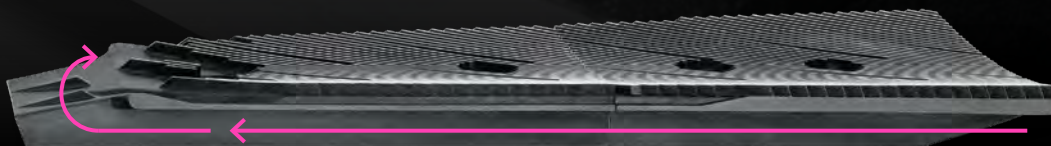
# Pluralis Conical

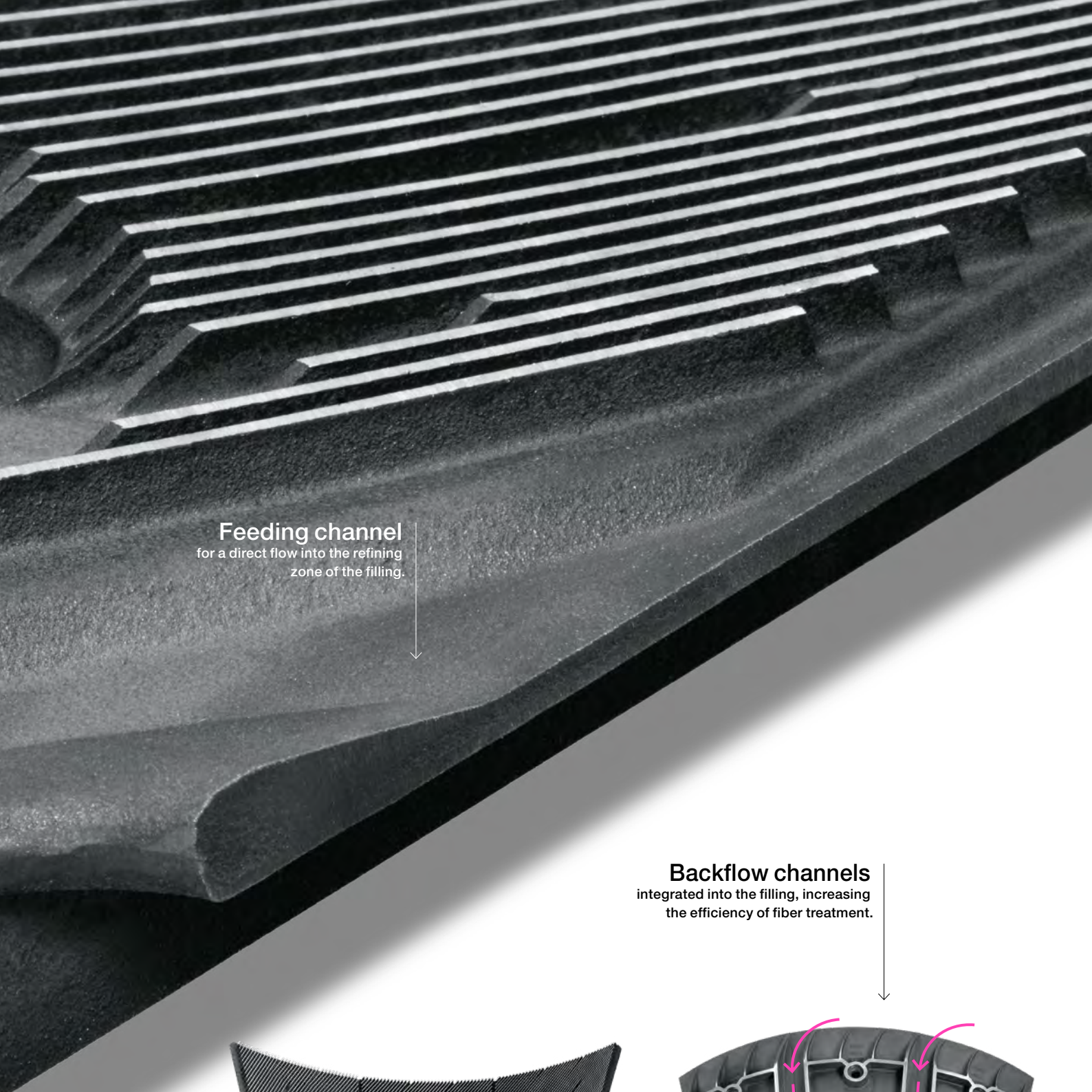
## Conical refining newly defined

Thanks to Pluralis Conical, fillings from the Pluralis family can now also be used in refiners with a conical refining zone. With the new filling, Voith has transferred the proven Pluralis design for gentle refining with optimum intensity to the conical shape. In addition, innovative backflow channels have been integrated to enable the suspension to flow through the refining zone several times. This increases the share of fibers treated, which is a key factor in achieving optimum fiber quality. Thus, the filling uses the energy applied most efficiently. As with existing Pluralis Line products, Pluralis Conical will offer a range of fillings that allow many fiber types to be refined. Voith offers the service of converting existing machines from full cone fillings to segmented refiner fillings. Our refiner filling segments also fit existing holders, in case the customer is already using segment holders.

### Recirculation

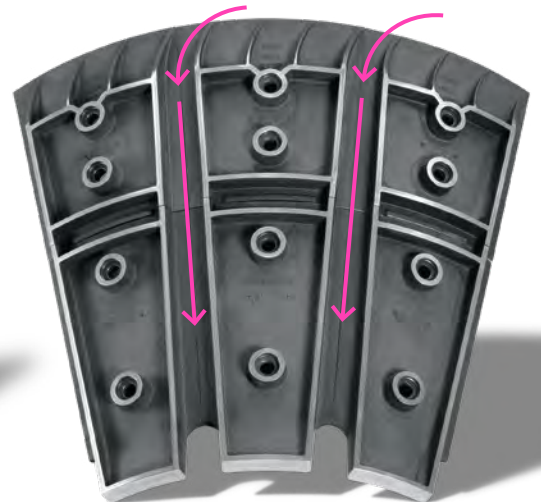
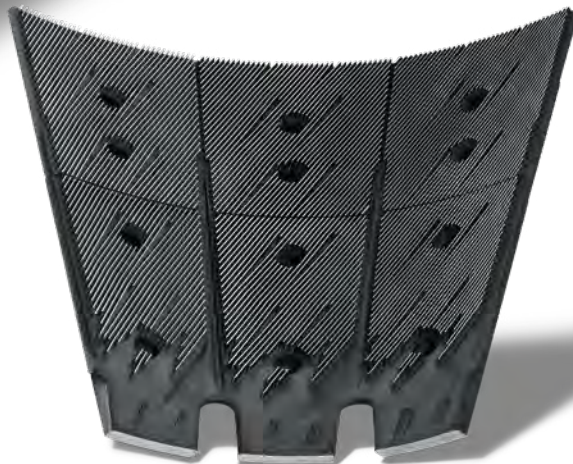
allows the pulp to pass the refining zone several times.





**Feeding channel**  
for a direct flow into the refining zone of the filling.

**Backflow channels**  
integrated into the filling, increasing the efficiency of fiber treatment.



## Major order: complete production line for SCA

In its capacity as a full-line supplier, Voith will build an innovative kraftliner production line for SCA's Obbola paper mill in Sweden. In addition to the BlueLine stock preparation unit and XcelLine paper machine, the scope of supply for the PM 2 project also includes detailed engineering, all sub-systems and a long-term service and efficiency agreement. The objective is to set new benchmarks for strength and downstream finishing properties through intelligent controls with digital solutions from the Papermaking 4.0 concept. The paper machine is set to go into operation in the first quarter of 2023.



130,000

spare parts are available immediately from the new Voith Paper Webshop (see page 16).



1M

spare parts can be identified online and requested from Voith.

## Customized asset management

Voith helps companies improve their efficiency. Based on its specific domain expertise, Voith offers the scalable solutions SmartBasket, pmPortal and OnCare.Asset. With their intuitive user interface, these solutions help to manage inventories, avoid unscheduled downtimes and identify replacement parts.

"SmartBasket allows customers to track and manage their screen basket inventories," says Michael Thoma, Vice President E-Commerce & Digital Supply Chain Management at Voith. "The next stage is pmPortal for the management of consumables, wear and replacement parts including graphical navigation options." OnCare.Asset then provides extended functionality through complete downtime planning and interfaces with ERP systems like SAP. Customers can start with an entry-level solution and then extend it, as required, without losing any data.

Recently, Mexican paper producer Grupo Gondi was the first customer in North America to order OnCare.Asset for its Guadalupe facility.

# News

from the world of Voith Paper

## New pilot calender

# XCal1

Voith has unveiled a new pilot calender that covers all finishing processes in combination with the pilot coater in the Heidenheim Paper Technology Center.

The XCal1, which has a web width of 800 mm, uses a modern 1x3 design and enables a flexible web run with one or two nips, in hard and soft nip configuration. The hard and soft rolls are designed as Nipco rolls and enable the simulation of operating conditions that are as realistic as possible. The pilot calender can process all relevant paper grades and basis weights; the maximum speed is 2,000 m/min.

One of the special features of the calender is an inductive external heater that achieves a surface temperature of up to 280°C on the heated roll. Thanks to two climatic chambers, the paper rolls can be preconditioned so that, for the first time, it is possible to replicate the paper properties of moisture and temperature to exactly mimic those of production operation. By combining of preheating with infrared heaters, moistening with nozzle moisturizers and the application of steam with a steam box, moisture gradient calendering is also possible.

# innovate

## A look at key trends

### Faster jumbo roll changes with new double unwinder

To speed up paper production at the winder, Voith is launching a particularly efficient unwinding solution.

The new double unwinder has an up to 20 percent higher winding capacity and allows automatic roll changes during the winding process. The resulting time and efficiency gains pay dividends, especially in the case of high production rates. The system meets the latest safety standards and is easy to operate thanks to a user-friendly design. The double unwinder can be fitted with either a FlyingSplice or ButtSplice.

Thanks to the short installation time, the solution is not only suitable for new paper machines but also for upgrading existing systems.



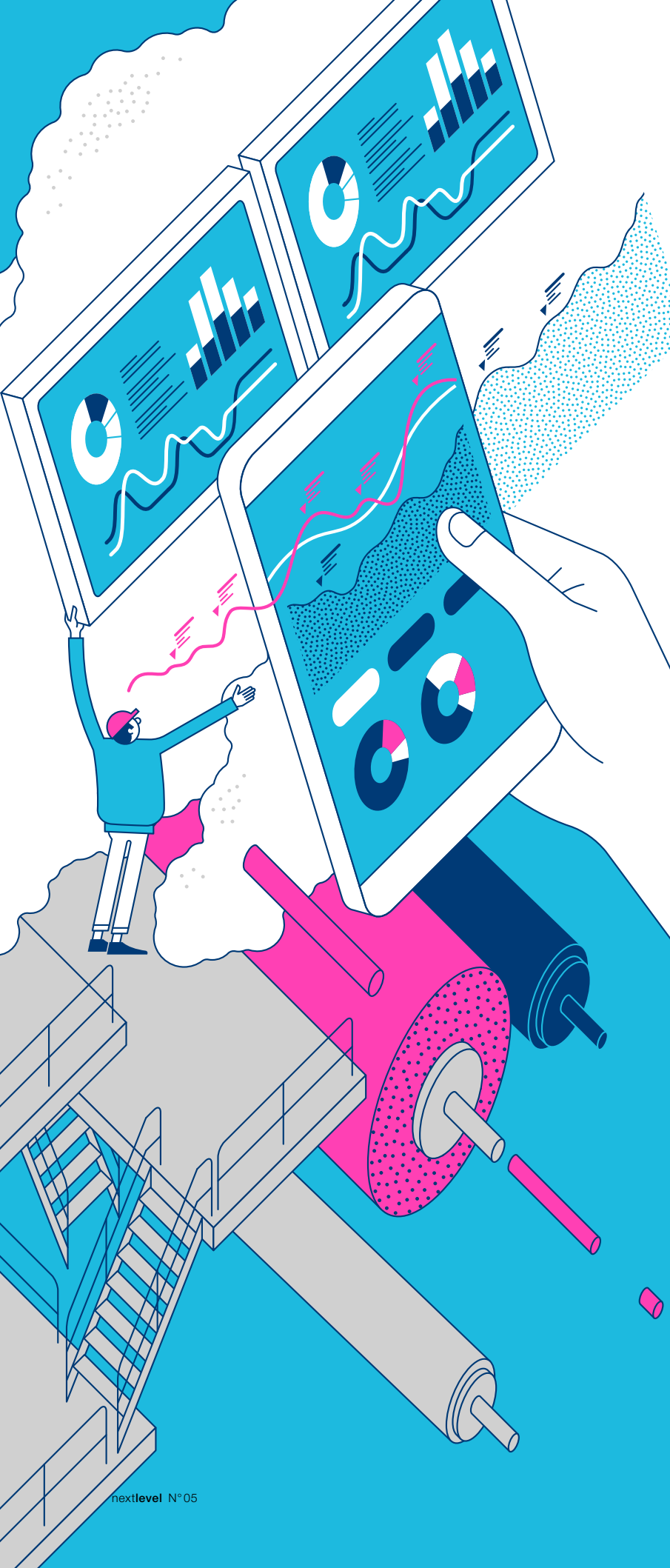
# R&D

## Shaping the future of paper

The digitalized paper industry needs to combine **efficiency and conservation of resources** to satisfy economic and statutory requirements.







