

VOITH



Koehler
PAPER

SUSTAINABLE, FLEXIBLE PACKAGING PAPER FROM KOEHLER

PRODUCTION LINE 8 IN KEHL





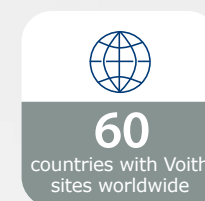
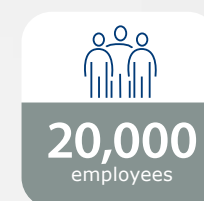
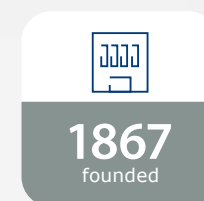
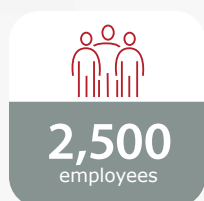
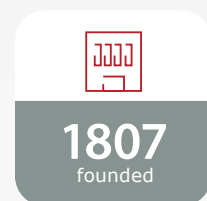
KOEHLER PAPER

A FAMILY COMPANY WITH FUTURE VISION



The Koehler Group was founded in 1807 and has been a family-run company from that moment to the present day. The company, with its headquarters in Oberkirch at the foot of the Black Forest, in Germany, is currently in its 8th generation, under the management of Kai M. Furler. The core business activity of Koehler Paper, a Koehler Group company, lies in the development and production of high-quality specialty paper. This includes thermal paper, fine paper, carbonless paper, recycled paper, decor paper, wood pulp board, sublimation paper, and, since 2019, also innovative specialty paper for the packaging industry, known as flexible packaging paper. The company is the global market leader in the production of thermal paper and playing card board.

Koehler employs around 2,500 people across five production sites in Germany, with three additional sites in the USA. Koehler Paper operates internationally and supplies customers in more than 120 countries. In 2020, the export ratio was over 70%, with annual revenue of 770 million euros. Koehler Renewable Energy has also been part of the Koehler Group since 2012. As an energy-intensive company, Koehler has set a goal of producing more energy from renewable sources than is required for its paper production operations by 2030. With Koehler Renewable Energy, Koehler is investing in renewable energy projects, such as wind energy, hydropower, photovoltaics, and biomass, in order to make a sustainable contribution to the energy transformation in Germany.



THE VOITH GROUP

SUSTAINABLE AND EFFICIENT ONE-STOP SOLUTIONS FOR PAPER PRODUCTION



As the full-line supplier for the paper industry, Voith supplies the broadest range of technologies, services, components, and products on the market and offers paper manufacturers one-stop solutions. The company's continuous innovativeness raises paper manufacturing to the next level and enables resource-saving production. With the Servolution concept, Voith offers customized service solutions for all areas of the production process. Thanks to Voith Papermaking 4.0, paper manufacturers can network their equipment optimally and increase the availability and efficiency of their systems through secure use of the generated data.

The Voith Paper corporate division is part of the Voith Group. The Voith Group is a global technology group. With its wide range of systems, products, services, and digital applications, Voith sets benchmarks in the energy, paper, raw materials, and transport & automotive markets. Founded in 1867, today the Group employs more than 20,000 people and achieves revenue of 4.2 billion euros. With sites in more than 60 countries across the globe, it is one of the biggest family-run companies in Europe.



TARGETING SUSTAINABLE PRODUCTION

Koehler Paper produces paper at four locations in Germany and has a total of nine paper and cardboard machines. We set great store by keeping our machines up-to-date in order to meet our customers' wishes. That's why we occasionally perform modernization work and implement further developments. By making regular investments, we are able to make production processes increasingly resource-saving and meet the requirements of sustainable production.

KEHL SITE

PAPER MACHINE 1

The mill in Kehl commenced production in 1988. Paper machine 1 was the first paper machine at this site. With a working width of 420 cm and speeds of up to 1,300 m/min, it is designed to produce thermal paper and other specialty paper. This production line is rounded off with coating machine 1.

PAPER MACHINE 2

Paper machine 2 is specialized in the production of thermal paper and is characterized by a vertical wire section. It began operating in 2001, is designed for a width of 420 cm, and reaches speeds of up to 1,650 m/min. Coating machine 2 is part of production line 2.

PAPER MACHINE 6

Paper machine 6, a specialist in decor paper, was added to the fleet in the year 2000. The machine is 230 cm wide and can reach speeds of up to 1,000 m/min. A defining feature of paper machine 6 is that it offers significant scope for customization to meet clients' individual needs.

PAPER MACHINE 8

With an investment amount of 300 million euros, the construction of production line 8, comprising paper machine 8 and coating machine 8, was the biggest single investment in the history of Koehler. It was designed explicitly for the production of flexible packaging paper. Production line 8 began operating in 2019. The heart of paper machine 8 is the Yankee cylinder with a diameter of 730 cm, which gives the paper its unique smoothness. PM 8 runs at 1,400 m/min and has a working width of 426 cm. Coating machine 8 is used to give the paper a variety of functional coatings, with the distinguishing feature being that up to three coatings can be applied in one pass.