**Like all resource-intensive industries, the paper sector needs to become more sustainable. This is why Voith is working on improvements at the product level while also developing fundamentally new concepts for the future of the entire sector. A special example of this is the Model Factory Paper, which is being supported by an industrial consortium.**

“It is not predicting the future that matters, but being prepared for it.” This might sound like a comment on the current discussion about climate protection and sustainability, but it is actually a quotation by Athenian statesman Pericles from the 5th century B.C. And yet it describes in a nutshell the requirements with which the paper industry is currently confronted. As a resource-intensive sector, it is subject to social and legislative pressures to become more of a closed-loop system with respect to carbon neutrality, water consumption and energy efficiency. It’s a herculean task.

“Improving the existing manufacturing process incrementally will not be enough to achieve the goals that the European paper industry has set for itself by 2050; we need new and more radical solutions,” explains Dr. Michael Weiß, Vice President New Business & Research at Voith Paper. “This affects the entire paper supply chain, and we want to make this visible across the industry as well.” The plan is to work together as an industry, in close collaboration with the research community, to tackle problems that none of the stakeholders can resolve alone. The Model Factory Paper will provide the means. ———→

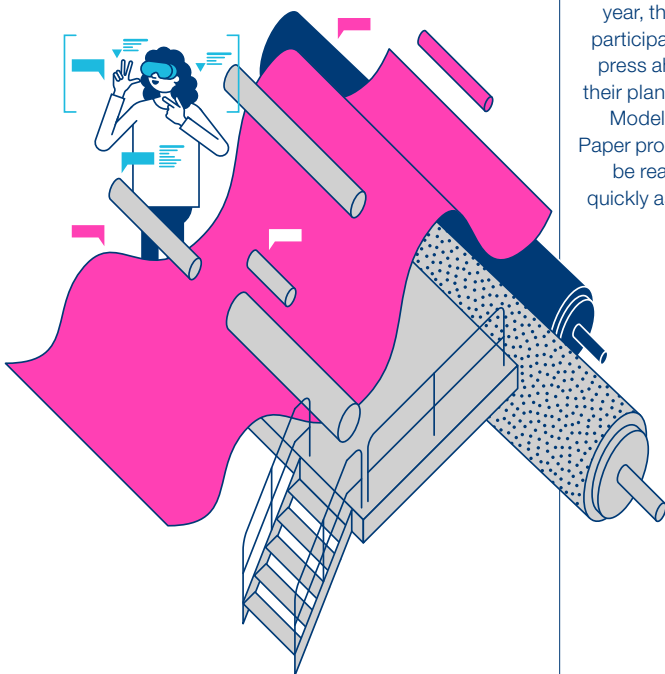
**Improving the existing manufacturing process incrementally will not be enough.**

**Dr. Michael Weiß,**  
Vice President New Business & Research,  
Voith Paper

### Open to industry and research

At the moment, the Model Factory Paper exists only as a concept, but a consortium has already been formed in Germany to realize it. As well as paper producers and the Association of German Paper Mills (VDP) as its patrons, the consortium also includes universities and research institutes, as well as Voith in its capacity as a technology group. Other interested parties from industry and the R&D community are welcome to get involved, says Weiß, emphasizing the non-competitive nature of the project. Basic research will be an important aspect of the work to be done, which will be pre-competitive and based on open innovation approaches.

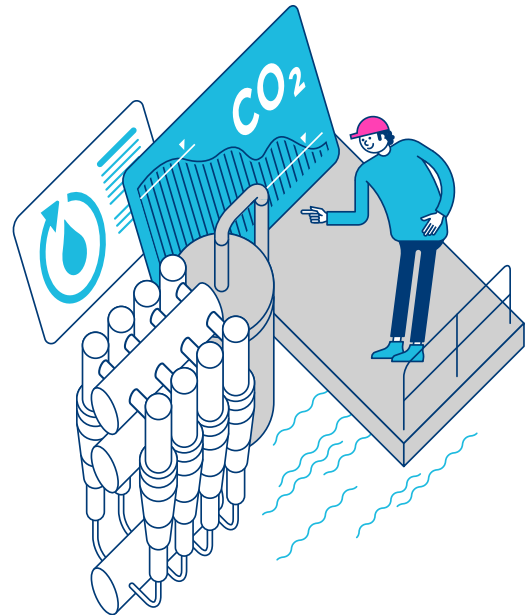
As of January 2020, the planning for the Model Factory Paper has been stepped up. Following prompt implementation, the plan is then for the mill to quickly become a center for disruptive innovation projects in the paper industry. Gerhard Hochstein, CTO of Felix Schoeller Group, says that these will include the reduction of CO<sub>2</sub> emissions and carbon neutral production, as well as energy efficiency, the industrial use of artificial intelligence, raw material substitutions and closed-loop recycling. He describes the model factory as a platform to allow cutting-edge knowledge to be exploited at an early stage and promote climate-related topics. The project aspires to develop attractive solutions that are crucial for future paper production and also help other industries facing the same challenges to make headway.



## CO<sub>2</sub>

### Reducing emissions

One of the areas that the Model Factory Paper production will work on is research into solutions to reduce carbon dioxide emissions.



## 2020

### Launch

From the start of the year, the project participants aim to press ahead with their planning so the Model Factory Paper production can be realized as quickly as possible.

The location for the model factory is currently being identified. In addition, the content of the various work areas needs to be definitively agreed upon by all stakeholders in the coming months.

From the perspective of Weiß, it is crucial to exhaust all potentials and utilize important expertise and capabilities. These range from paper manufacturing to machine and plant construction and from technologies for producing and storing regenerative energies to artificial intelligence and data analysis. Industry knowledge as well as the latest scientific and research findings from universities and institutes need to flow into the project, the R&D manager emphasizes, across the boundaries of all disciplines and to all participants in the supply chain. This is why the Model Factory Paper will provide for flexible test and pilot installations and “digital twins” of process steps to ensure end-to-end interconnectivity along the entire manufacturing process.

In this context, Voith will contribute as a member of the consortium and technology vendor to the paper industry. “Together, we want to develop paper production of the future and create

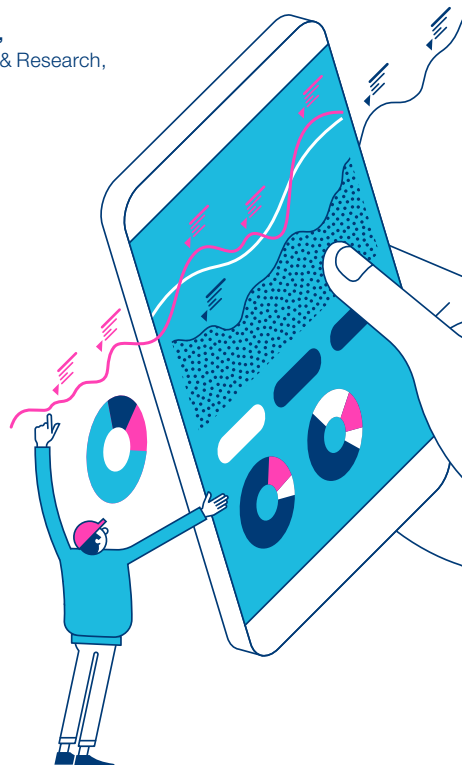
sustainable, future-proof production locations in Germany and the rest of Europe,” says Weiß. “To achieve this goal and tap into future business potential, we need innovative and integrated solutions that we can only develop by working together.”

### Knowledge platform for the future

The concept of the Model Factory Paper is based on others on the ETA learning factory that serves as a center of expertise for energy efficiency in industrial manufacturing and is affiliated with the Technical University of Darmstadt, Germany. The research focus of the Model Factory Paper production will be on the paper industry. “The networking aspect is a very important one,” Weiß emphasizes, especially in the context of digitalization. “Previously, a lot of know-how was kept in-house. Today, speed is crucial, and due to the high level of complexity and uncertainty, open approaches to finding solutions are called for.” However, given the large number of thematic areas under investigation and their overlaps, it would be naive to expect fast results. The Model Factory Paper production is therefore designed for a long service life.

**Innovative and integrated solutions are required that we can only develop by working together.**

**Dr. Michael Weiß,**  
Vice President New Business & Research,  
Voith Paper



## Vendor-neutral

**Basic research**  
The Model Factory Paper will be pre-competitive and based on open innovation approaches.

# Research examples

## Fiber treatment

To improve the efficiency of process engineering in fiber treatment and at the same time increase strength values, Voith is conducting detailed investigations in collaboration with customers at its Heidenheim Fiber Technology Center (FTC). The objective is to better exploit the potential of the fibers to be able to manufacture the end product more energy efficiently and economically.

## OnEfficiency.Strength

The OnEfficiency.Strength software developed by Voith substantially reduces the use of resources and operating costs. It uses virtual sensors to measure various parameters and analyzes them automatically to provide a prediction of the strength value. The information flows into the current production process and helps continually optimize it (see page 18).

## Refiner fillings

In the case of the Pluralis Conical refiner filling, specially developed backflow channels ensure that the pulp flows through the refining zone several times. This not only improves fiber quality but also saves energy and raw materials (see page 04).



# “The future is paper”

What does the future of the paper industry look like? The paper foresight process delivers answers. Along with more than 50 experts from industry, think tanks and universities, Voith has analyzed trends and developed scenarios that provide a concrete outlook and enable economically attractive, sustainable and future-proof solutions to be developed in association with customers.

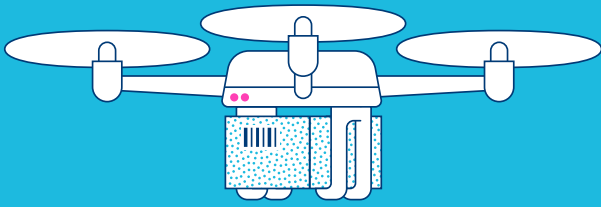
**Dr. Weiß, Mr. Kalefe, you use the paper foresight process to analyze the meaning of social and technological developments for the future of the paper industry. What are the most important trends that define this future?**

**Kalefe:** The future business environment will be very strongly influenced by the two mega-trends of sustainability and digitalization. The paper industry uses a renewable raw material. In addition, the majority of paper products can be recycled. Already, we are able to meet to a great extent the basic precepts of a closed loop for sustainable paper solutions. This will become increasingly important in the future due to the growing mountains of waste worldwide and the accumulation of plastic in the world's oceans.

**And the second trend, digitalization?**

**Kalefe:** The paper industry is a very mature industry that has undergone very few technological leaps in recent years. So, the issue of efficiency – in production and in the complete supply chain – is all the more decisive. And this is where digitalization plays a very large role, because it can exploit new efficiency potentials, for example, via more control in the manufacturing process as such or through closer interconnection of the entire supply chain. The availability of production lines and production resources can also be substantially increased using digital solutions. In this context, the paper industry can still make much more progress and exploit potentials, and we are going to see this happening in the future as well. Even if not all specific manifestations of this mega-trend can be predicted, these two developments are going to affect us decisively in every future scenario.





### What changes do you expect in the core area of resources consumption?

**Kalefe:** The issue of CO<sub>2</sub> emissions is set to gain massive relevance in the future. The paper industry will be working even harder on this in the future and will develop new solutions. The foresight process came up with promising breakthrough technologies in this area and generated new ideas that are now being pursued intensively in our development departments. Alongside CO<sub>2</sub> emissions, water consumption will also continue to be a focus in many regions.

### What do you think of the “paper, not plastic” debate, and what is the development potential?

**Dr. Weiß:** Already there are some solutions that clearly show potential but are not yet satisfactory in all areas of application. Cost is an important aspect. Plastic packaging is extremely cheap to produce, but that is not always the case for paper products. This fact is currently limiting the size of the market for paper as a substitute for plastic, but it is an issue that is increasingly being addressed by legislation and will definitely become an important driver. In addition, consumers are showing more and more interest in sustainable products. This issue will continue to gain importance, with steadily growing opportunities and market shares for paper as a substitute for plastic.

### What other technologies will we need to take into account in the future?

**Kalefe:** We expect a number of new and functional materials to be developed in the future that we believe will offer interesting applications for packaging and specialty papers. Due to new technologies like quantum computing, the IT environment will continue to evolve rapidly again in the coming decades and will open up completely new possibilities in the research field. Last but not least, providing an efficient transport infrastructure in what are known as megacities will be one of the major challenges in the next 10 years. We expect this to have a significant effect on the online retail business and, consequently, on the market for packaging papers as well.



#### Outlook

Sustainability and digitalization, in particular, will change the paper industry.

#### Dr. Michael Weiß

(photo left)  
As Vice President New Business & Research at Voith Paper, he identifies and evaluates, among other things, technological developments and their effects on the industry.

#### Timo Kalefe

(photo right)  
The Innovation Manager at Voith Paper is responsible for the ongoing management of the paper foresight process.

### You have developed various scenarios for the paper industry in the year 2040. What is the result?

**Dr. Weiß:** We are currently seeing a very high probability of a scenario we are calling “same but different.” In this scenario, there will be a large number of new technologies, especially from the digital area. However, overall the paper industry will be similar to how it is today, for example with respect to market shares of the various paper grades and the production process as such. There will be radical approaches and disruptions in specific areas such as the substitution of plastic packaging. Improving efficiency and reducing costs will continue to be major drivers. In this context, digitalization will play a role as one of the key technologies that enable the efficiency of paper manufacturing to be further improved, resulting in a reduction in costs. It is absolutely essential to analyze these extreme scenarios properly – in terms of positive and negative outcomes for the paper industry – and also to have strategies and approaches on hand to deal with them. For the next five years, however, the starting points will primarily be for a “same but different” scenario.

**Kalefe:** Niche markets are another important aspect. One such area is functional papers, which might be electrically conductive, for example, or used as solutions for energy storage. These premium niche markets are certain to grow and will represent an attractive business area for paper manufacturers in the future. However, compared with the general paper market, the production volumes involved will be relatively small.

### If you had to describe in one sentence the key message of the paper foresight process from the perspective of the paper industry, what would it be?

**Dr. Weiß:** “The future is paper.” Paper is a fantastic material that is natural and renewable, and the raw material it is made from is sustainable. However, the industry still needs to do a lot of work, for example in further reducing CO<sub>2</sub> emissions. Nevertheless, the already 75% closed-loop supply chain is very stable and will be consolidated even more in the future due to the growing interest in sustainable products on the part of consumers. And that’s an ideal basis for meeting the challenges of the future!

Better in combination: Digital connectivity extends the functionality of the tried-and-tested DuoShake shaking unit. This results in improved machine availability and process reliability along with reduced operating and maintenance costs.

# DuoShake digital

## 1 Familiar interface

The intuitive user interface of the operating software developed by Voith is similar to that of smartphones and tablets.

## 2 Mobile devices

can also be used, e.g., to adjust shaking stroke and drive frequency. The effect of the changes can be observed directly at the wire section.



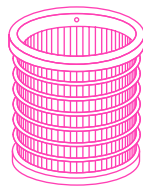
## Digital future-proofing

After more than two decades on the market, DuoShake has been installed hundreds of times and continually improved and developed. The DuoShake shaking unit optimizes fiber orientation yet is so mature that it is increasingly difficult to find ways of improving it mechanically. However, there is huge potential for added functionality through digitalization. The new DuoShake DG (Digital Generation) is now tapping into this potential in line with the Papermaking 4.0 concept.

The product update offers paper manufacturers comprehensive benefits and a new level of transparency in production and maintenance. For example, all relevant operating parameters can now be set using a fixed operator panel on the control cabinet or via mobile devices like tablets or smartphones. The intuitive interface using touch control provides a real-time overview of all the main parameters like availability, stroke accuracy and drive frequency. The software presents important information like air, oil and motor temperature as an easy-to-see traffic light system. "Data visualization is important to be able to make decisions about efficiency," says Benjamin Kitze, Global Service & Product Manager at Voith Paper.

This is also supported by the service function. DuoShake DG records actual operating times and provides real-time data on maintenance intervals and service life of the most important machine components. Because the operating condition is known at all times, maintenance can be planned and scheduled more efficiently. "With DuoShake DG, we are turning time-based maintenance into needs-based maintenance and in doing so are extending the service life of the product," the service and product manager explains.

An optional service that Voith offers for DuoShake DG is also designed to achieve maximum availability. Via a cloud interface, the shaking unit can be connected to the IIoT platform OnCumulus. On the basis of the transmitted data and trends, Voith experts can then analyze the operating parameters, which ultimately improves the overall efficiency of the paper machine. "Thanks to the visualization and analysis options in combination with our service concept, we can already increase availability to almost 100 percent," says Kitze.



SmartBasket with RFID



Scanner



Mobile app



Database



Corporate cockpit of global inventories

## SmartBasket

Monitoring and tracking screen baskets is a never-ending task in the paper industry. The stock preparation unit uses countless screen baskets that all need to be regularly replaced, re-chromed or put in the warehouse, necessitating a major administrative effort. Voith is now reducing the workload with its **SmartBasket**, an intelligent solution for asset and life cycle management. Each screen basket is fitted with an RFID chip (radio frequency identification), which gives it a digital identity. It can be read with a hand scanner and the data transferred to a database using a cell phone or tablet. This means that paper producers have access at all times to important data like the location, inventory and life cycle of their screen baskets. This information provides complete transparency across the entire supply chain and various locations. This in turn increases availability while reducing the cost of inventory management.

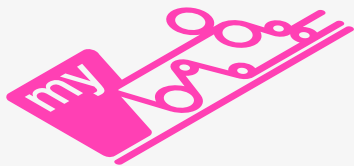


### SmartBasket creates transparency

Scanned screen basket data can be monitored with mobile devices or a web app.



# Voith Paper Webshop



On the start page, the Webshop provides an overview of the current processes and lists the most recent orders and quotations.

## Orders

Filter the results

1066 items

Document no.

Document date (to)

Voith mat. no.

RESET FILTERS

## Order history

Header data

Document no.

Document date

Aug 15, 2018

Document type

Order

The order history brings transparency, displaying both the order data and the status of the respective purchase order.



**Proven system improved:  
Extended functionality  
and new design now allow  
even faster access  
to the right spare parts.**

### Powerful tool for operations and purchasing

Since the beginning of 2017, the Voith Paper Webshop has been helping industrial clients, around the clock and seven days a week, to find and order the right spare and wear parts out of tens of thousands of components. It has been a resounding success, with around 90 companies using this e-commerce option from the Servolution portfolio. Voith has now updated the system to enhance it even further. With a greater degree of personalization, new functions and an intuitive user interface, the new Webshop has become an even more powerful tool.



This is already apparent on the home page, which shows the five most recent orders and quotations. It takes just one click to retrieve the respective order details and the latest order status. The personalized area also helps shop users gain an overview of equipment already delivered and provides transparency thanks to sophisticated search functions. Customers are able to find components they have used by entering origin, order history, operating instructions or customer-specific material numbers.

“In the paper industry, an open content catalog is not enough; everything has to be personalized,” says Michael Thoma, Vice President E-Commerce & Digital Supply Chain Management at Voith.

### Time-saving search for material numbers

The search for material numbers in particular quickly gives customers all the information they need. After the information has been entered into the search field, the Webshop immediately indicates if the respective item is available as a spare part, if it was already included in the original delivery, or if a current quotation is available.

The multiple search function even allows several material numbers to be queried in the shop at the same time. These numbers can be imported from an Excel list or taken from the customer's ERP software. “Our customers really appreciate the option of being able to search using their own material numbers,” says a delighted Thoma.

The shopping cart, too, has been given an update. Notes and documents can be added to every item stored in the cart, which facilitates cooperation between customer teams. For example, a staff member from the technical department uses a note to tell the purchasing department the purpose of the spare part, which machine they need it for and when. In addition, the cart can be transferred from one department to another.



Products can now be appended with notes, for example, to provide purchasing departments with additional information about delivery times.

**In the paper industry, an open content catalog is not enough; everything has to be personalized.**

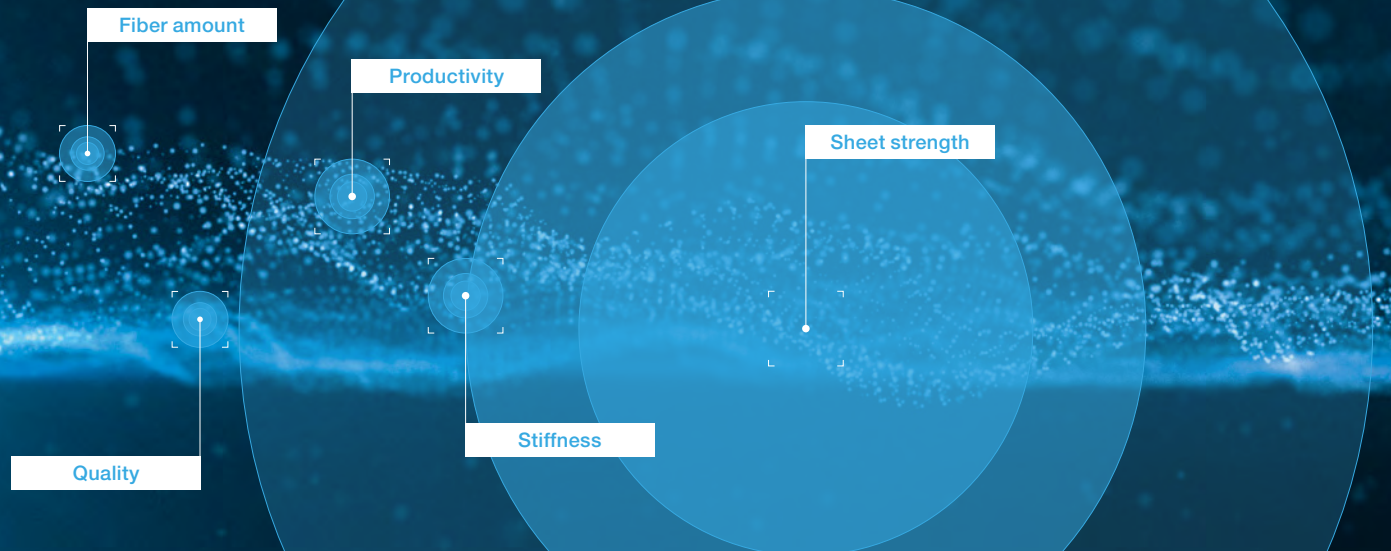
**Michael Thoma,**  
Vice President E-Commerce &  
Digital Supply Chain Management, Voith

### 130,000 spare parts directly available

The success of the Voith Paper Webshop has also seen its range grow. “Around 130,000 spare parts – those most in demand – are directly available online,” says Thoma, summing up. Customers can identify and request a million parts from Voith. Because the paper industry has recognized that the Webshop helps reduce the administrative effort necessary for procurement, the manager has, for some time now, been thinking beyond the mere product level. “In the future, we want to offer repairs and on-site services.” In the longer term, Thoma wants to also link the Webshop to Voith's asset management solution, pmPortal, to simplify the ordering process even more. Guided by a graphical navigation system, customers would then be able to select the required components directly by clicking in exploded-view drawings.

The multiple search function allows users to look for several material numbers at the same time. These numbers can be imported from Excel or ERP systems.