WEISENBACH SITE

CARDBOARD MACHINE

The cardboard machine in Weisenbach makes cardboard from wood pulp produced on-site. The machine was initially commissioned in 1960. With a working width of 265 cm and grammages of between 333 gsm and 1,040 gsm, it reaches speeds of 15 to 80 m/min.

GREIZ SITE

PAPER MACHINE 1

Paper machine 1 at the Greiz mill is used to produce recycled paper from 100% secondary fibers. It was commissioned in 1971. The Greiz mill has been part of Koehler Paper since 1998. The machine enables paper production with a width of 286 cm at speeds of 90 m/min to 330 m/min. The machine is distinguished in particular by two stock preparation plants that enable duplex foliation, which influences the rigidity and formation of the paper.

OBERKIRCH HEADQUARTERS

PAPER MACHINE 3

Paper machine 3 was constructed in 1924. With a working width of 212 cm and speeds of up to 250 m/min, it is used to produce edge banding paper and fine paper.

PAPER MACHINE 4

Paper machine 4 is designed for the manufacture of countless fine and specialty paper. It has a working width of 335 cm, was installed in 1961, and is characterized in particular by the fact that two coaters are integrated in the paper machine. It runs at speeds of up to 700 m/min. In addition, the machine is extremely flexible.

PAPER MACHINE 5

Carbonless paper and FineTech specialty paper from Koehler are produced on the 370 cm-wide paper machine 5. The machine can reach speeds of up to 1,050 m/min. This machine, which was installed in 1980, has been modernized several times – most recently in 2020 (new ultra modern film press complete with auxiliary systems) – and further modernizations are set to follow. Large shares of the paper are further refined in coating machine 7, which follows offline.





PRESSURE TO CHANGE IN THE PACKAGING INDUSTRY

TOGETHER, KOEHLER AND VOITH ARE STEPPING UP TO CHANGE THE WORLD OF PACKAGING – AND MAKE IT MORE SUSTAINABLE



According to Greenpeace, there are 150 million tons of plastic waste floating in the oceans, a significant proportion of which is packaging. The packaging industry is therefore under huge pressure to change. While the plastic industry reflects on its problems, Koehler Paper has identified the potential here. A forward-look-

ing solution is paper packaging. Produced from sustainable materials, recyclable multiple times over, and easily compostable, it is a convincing alternative to plastic packaging. Koehler NexPlus® paper from this range aims to replace plastics in many primary and secondary packaging applications.

» Eckhard Kallies, Director Flexible Packaging Paper Division at Koehler, points out: "There is a clear trend when it comes to packaging material options: Paper scores points right across the board, and is already making an active contribution towards the objectives of a circular economy. With flexible paper packaging solutions, Koehler Paper is reducing the proportion of plastic in product packaging and making the world a bit more sustainable in the process."

When Koehler NexPlus® paper is recycled, the recovered material can also add value to recycled paper. Just recently, Interseroh awarded the 'Made for Recycling' mark to a variety of paper from the Koehler NexPlus® range. In contrast to conventional laminates, the end customer can clearly recognize the product as paper and throw it in the paper recycling bin, making it available as a raw material for recycled paper again.

» Jens Kolb, Technology Engineer at Voith Paper: "By producing sustainable barrier paper, Koehler is sending a powerful signal. We are proud that, together with Koehler, we have developed and implemented solutions to global challenges. Sustainability was the priority throughout the entire project." The coating machine in particular uses contactless, gentle drying with simultaneously high thermal efficiency, which is achieved by a heat recovery system (heat exchanger). In addition, the Voith experts implemented sustainable water management in the paper machine, significantly reducing fresh water consumption in comparison with conventional systems.

» Jens Kriete, Sustainability Manager at Koehler: "In 2021, sustainability has long ceased to be a niche topic, and has instead developed into a competitive advantage."

Today a large number of people are questioning their own consumer behavior and placing greater importance on sustainability when shopping. Retail is reacting to this and enhancing its sustainable product offering – the term 'sustainability' is no longer simply restricted to the product, but also shines a spotlight on the product packaging itself. Major branded companies such as Südzucker or Ritter Sport are already using flexible packaging paper from Koehler. Many other projects and products are in development. There are sure to be even more application areas following the development of barriers for oxygen, grease, or oils, which will soon be market-ready.

»
Eckhard Kallies
Director Flexible
Packaging Paper
Division



»
Jens Kolb
Voith Paper
Technology Engineer



»
Jens Kriete
Koehler Group
Sustainability
Manager



Sustainability at Koehler is not limited to manufacturing practices, but influences all aspects of thinking and behavior. We handle resources like water responsibly. The pulp for the production of fresh fiber paper comes from certifiable, sustainable forestry and controlled sources. Thanks to continuous internal improvement processes, all Koehler employees contribute toward saving resources, streamlining processes, and optimizing workflows. The company has therefore become the industry benchmark in many areas.