# OnEfficiency. Strength

**Metsä Board is counting on the Papermaking 4.0 product OnEfficiency.Strength to optimize fiber use and strength values.**

### Monitoring sheet strength

Every year, Finnish company Metsä Board produces two million metric tons of cardboard packaging at its eight plants, including folding box board, food service board and white kraftliner. However, like all paper and board manufacturers, Metsä does not have the option of measuring and adjusting sheet strength values during production. The result is quality fluctuations.

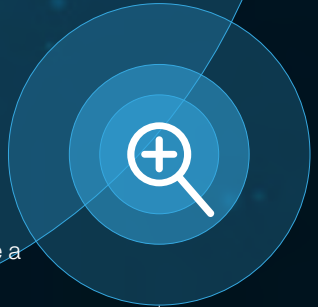
The Metsä Group now aims to change that with Voith's help. At one of its mills, the company is testing the digital concept OnEfficiency.Strength, which determines paper quality using virtual sensors during operation. This process provides information on the expected quality, particularly bending stiffness and plybond strength, during production and not just at the end following elaborate lab tests on the finished reel.

### AI-supported optimization

Virtual sensors for sheet strength values achieve a high prediction accuracy and form the basis for an efficient control process. As the volume of data grows, OnEfficiency.Strength can increasingly optimize production and automatically offset fluctuations in sheet strength. This results in fewer deviations in production output and a more efficient use of resources. The productivity of the machine also increases because the system speeds up grade changes.

"We opted for the Voith solution because Voith has sound expertise in the board manufacturing process," says Ari Kiviranta, SVP Development at Metsä Board. "This makes it easier to use an AI application rather than solutions from vendors that are not familiar with the specific processes."

**OnEfficiency.Strength has been optimized for the paper industry. The virtual sensors for strength values achieve a high prediction accuracy and therefore form the basis for a highly efficient control process.**



# AI

**Artificial intelligence can produce accurate strength forecasts from process data and statistical models.**

Dr. Jens Haag,  
R&D Manager Advanced Controls &  
Data Analytics, Voith

# transform

## New facilities and services

### Added value through modernization

Umka is growing. In business since 1939, the Serbian paper mill today supplies 30 European countries with different board grades. To be able to tap into other markets, it commissioned Voith in 2017 to modernize the stock preparation for its board machine. The goal was to ramp up annual production from 105,000 metric tons to more than 200,000 metric tons and still ensure the quality of the end products despite ever-worsening raw materials. Voith installed the space-saving InjectaCell Compact flotation system in combination with the robust InfiltraDiscfilter with bagless technology for separating the water circuits. It was a success. “The performance of the InjectaCell Compact and the InfiltraDiscfilter fully met our expectations,” explains Umka Project Manager Dragoslav Nešković. The interim balance shows higher paper quality at optimized operating costs and growth in volume to currently 130,000 metric tons per year – and the production trend is improving.

During flotation, air bubbles carry the hydrophobic particles from the suspension to the surface, where they flow off at the overflow edge.



# Think big!

The world's most modern board machine is located in Gruvön, Sweden. The entire machine, from headbox to winder, was built by Voith for BillerudKorsnäs. With its high-end components, the BM 7 doesn't just define the latest state-of-the-art installation. Thanks to the large degree of component interconnectedness and extensive monitoring of all process data, it is actually pointing the way to the digital future of the paper industry.



The 350 m long BM 7 is accommodated in a new hall that had to be built on a particularly problematic subsoil.

**BillerudKorsnäs Grevön**

- 1 Building with paper machine
- 2 BM 7
- 3 Stock preparation
- 4 Roll warehouse

**2017**

Kick-off on site, design and concept meetings in Heidenheim, Germany



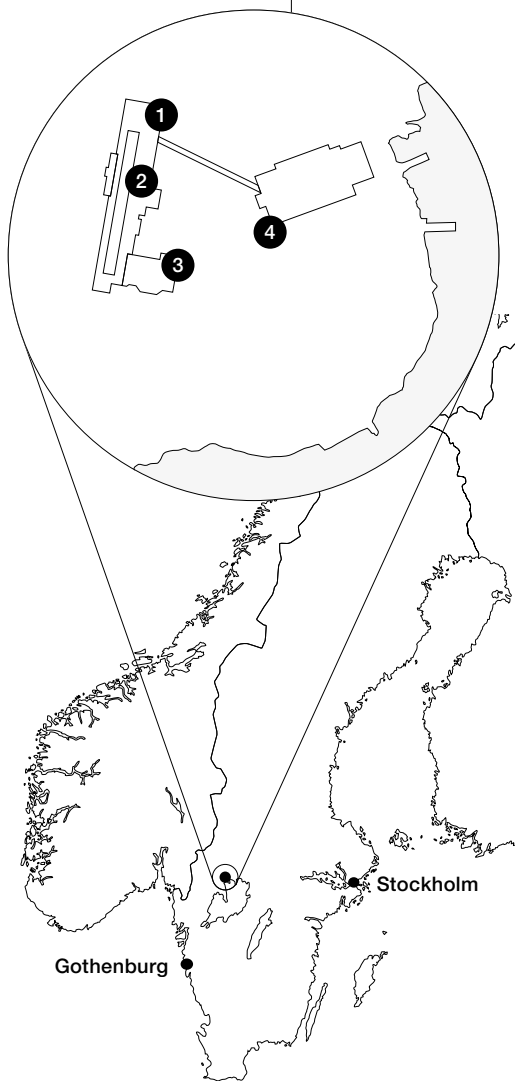
**2018**

Building work starts with the foundations followed by assembly



**2019**

Installation of DCS control software and functional tests; operation starts in June



Patric Romes is not inclined to exaggerate. But when he's talking about the board machine that Voith built for BillerudKorsnäs in Sweden, even the voice of the seasoned senior project manager resonates with respect. "To my knowledge, such a fully equipped system for high-quality board has never been realized anywhere else in Europe in recent years. It is an outstanding achievement that is setting benchmarks," says the 58-year-old. The BM 7 is an end-to-end system and the world's most modern board machine. Romes and the Voith team installed the machine at the company's mill at Lake Vänern in Grevön, Sweden. It went into operation in June 2019.

The standards it now has to meet are exacting. The BM 7 produces four different board grades with a total annual volume of 550,000 metric tons from virgin fibers from sustainably managed forests. To achieve this capacity, the machine works with a web width of 8,800 mm at the headbox and a design speed of 1,200 m/min.

**Software optimizes the processes**

But the general parameters only provide a rough picture. In fact, it is primarily the precisely matched combination of high-end components and Papermaking 4.0 software that makes the machine in Grevön so outstanding. This is largely due to the digital solutions OnEfficiency and OnCare, which allow BillerudKorsnäs staff to manage all process data online. In the control room, they monitor more than 20 continually updated production parameters. Using the OnEfficiency Forming module, the operating team coordinates and stabilizes the de-watering, retention and flocculation at the same time, for example. The OnCare package handles the asset management and helps the paper manufacturer ensure the greatest possible machine availability through preventive maintenance, which ultimately reduces operating costs.



The XcelLine board machine specifically tailored to BillerudKorsnäs also reflects the latest state-of-the-art at the component level. Various innovations have been incorporated from head-box through to winder. In the dryer section, for example, EvoDry steel cylinders are being used in a board machine for the first time. Their thinner walls mean that they transfer heat better and are particularly safe, because their flexible material prevents the spontaneous ruptures that can occur in cast iron cylinders. In the finishing section, the BM 7 is the world's first board machine to feature Curl Control, which is generally used to reduce paper curl in single-tier dryer sections. Another new feature is the highly efficient VariFlex Performance winder, which will be increasing productivity in a European paper mill for the first time.

### Obstacles overcome with teamwork

Nevertheless, the project participants did have to overcome some obstacles first before the BM 7 could be commissioned. For example, the start of assembly with the foundation rails was scheduled for January 2018, as Patric Romes recalls. "However, they couldn't be installed at that time because the building wasn't ready." This was due to problematic subsoil; the loamy soil had subsided unexpectedly, delaying the construction start for the foundations of the 400 m long hall. In addition, there were also problems with the cabling in the building. The digital control system (DCS) for monitoring machine functions could not be installed until these problems were resolved.

All these delays had consequences: The stock on wire deadline, originally scheduled for November 2018, was achieved during April 2019, and first roll was produced early June.

It is not unusual for unforeseen events to occur in a project of this scale. The large number of subcontractors and suppliers involved increases the number of interfaces; this was the case for the Gruvön BM 7 project. Accordingly, the need for coordination was great, which created additional pressure and led to delays. →

# BM 7

## Board machine

The BillerudKorsnäs BM 7 is currently the most modern board machine in the world. Apart from its proven and in some cases newly developed components, the XcelLine machine impresses above all with the highest level of integration of Paper-making 4.0 functions, ensuring higher quality and improved efficiency through the digital monitoring of the production process.

**Design speed:** 1,200 m/min  
**Wire width:** 8,800 mm  
**Capacity:** 550,000 metric tons per year  
**Basis weight range:** 120–290 g/m<sup>2</sup>

## Voith scope of supply

Headbox: 3 MasterJet Pro  
 Three-ply wire section: 2 TopFormer F,  
 1 DuoFormer D II

Tandem NipcoFlex shoe press  
 EvoDry steel cylinders  
 EcoCal hard calender

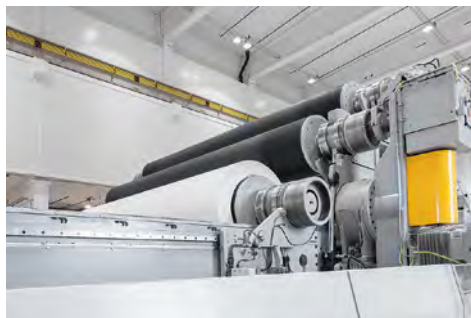
2 SpeedSizer AT  
 2 DynaCoat AT

Sirius winding system  
 VariFlex Performance winder  
 Complete initial clothing package

Automation:  
 OnEfficiency and OnCare packages

### Sirius

The Sirius winding system gently winds the paper or board and is especially suitable for surface-sensitive papers and large winding diameters.



1,200 m/min  
 design speed

8,800 mm  
 wire width at headbox



#### Film press

The BM 7 is fitted with two DynaCoat AT coaters and two SpeedSizer AT film presses that offer good runability for long, steady production runs.

#### Taking charge

Magnus Haldor Johansson, Area Manager BM 7, BillerudKorsnäs, supervised the installation of the machine along with Voith Commissioning Manager Christian Merz.





#### Jumbo rolls

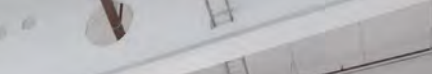
The standout features of the highly efficient VariFlex Performance winder include a high design speed and short set change time.

**The BM 7 is the first new board machine in Sweden in the past 15 years to be built as a complete system.**

**Christian Merz,**  
Voith Commissioning  
Manager







**550,000**  
tons per year  
production capacity

**120 – 290**  
g/m<sup>2</sup>  
basis weight range

However, the Voith team always found solutions through pragmatic discussions with the customer. “We got together and agreed on how to deal with obstacles. The collaboration was exceptionally good. Close communication was necessary and was genuinely put into practice on site,” emphasizes Voith manager Romes. “We found the collaboration to be very friendly and constructive,” adds Magnus Haldor Johansson. As Area Manager BM 7 at BillerudKorsnäs, he supported the construction work from start to finish. His colleague Maria Engnes, Director of the NEXT Generation Program, was also often involved on site to make sure that, despite all the hurdles, production could start as soon as possible.

### Strategic investment

For BillerudKorsnäs, the new board machine is not just the biggest investment in the company’s history but also an important strategic move. When announcing the building plans at the end of 2016, former President and CEO Per Lindberg spoke of a “historic decision.” From their mill in Gruvön, the Swedes want to do their part to help satisfy global demand for board, liquid packaging, food board and liners. In doing so, they are focusing on the growing need for sustainable solutions on the part of increasingly more brand owners, food retailers and consumers. To be able to cover this demand, the group is increasing its production capacity through the BM 7. But it is not just about the volume. “The quality that the machine is producing is promising,” says BillerudKorsnäs’ Project Manager Göran Korsfeldt.

For Voith, the BM 7 is not only a technological showpiece and impressive reference. The successfully completed, large-scale project delivered many insights that will give the company a crucial lead – for example, when refining the Papermaking 4.0 concept and also in conjunction with the ongoing improvement and development of expertise in board machine construction.

**Global aspirations:**  
The board produced in Gruvön is intended for the world market.



**Raw material**  
The primary fiber used for board production comes from sustainable forestry. The BM 7 processes them in an efficient and resource-conserving manner with few emissions.



**Capacity**  
The capacity of the BM 7 is designed to help BillerudKorsnäs cover the expected demand for sustainable board from climate-friendly production processes.



**Availability**  
The cut rolls will be kept in a new 20,000-square-meter warehouse for fast delivery to customers around the world.

**The quality produced by the machine, even shortly after startup, is very promising.**

Göran Korsfeldt,  
Project Manager  
BillerudKorsnäs

### Final product

The finished rolls are transferred to the packaging facility on a conveyor belt.



# More than just lip service

Double the benefits for the customer: Voith's headbox service offers a maintenance solution for the headbox lip that guarantees maximum quality while simultaneously reducing downtime to a minimum. It is available for all machines with replaceable lips.

1

**Interval maintenance**  
The headbox lip suffers wear due to abrasion and needs to be replaced at regular intervals.

1

The countdown is on. The lower headbox lip needs to be serviced every three to five years, because by this time the abrasive solids and fillers in the suspension have worn the lip to such an extent that paper quality is impaired. Not only can this cause reduced CD profile quality, but there is also a risk of sheet breaks and high consequential costs due to production downtimes. Even work safety may be compromised.

### Saving time and reducing stoppage costs

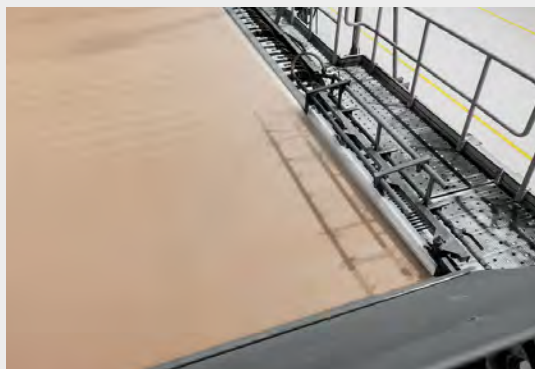
To avoid these consequences, preventive maintenance is absolutely essential. Through its headbox service, Voith offers paper manufacturers an especially efficient maintenance solution that drastically reduces downtime costs. It also allows a very high-quality refurbishment of the lip, because it is not ground directly in the machine under difficult working conditions but removed and completely overhauled in one of Voith's workshops.

### Complete removal and re-installation service

"Our scope of supply always includes a replacement lip that is used while the original lip is being refurbished in one of our workshops," explains Benjamin Kitze, Product Manager at Voith Paper. In the workshop, the lip can be reconditioned under ideal conditions by experts with specific know-how. Following refurbishment, the lip is as good as new and is then available to the customer again as a replacement lip. As part of the complete headbox service, Voith service technicians also inspect the entire headbox area for deposits, damage and wear.

### In the wet section

the headbox has a major influence on the overall quality of the paper produced.

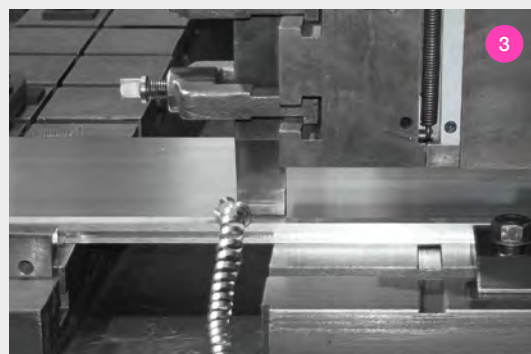


2

Reworking a top lip

3

Machining a bottom lip



70

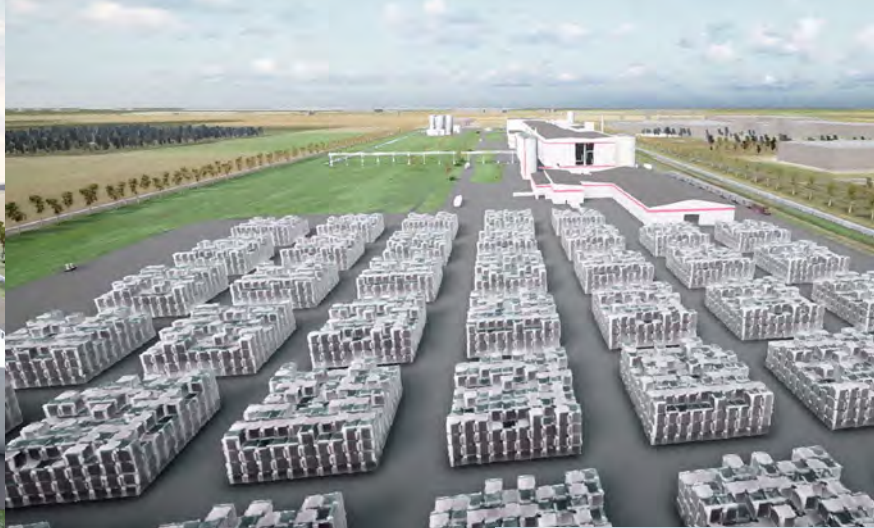
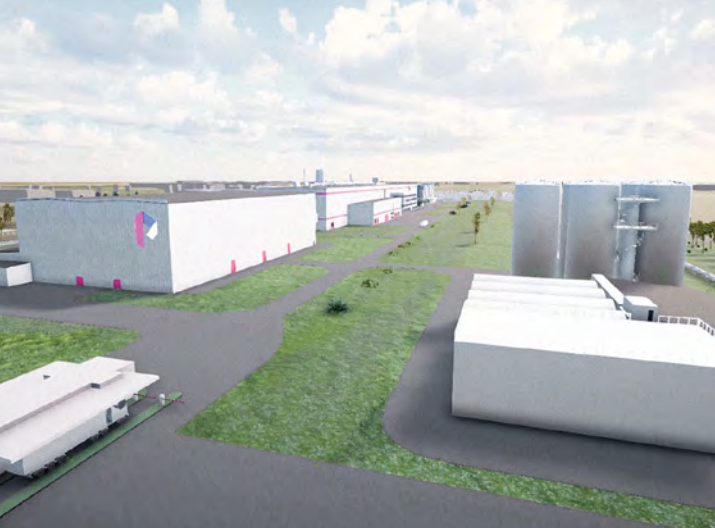
percent shorter downtimes thanks to headbox service.

"We achieve better quality than an in-situ refurbishment and save the customer a lot of time," Kitze concludes. He estimates that this process reduces paper machine downtime by around 70 percent compared with conventional headbox services, while the manpower requirement is reduced by 40 percent.

### For all replaceable lips

The headbox design of Voith's MasterJet Pro makes provision for this highly efficient form of lip servicing, which is already being used by many customers. "However, this kind of service can also be performed on the machines of other suppliers provided the lips are also replaceable," says Kitze. This maintenance concept underscores Voith's position as a full-line supplier that not only provides machines and spare parts but also delivers end-to-end service tailored to the specific requirements of customers through its Servolution portfolio.

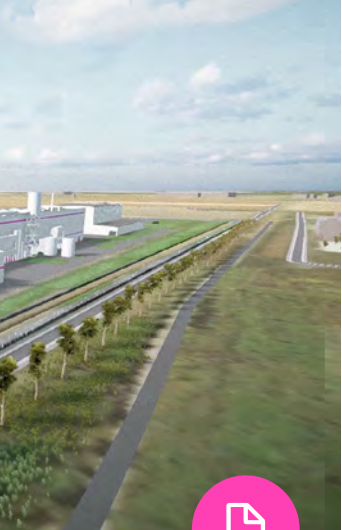
Preventive maintenance and effective spare parts management are crucial for the smooth operation of the headbox.



**In northeast Germany, Progroup AG is currently building one of the most modern packaging paper mills in the world. As a full-line vendor, Voith is supplying the paper machine and BlueLine stock preparation unit.**



# No trifle



The production facility, which has been under construction since January 2019 on a 450,000 m<sup>2</sup> site in Sandersdorf-Brehna near Leipzig, is no small thing. The 32 m high production hall alone will have an enclosed space of 750,000 m<sup>3</sup>. On completion, the roll warehouse will be 29 m high and will provide 230,000 m<sup>3</sup> of storage space. The centerpiece of the facility is the new paper machine with a working width of 9.2 m. It is set to produce 750,000 metric tons per year of testliner and corrugating medium in the basis weight range of 80 to 150 g/m<sup>2</sup>.



## 860,000

### tons of recovered paper

The plant is set to produce new paper from 860,000 metric tons of recovered paper per year.



The Progroup from southwest Germany is relying entirely on Voith Paper to supply the technical equipment for the production facility. “As far back as 2006, we supplied the Progroup with a stock preparation unit for its machine at the company’s production facility in Burg,” says René Bauer, Project Manager Division Projects at Voith Paper. “The fact that we are to supply the new plant with the entire equipment for paper production, from recovered paper feed to the finished and cut paper roll, is a fantastic success and a great vote of confidence in us.”

### Everything from a single source

In addition to the XcellLine packaging paper machine with a wire width of 10 meters, the scope of supply also includes the VariFlex Performance winder with an operating speed of 3,000 m/min, the new IntensaDrumDuo pulping drum, the BlueLine stock preparation unit, as well as air systems and hall ventilation. Voith has also won a five-year contract to supply roll covers and clothing. This will be the first time the new Voith double unwinder will be used.

From the perspective of René Bauer, what is important, apart from the purely technical aspects of the project, is the close consultation between Voith Paper and the customer. “In our collaboration, we were able to benefit in many instances from the experience and expertise of our client. Representatives of Progroup were closely involved in the manufacture of machine components and also visited the Voith workshops where the rolls and IntensaDrumDuo were fabricated.” —>



## 750,000

### ton capacity

The packaging machine will produce 750,000 metric tons of testliner and corrugating medium every year.



## The new plant will play an important role in our Two Twentyfive growth strategy.

Maximilian Heindl,  
Chief Development Officer, Progroup AG



### 2020

#### startup

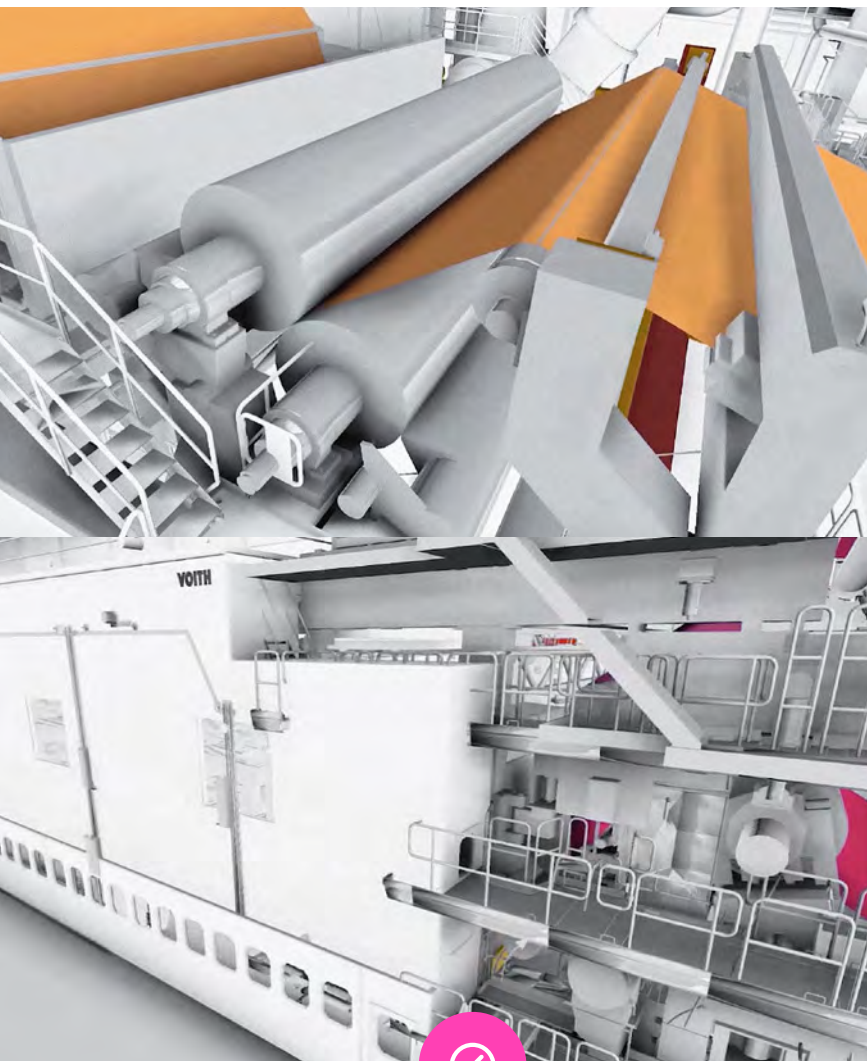
The plant is scheduled to start production in the second half of 2020.

#### Dimensions that impress

The IntensaDrumDuo consists of a 48 m long pulping zone and 23 m long screening zone and has a diameter of 4.5 meters. Thanks to these dimensions, the pulping drum can process almost 3,000 metric tons of recovered paper per day. "Due to its size, the IntensaDrumDuo will be the plant component that we install first while the facade of the factory building is still open," says Bauer. Only when it has been successfully installed can the rest of the construction work proceed on the pulper charging building, recovered paper storage yard and rainwater basin.

#### State-of-the-art for sustainability, too

A closed water loop and modern processing technology for waste water treatment by Meri Environmental Solutions, a Voith subsidiary, allow the plant to be operated in a very sustainable fashion. For example, all the process water occurring in the paper manufacturing process is treated in the company's own water treatment facility on site and then returned to the production process. This results in both sustainability and efficiency gains, according to René Bauer. "In this way, the new paper machine produces more paper of the highest quality while reducing energy and raw material use." Progroup is making additional investments in environmental protection to the tune of around EUR 100 million. Part of its philosophy as a family-managed company is to think and act sustainably with a view to the longer term and, in doing so, assume responsibility.



### 1,600

m/min working speed

The paper machine will work at an operating speed of 1,600 m/min.



# “Basis for long-term collaboration”

## Five questions for Maximilian Heindl, Chief Development Officer of Progroup AG

### What is the importance of the new facility in Germany for your company?

The new plant will play an important role in our Two Twentyfive growth strategy. This strategy is helping us to secure the integrated raw material supply for our growing number of corrugated board plants. But we are also implementing a division of labor and a higher level of specialization in our paper mills. At the new location we will be producing mid-range basis weights. The PM 1 will focus on high basis weights and high-quality paper grades, while the PM 2 can specialize in the lighter-weight papers.

### What was the deciding factor that prompted you to award the order for the paper machine to Voith?

We have worked with Voith ever since we have been involved in paper production. Both family companies pursue similar values, have known each other a long time, and work very well together in a spirit of trust. Voith has a technologically convincing machine concept that covers all process steps from a single source, from recovered paper feed to winder. Moreover, Voith will continue to offer us flexible support even after commissioning by supplying clothing, rolls and services to ensure the best possible operation.

### How important was it to work with a full-line supplier like Voith and its subsidiary Meri Environmental Solutions GmbH?

It certainly was an important aspect. Having a full-line supplier on board means there are fewer interfaces for us to manage. In addition, the development of the closed-loop water treatment facility was only possible through very close cooperation between Progroup, Meri and Voith. This enabled the various facilities to be carefully matched to one another with the common goal of optimizing the overall process.

### The timetable for building the new paper mill is very tight. What are the greatest challenges?

With a project of this size, there are a lot of partners on the construction site at the same time. The building shell is still being built as equipment is already being installed. You need reliable and competent partners to keep track of so many interfaces simultaneously. And we have found that partner in Voith.

### What is it like to collaborate with Voith?

We find Voith to be solution-driven, cooperative and with a clear customer focus. We achieve the best outcomes by working together. This means we are not only creating a facility that is unique worldwide but also establishing the basis for long-term collaboration over and beyond the project phase.



100

million euros

is the additional sum being invested by Progroup in environmental protection.



**Maximilian Heindl**

The son of company founder Jürgen Heindl is a member of the Executive Board of Progroup AG.



Appleton's role in the U.S. paper industry is bigger than the city itself. With three plants in the Fox River Valley region, Voith uses this location to serve all of North America – and from there, brings product innovations onto the global market.

# The small capital of paper

Appleton has a long tradition in the paper industry and with Voith that stretches back into the 1800s. Current Appleton mayor Timothy Hanna can personally attest to the town's deep connection with the paper industry, as his father once worked for Voith.



Framed by farms and forests, Appleton has a population of 70,000 and lies on the northern tip of Lake Winnebago in the state of Wisconsin. The peaceful Fox River meanders through the city – one of the 10 most family-friendly in the U.S., as Mayor Timothy Hanna points out. The city, about 195 miles from Chicago, has numerous amenities, including museums, shopping centers and several universities.

Most notably, Appleton is truly a hub for the North American paper industry, and it is here where Voith employs about 600 people. Appleton's papermaking tradition began in 1853, four years before the city was even founded. Starting in 1882, one of the world's first hydroelectric power plants began supplying electricity in the community – and it was built at the request of papermaker Henry J. Rogers. The following year, a small blacksmith's workshop started manufacturing grinding machines and water wheels, among other things. This workshop soon became Valley Iron Works, which, by the 1920s, entered into a licensing agreement with Voith, marking Voith's entry into the U.S. paper machine market.

Today, nearly 100 years later, Voith continues the region's paper tradition with three manufacturing and service facilities. From here, Voith delivers machines, replacement parts and fabrics for the paper industry. There are two locations in Appleton. One was established from a joint venture

## 1857

The city of Appleton is founded. Since 1853, a paper mill has been operating in the region, which has plenty of papermaking resources, including the Fox River and nearby forests.



## 1920

Through a licensing agreement with Valley Iron Works, Voith enters the North American paper market.

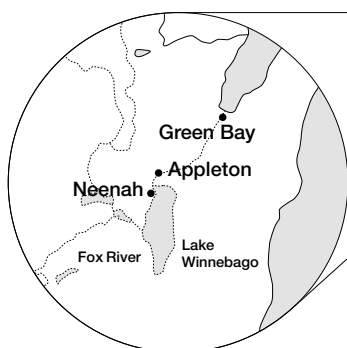


with Allis-Chalmers and produces machines and replacement parts. The other resulted from the acquisition of Appleton Mills. This marked Voith's entry into paper machine clothing and is where the company produces press fabrics for the North American market. But that's not all – just south of Appleton is the city of Neenah, where Voith manufactures new roll covers and also offers mechanical roll services for customers' existing rolls. Voith's Neenah location is particularly ideal; the facility's immediate neighborhood is home to numerous paper companies.

The concentration of paper producers in the area is further evidenced by Voith's proximity to Green Bay, the home of Green Bay Packaging (GBP). Voith and GBP recently announced that Voith will serve as the single-source supplier for GBP's new testliner production line in Green Bay, and it is the first contract of such a wide scope in U.S. paper industry history. The contract includes the wastewater treatment and stock preparation systems, paper machine clothing, winder, Papermaking 4.0 products and a multi-year roll service contract for several machines. GBP's new installation, PM 4, is expected to start operations in early 2021.



Appleton, Neenah and Green Bay are important locations for the entire North American paper industry.



The three Voith plants in the Appleton area cover the entire range of paper industry components, and customer visits are often coordinated between the three to show guests Voith's overall capabilities. "Our extensive capabilities in the Fox River Valley region showcase the depth and breadth we have in the paper market, considering Voith is the largest full-line supplier in North America – from complete paper machines to stock preparation systems, fabrics, rolls, shoe press sleeves, services, digital tools, spare parts and paper machine rebuilds," says David Buchanan, President, Voith Paper Products & Services, North America.

"Also, this footprint in the market makes us one of the significant employers in the area, which is important for us as we seek to employ skilled trade and salaried workers in our facilities here," explains Buchanan. "Appleton and the surrounding region are home to high schools, trade schools and universities where we have the opportunity to let potential talent know there are exciting careers in the paper industry, right in their backyard."

And, in this "backyard," the papermakers of Wisconsin see themselves as being well-positioned. In 2018, as the fifth largest industry in Wisconsin, papermaking and its related industries added more than 18 billion dollars to the state's economy and employed around 30,000 people. These papermaking companies are technologically state-of-the-art and are growing, notes Scott Suder, President of the Wisconsin Paper Council (WPC). "Papermaking has a great legacy, but also a great future," he says.

To secure this future, Voith is investing further in the location of Appleton, for example, in a new Infinity loom at Voith Paper Fabric & Roll Systems. "The loom will produce defect-free base cloth for press fabrics and will offer quality unparalleled in the industry. This leads to improved pressing uniformity and best-in-class seam felt installation time," explains Jonathan Antes, Business Development Manager, Voith Paper Fabric & Roll Systems, North America.

"These press felts enable us to advance further into the market of board and packaging papers," adds Jeff Berg, Vice President Operations, Voith Paper Fabric & Roll Systems, North America. "Our Infinity press felts offer good runnability and dimensional stability. We see a global market for these felts."

## 1977

Following a joint venture with Allis-Chalmers in 1974, Voith Paper establishes its first production facility in Appleton.



## 1983

Voith acquires Appleton Mills and expands into press felts.



## 1999

Voith purchases SCAPA rolls and paper machine clothing.



## 2008

Voith Paper Fabric & Roll Systems, Inc., is established.



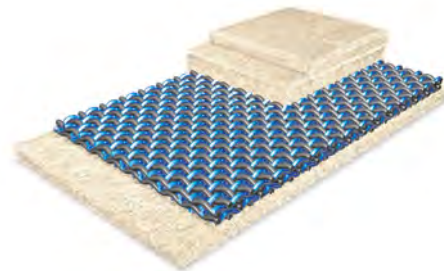
## Present

Voith operates three facilities in the Fox River Valley region as a full-line supplier covering all areas of the paper production process.

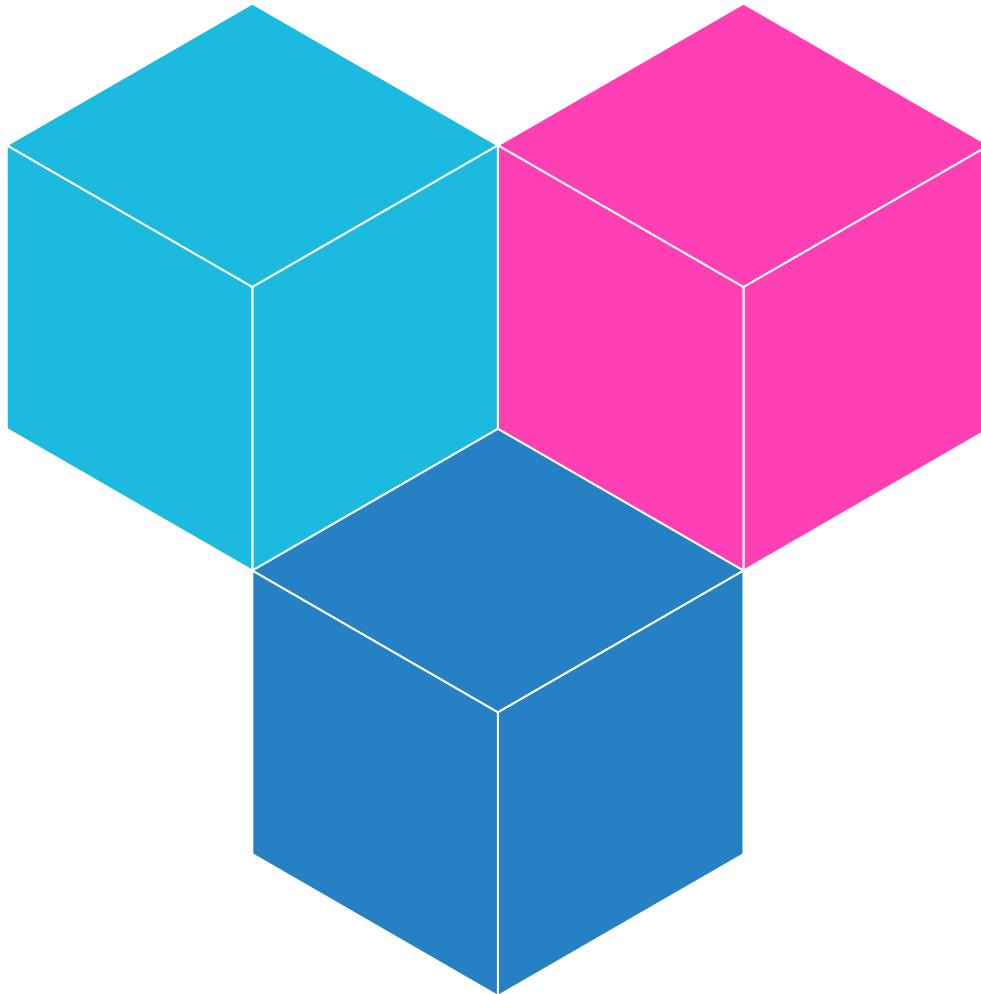
Over 160 years after its founding, Appleton remains a prime location for technology innovation and continues to serve an important role in the North American paper industry.

### New loom: Update for Infinity press felts

In November 2019, Voith Paper Fabric & Roll Systems, Inc., in Appleton installed a new Infinity loom. This investment in new technology enhances both product quality and efficiency. "Quality, speed, capacity and flexibility," says Pamela Leisgang, Plant Operations Manager, Voith Paper Fabric & Roll Systems, North America, summing up the advantages coming from the new machine. "This loom, which supports the continued growth in the board & packaging and tissue markets in North America, provides us with a more precise and repeatable manufacturing process for seamed products. With it, we further our capabilities to produce press felts that meet our customers' exact requirements. The technology allows us to produce a defect-free base fabric and an improved seam product that can be used in customer machines that have historically not been able to run seamed felts." Also, the Infinity loom works about three times faster than a conventional loom, stresses Leisgang. For papermakers, this means not only higher paper quality but also shorter lead times overall.



Infinity press felts have proven themselves through their uniformity, dimensional stability and good runnability.



P. 35 —————> 45

# reflect

Insights and insider views

## Shaping change

Sustainability and digitalization are mega-trends that are not just going to shape the future; in the paper industry they have already been driving the present for some time now. Without improved efficiency, it will be impossible for companies to remain competitive while meeting the ambitious targets imposed by legislators and society to reduce the use of natural resources and cut CO<sub>2</sub>-emissions. In this context, significant improvements are obtained, above all, through digital solutions that allow elevated monitoring of all processes and therefore more accurate production control. Efficiency thus plays a key role when it comes to reconciling ecological and economic requirements. On the following pages, we will describe how change can be shaped and what perspectives this offers the industry.



**The paper industry continues to be in a state of transition. It is facing cost pressures, an increasing focus on sustainability, and a shortage of new recruits. Voith Paper CEO Andreas Endters outlines some approaches that will enable companies to master these challenges and benefit from the growing importance of paper as an environmentally friendly product.**

# “Paper does have a future”

**Mr. Endters, what are the biggest challenges for the paper industry in the coming decade?**

Currently, I see three major challenges that offer huge opportunities. First, paper producers are under constant cost pressure to compete internationally. Second, in many places nowadays there is social consensus about the need to protect the environment and handle resources responsibly; in many regions this is actually being required by legislation to a massive extent. And third, our customers are struggling to find qualified new recruits to operate their factories. These issues don't just affect the paper sector but apply to a lot of industries.

**What conclusions do you draw from this?**

Because we offer a very wide range of products and intelligent services, we can combine these on an application-specific basis and as a result help our customers to noticeably reduce their production costs. As paper is produced from renewable

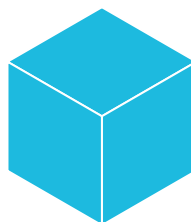
raw materials and is a biologically degradable end product used in a wide range of applications, it also has great potential to replace products based on fossil resources.

We help conserve resources through our environmentally friendly technologies that continually reduce the use of energy and water in paper production and minimize fiber losses. Incidentally, this also reduces manufacturing costs.

To counter the shortage of new recruits, we are relying partly on our digitalization capabilities. Through the effective use of the data generated, we are in a position to further automate and stabilize production processes. In doing so, we help our customers replace missing or lost expertise.

**Which environmental imperatives do you think are more urgent – reducing CO<sub>2</sub> emissions, closing water loops or lowering fiber consumption?**

We are going to tackle all these issues at the same time and with the same intensity. In R&D, we are already putting this into practice by addressing some issues incrementally. In some cases, we can achieve smaller improvements and savings in the various process stages that all add up in the end. At the same time, we are pressing ahead with research projects that aim to develop disruptive technologies to market readiness. By doing this, we want to achieve as soon as possible those savings that will be required by legislation by 2030 and 2050 in any case. ———>



**Paper structure**  
Professor Markus Biesalski uses polymers to create new applications for paper with maximum recyclability (see page 45).

# 1

## Sustainability

**Paper is based on renewable raw materials and is biologically degradable. This means it has the potential to replace products made from fossil resources.**

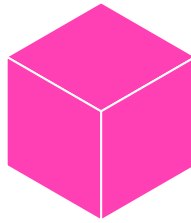
# 2

## Cost efficiency

**Paper producers competing with one another are under significant cost pressure. Intelligent solutions can further reduce production costs to a significant extent.**

**Voith invented the recycling of recovered paper. Has this technology been fully developed, or is the goal of a closed-loop economy providing new impetus?**

Recycling technology has certainly not reached its zenith. On the contrary, paper and board still have huge potential as materials. Increasingly, good recovered paper qualities are becoming a rare resource. Following the ban on waste paper imports to China, mixed recovered paper is being disposed of in landfill because only a few paper mills have stock preparation units capable of processing such low-quality paper. In other markets, even higher recycling rates are being required than before. As a reminder, in the early 2000s, Voith had joined with other paper manufacturers from CEPI (Confederation of European Paper Industries) to set for itself the very ambitious goal of increasing the recycling rate of recovered paper for paper manufacturing from below 50 percent to 70 percent. Since that time, the recycling rate in the EU has already exceeded 70 percent.



**Benchmark**  
BillerudKorsnäs' board machine BM 7 increases efficiency by networking components to the greatest extent possible and through process data monitoring (see page 20).

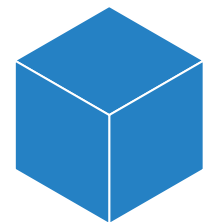
**So, despite declining qualities, is the concept of recovered paper recycling still viable for the future?**

Yes, but this will also result in higher and higher contaminant loads, which present entirely new challenges for recovered paper pulping and screening, treatment of residues and water management. In addition, the high volume of stickies disrupts the stable running of the paper machine. As a market leader, we have been working intensively on all these problems for a long time in cooperation with customers and research institutes. As a result, we can offer stock preparation systems that are world-leading with respect to energy efficiency and fiber treatment. However, the most important aspect is still the quality of the suspension. The question of whether a paper machine is going to produce high-quality paper is largely decided upstream of the headbox in the stock preparation unit, and this is definitely where one of our major strengths lies.

# 3

## Digitalization

**Even the shortage of skilled personnel and lack of expertise can be countered by using digitalization to automate and stabilize processes.**



**Software solution**  
Using virtual sensors, OnEfficiency. Strength determines the expected paper quality during operation and optimizes it with the help of AI (see page 18).

**What other strengths does Voith Paper offer in its collaboration with the paper industry?**

We have a unique product range from stock preparation to paper machine and from winder to waste water and residue treatment. Voith Paper not only covers its customers' needs for new facilities and rebuilds; we also supply the necessary spare and wear parts for efficient operation as well as services and complete automation solutions. As a result, we are not just capable of giving our customers comprehensive expert advice on the complete paper manufacturing process but can also supply them with solutions from a single source that require no other interfaces.



This reduces their workload in-house. What this means for our customers is not only a fast startup of new machines but also a guarantee of reliable production volumes over longer periods and thus improved predictability of their processes and ultimately, their profits. As a full-line supplier, Voith Paper is therefore an exclusive partner for the manufacturing of board, packaging and graphic papers, tissue and various specialty paper grades.

**How are you aligning Voith Paper strategically against the backdrop of economic and ecological change?**

We are going to further develop our leading position as a full-line supplier. At the same time, we are taking sustainable and efficient paper production to the next level with our BlueLine stock preparation units and XcellLine paper machines. In this context, our Servolution service packages and Papermaking 4.0 concept to increase resource-conserving machine efficiency will take center stage. We will continue to develop our product portfolio, our organization and our footprint within these cornerstones.



**Complete package**  
As a full-line supplier, Voith combines ongoing sustainability-driven product improvements and efficiency-enhancing digital solutions into a complete package for the paper industry.

**We are going to further develop our position as a full-line supplier and at the same time take sustainable and efficient paper production to the next level.**

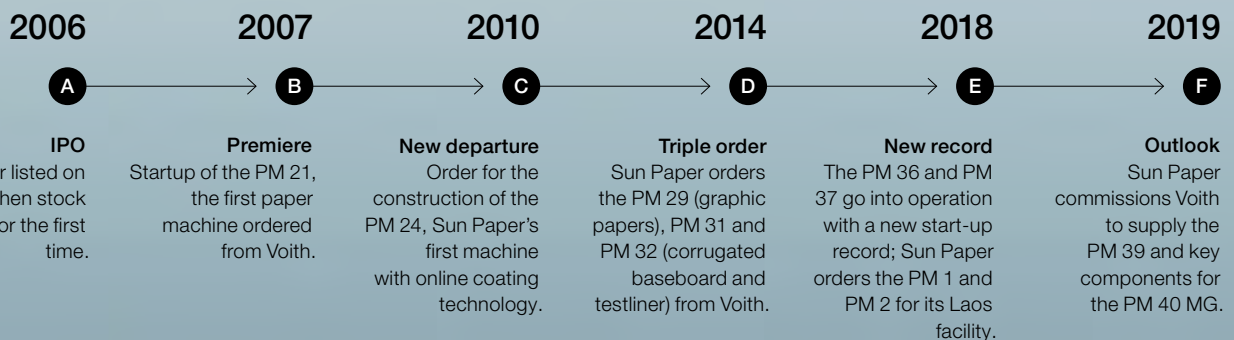
**Andreas Endters,**  
President & CEO,  
Group Division Voith Paper

**Full-line supplier**  
**Sustainability**  
**Efficiency**  
**Digitalization**



# New milestone

Sun Paper is increasing its capacity for graphic and specialty papers with another two machines. The PM 39 and PM 40 MG are to be installed at the company's Yanzhou facility. Since 2007, the paper manufacturer has ordered a total of 11 Voith machines, an unprecedented collaboration during which both parties have set several industry records.







Cooperation built in a spirit of trust is a very valuable asset. This is true especially but not only in China. The saying “Trust is achieved through honesty. Success is acquired through zeal.” is attributed to the Chinese philosopher Confucius. Twenty-five hundred years later, the partnership between Sun Paper and Voith is proof that this maxim can be applied to the modern business environment. The subsidiary of the Chinese Shandong Sun Holdings Group has engaged Voith to supply the PM 39 paper machine for graphic papers as well as key components including the MG cylinder for the PM 40 MG. The latter will produce flexible packaging papers that will be used predominantly for foodstuffs. These papers are smooth on one side, a quality that is achieved by drying them on an extra-large Yankee cylinder.

Through this order, Sun Paper is not only underlining its commitment to growth but also its trust in Voith as a supplier, not least for graphic papers. This is because the market for clothing and other spare parts, components for rebuilds and service packages continues to be an important area of business for Voith Paper.

### Successful start

The order was preceded by a long-shared history. Sun Paper, currently one of the most important paper manufacturers in Asia, was established in 1982 and has been a listed company since 2006. Earlier contact with Voith had convinced Sun Paper of the Group’s expertise. Voith then got the opportunity to put its capabilities to the test in the same year as the IPO, when Sun Paper ordered the PM 21 for wood-free coating base paper, offset and copy paper. Assembly began at the end of September 2006, and the machine was commissioned just six months later in April 2007. In the process, a start-up record was achieved, as there were just six hours between “stock on wire” and marketable paper on reel.



### Lightning-fast start

When put into service, the PM 37 was able to produce marketable paper in record time.



### Quality check

The paper produced by the PM 36 and PM 37 had to satisfy rigorous quality checks.

### Equipping Sun Paper for expansion

The lightning-fast start was followed by a rapid expansion of the collaboration between the companies. In 2010, Sun Paper engaged Voith to build the PM 24 at the same location. It was the company’s first paper machine with online coating technology. Then in 2014, the manufacturer ordered no less than three machines from Voith: the PM 29 for graphic papers and the PMs 31 and 32 for corrugated baseboard and test-liner. The PMs 36 and 37 went on stream in 2018, both earlier than scheduled, with the PM 37 also setting a new record for packaging paper machines. When it started up, it took just one hour and 57 minutes from “stock on wire” to marketable paper on reel. One order in the same year was game-changing. Sun Paper commissioned Voith to supply the packaging paper machines PM 1 and PM 2 for its production facility in Laos, its first outside China.



### New chapter of cooperation

The PM 39 and PM 40 MG are now adding to this success story. Both machines will be installed in Yanzhou, where the PMs 21, 24, 29, 31, 32, 36 and 37 are already operating. With a wire width of 10.5 m and design speed of 1,800 m/min, the PM 39 is set to produce 450,000 metric tons per year of graphic papers. For the PM 40 MG, which will produce paper that is smooth on one side (machine-glazed), Voith will supply the MasterJet Pro F/B headbox including ModuleJet automatic control system, a complete press section, the single NipcoFlex shoe press and the EcoCal Soft calender.

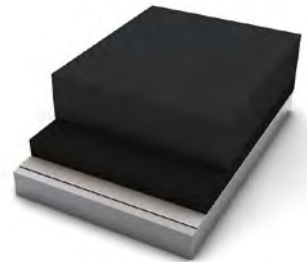
These latest orders reinforce the long-standing collaboration between the two companies. “In cooperation with Voith, the commissioning of our PM 36 and PM 37 was very successful,” says Guangdong Ying, Deputy General Manager and Chief Engineer at Sun Paper. “We very much enjoy working with Voith.” Trust is a currency, not only but especially in China.

### In cooperation with Voith, the commissioning of our PM 36 and PM 37 was very successful.

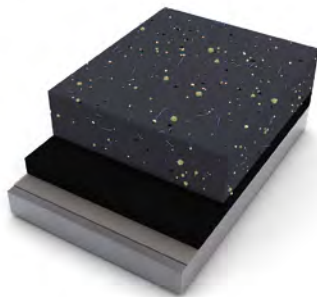
**Guangdong Ying,**  
Deputy General  
Manager and Chief  
Engineer at Sun  
Paper

# Roll- out: Supreme

The established high-performance rubber roll cover eVenFilm has already set a lot of benchmarks. New filler material concepts mean that it can now continue to write its success story.

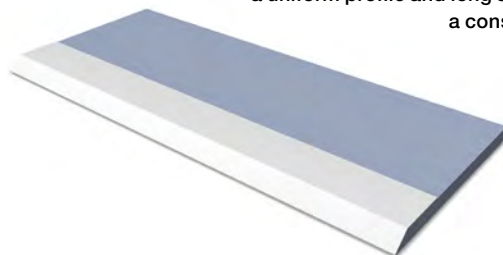


The rubber roll cover UniFilm can be used in film presses and helps to substantially extend metering rod service life.



# UniF OceanC Sk

The SkyCoat coating blade ensures a uniform profile and long service life with a constant wear rate.



Voith is extending its product range with the new polyurethane roll cover SupremeFilm. Developed for film presses, it achieves very consistent 2-sigma profiles. In paper finishing applications, it complements other highly durable roll covers like OceanCoat for coater backing rolls.

Film

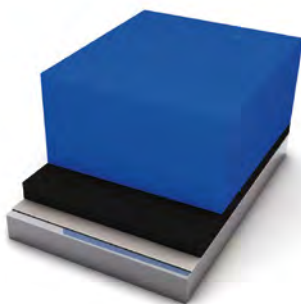


SupremeFilm combines the material-specific benefits of polyurethane with a new filler material concept.

evenFilm

ilm

oat



OceanCoat roll covers for coater backing rolls are especially durable, and their stable material needs regrinding less often.

yCoat



**Thanks to SupremeFilm, we were able to maintain the 2-sigma profiles constantly over an unprecedented installation period.**

**Dietmar Muser,**  
Manager Paper Mill, Sappi Ehingen,  
Germany

Because the SupremeFilm roll cover combines the material-specific benefits of polyurethane (PU) with an innovative filler concept, which maintains the surface roughness over the entire service life, it achieves an especially homogeneous and consistent film transfer. The high abrasion resistance also means that paper producers can extend the intervals between regrinds. But above all, it achieves an absolutely uniform paper quality. "Thanks to SupremeFilm, we were able to maintain the 2-sigma profiles constantly over an unprecedented installation period," says Sappi manager Muser. "In addition, we benefited from reduced maintenance costs and a longer running time between roll changes."

#### **New technology improves film presses**

Dietmar Muser has a smile on his face. As the manager of the Sappi paper mill in Ehingen in southern Germany, his job is to constantly optimize production. Now he has valuable support with the coating process. Sappi is one of the first customers to use the new Voith SupremeFilm roll cover for the film press.

"We aim to be constantly evolving and continually making our production more efficient. To enable this, new technologies were necessary," explains Muser. "For this reason, we opted to use a promising new development from Voith."

#### **Benefits for film transfer**

"At the heart of the innovation is a polyurethane material developed from scratch. With this development, we are meeting the specific requirements for film presses, especially with respect to profile accuracy and film transfer, better than with any other polymer cover on the market," says Ralf Moser, Global Product Manager Finishing Section, Voith Paper.

#### **Suitable for all film presses**

Adang Supriatna, PM 2 Production Manager at Indonesian manufacturer Riau Andalan Kertas – another of the very first customers to use the new roll cover – confirms a further reason why it is well worth switching to SupremeFilm. "The performance of SupremeFilm met our expectations of reducing the need to use our grinding machine," he says. Another advantage of the new polyurethane roll cover is its flexibility; SupremeFilm is not restricted for use in Voith film applicators like SpeedSizer AT, but can also be used in film presses from other manufacturers.

# Coat SkyCo

# Q A



## Questions and Answers

**At the Technical University of Darmstadt in Germany, Professor Markus Biesalski conducts research into macromolecular chemistry and paper chemistry. His objective is to extend the functionality of paper to give it new specific properties depending on application.**

**Professor Biesalski, as a scientist you are involved in altering the structure of paper. What deficits do you want to offset by doing so and what benefits do you want to extend?**

Due to its composition, paper has a whole raft of very exciting inherent advantages, mainly of a mechanical nature. It is extremely tear-resistant, very light and not very dense compared with other materials. Even just a little bit of moisture can impair its characteristics, but this can be countered using existing wet strength additives or waterproof coatings. With the help of bio-based coating materials made of polymers, known as macromolecules, we are trying to systematically find new approaches to increase the use of additives from renewable raw materials in paper.

**What application areas are you targeting with these papers?**

In Darmstadt, for example, we are working on two larger projects, the results of which are intended to allow us to use paper to an even greater extent as a lightweight construction material in building applications. One of the challenges in this conjunction is to gain a sound understanding of how the bond between paper fibers and a lightweight matrix of plastic, glass or mineral materials can be improved with bio-based polymer additives.

**Does functionally improved paper have the potential to become a base material like plastic used across industries?**

Yes. Paper and lightweight paper construction materials can play a major role in the future. To achieve this, we need to manage to control specific paper properties in such a way as to retain the described mechanical properties while ensuring the re-usability of the products either through recycling or cascade utilization. If this happens, then I think there is a possibility that in many areas we will see materials that can play an important role across industries. In the case of food packaging, this kind of trend is already very much in evidence right now. But in the future, I can very well imagine paper also being used in sports equipment, rowing boats or even bicycles, for a large range of components in the automobile sector and in architecture.

**How important could these new paper applications be economically?**

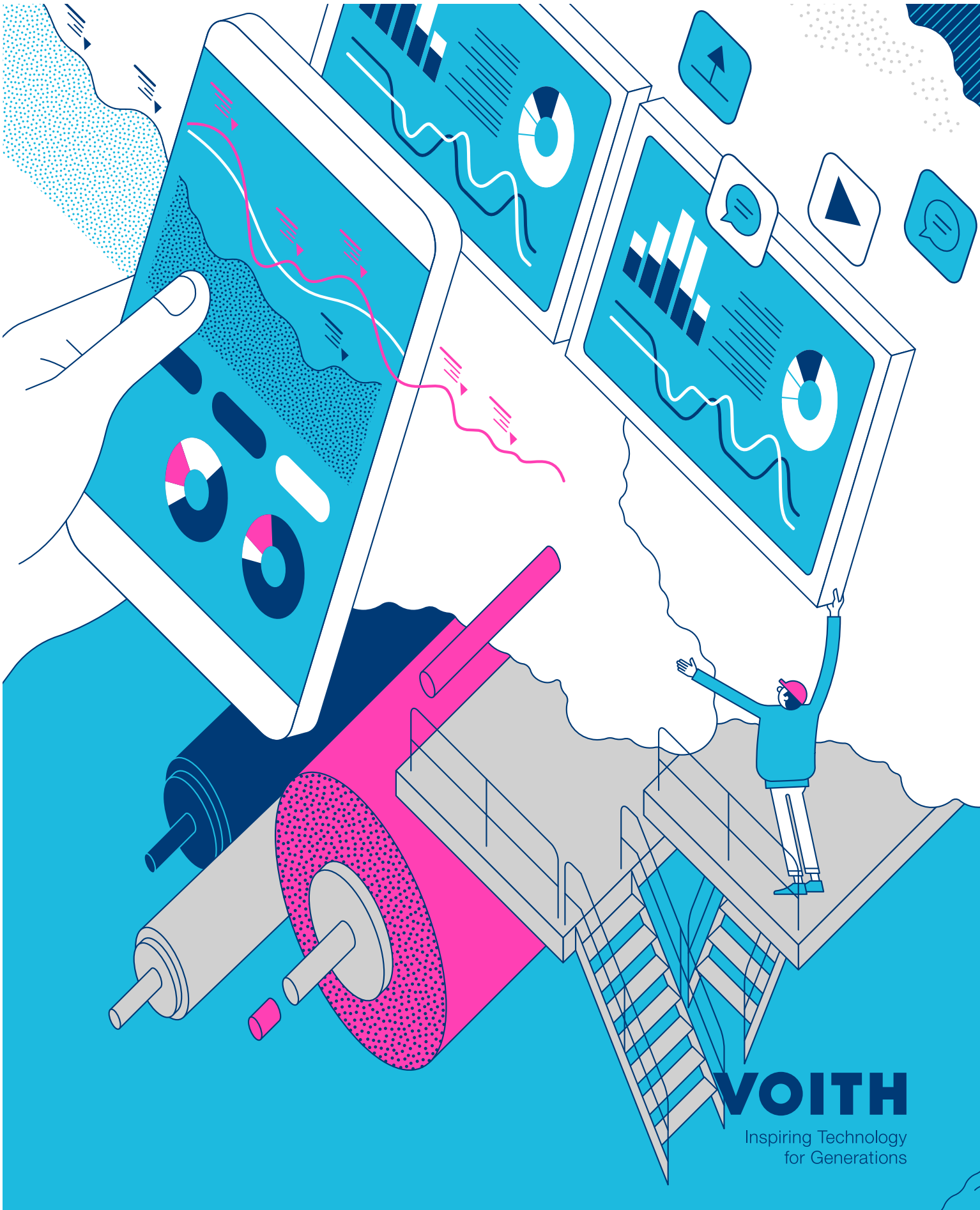
If we solve a few of the really big problems, this could definitely result in significant economic growth for the paper industry. If we manage to develop paper fibers with thermoelastic and thermoplastic properties, then molding and shaping processes will be possible in the same way they are for plastics or metals. If we tap into these completely new kinds of applications, then I envisage other exciting opportunities apart from those mentioned above.

**Does recycling have to be part of the concept?**

It is actually the most important part, where paper in particular offers many advantages over other materials. Because in the future we will need to press ahead with CO<sub>2</sub>-neutral, i.e., climate-neutral, processes to an increasingly greater extent, our research is already taking account of the need for recycling capacity or the possibility of being able to continue to use materials in another form at the end of their lifetime.

**You are already talking to paper producers about paper with extended functionality. What has the response been like?**

It's been broadly positive. So that we don't lose any time in implementing research results, there needs to be a concerted collaboration between industry and universities. And this is something that both sides have acknowledged.



**VOITH**  
Inspiring Technology  
for Generations