Based on the tradition of a family-run company and full-line provider, Voith too is committed to ensuring that its economic activity is environmentally-aware, fair, and successful in the long term. The company aims to make a measurable and visible contribution to the sustainable development of business activities, the company, and the environment, and in doing so to adopt a leading role as a trailblazer. The technology leader is addressing global mega-trends such as decarbonization, digitalization, and the circular economy through resource-saving paper production.



PAPER INSTEAD OF PLASTIC

THE KOEHLER WAY IN THE PACKAGING INDUSTRY MARKET

In November 2018, the decision was taken to not only make one of the biggest investments in the history of Koehler Paper – but to also enter

the market for flexible packaging paper. A market in which Koehler was not previously known.

A SUCCESS STORY:

11/2018



The new 'FlexTech' division starts up and the flexible packaging paper market is entered. Development of the modular barrier concept for different applications starts.

12/2019



Production of uncoated Koehler NexPure® paper starts for, e.g., candy or chewing gum wrappers.

03/2020



First customers are supplied with Koehler NexCoat® paper, which is coated on one side and is used for pouches, bags, banderoles, or sachets.

09/2020



Koehler NexPlus® Seal is the first paper with a barrier function to be market-ready and is tested by numerous customers.

02/2021



First big branded companies such as Ritter Sport or Südzucker use Koehler NexPlus® Seal Pure as secondary and primary packaging.

05/2021



Market-readiness of Koehler NexPlus® Advanced with an oxygen, mineral oil, and grease barrier is validated.

05/2021



The environment service provider Interseroh awards the 'Made for Recycling' label to a variety of Koehler NexPlus® paper, certifying their excellent recyclability.

07/2021



A leading supplier of dry fruits and nut kernels uses Koehler NexPlus® Advanced as primary packaging for its mixed nuts throughout Germany in 1,500 REWE supermarkets.

11/2021



Estimated market-readiness of Koehler NexPlus® Performance, a greaseproof, heat-sealable paper with a water vapor and mineral oil barrier.

ASMUS WOLFF, SUPPLY CHAIN DIRECTOR, RITTER SPORT

RITTER SPORT AT THE FOREFRONT OF ADDRESSING CHANGES IN CONSUMER BEHAVIOR



Our aim is to create packaging solutions from renewable raw materials that are in harmony with both humans and nature and recyclable. We are responding to consumer behavior that has grown exponentially in recent months. The concept of sustainability is becoming an increasingly important criterion in shoppers' purchase decisions, with a growing emphasis on packaging, rather than just the product itself. We also need to think outside the national box and establish a global focus.

The use of plastic in product packaging is widespread in the FMCG sector. With a view to offering consumers a completely sustainable product, we started scrutinizing packaging made from plastic back in 2018. Test customers considered the advantages of alternatives such as paper to be far-reaching. A change in packaging must be handled very carefully in particular for



a branded FMCG product with such iconic characteristics as our color, square shape, and the knick-pack opening. That's why, from the outset, we decided to include our faithful and extremely critical Ritter Sport fans with us on our journey to develop the new packaging. With a clear conscience, we can look on the previous packaging developments as being good, but not quite good enough.

That's why we are working on an even better solution that also includes the actual recyclability and the transparency of the raw materials' origins. We believe it will be possible at some point to develop chocolate packaging out of 100% renewable raw materials. In terms of secondary packaging, we have taken a first big step with the 'mini colorful bag' and are now using paper instead of plastic as the outer packaging.



KAI M. FURLER, CEO OF THE KOEHLER GROUP

A SUSTAINABLE COURSE OF ACTION THAT WILL AFFECT GENERATIONS



A glimpse into the past shows that Koehler was already facing an important decision at the end of the 1970s. Should paper machine 5 be installed at our Oberkirch site or not? My father, Klaus Furler, and my uncle, Wolfgang Furler, persuaded their uncle, Werner Koehler, of the need to do this. And in doing so, they set a success story in motion. Carbonless paper and thermal paper became the foundation of the company, which developed brilliantly in this time. To this day, we are still market leaders here. We are now setting a new standard with the



environmentally-friendly blue Blue4est®-thermal paper that we have developed in-house.

In 1988 the Kehl mill was added, where we now employ more than 500 people. This is also where we installed the new production line 8. With an investment of 300 million euros, it is one of the biggest projects in the company's history. Once again, Koehler was at an important junction in the company's history and once again we decided to take the courageous leap into the future.

Increasingly, branded companies are making a commitment to drastically reduce the amount of plastic they use. That's because, if we look at the changes in consumer behavior, sustainability is no longer a choice but an obligation. The use of paper as a packaging solution by food retailers has become a purchase decision. We as a company are stepping up to reduce the use of plastic as a packaging solution with our flexible packaging paper. By deciding to install production line 8, we have entered a completely new business field for

Koehler. In a relatively short time, we have developed paper solutions with a barrier function, which are already being used by customers such as Ritter Sport or Südzucker.

Koehler's successful company history goes back more than 213 years. Otto Koehler laid the foundations for the Koehler Group in 1807. With the decision to start up production line 8, we are blazing a trail that will shape Koehler and benefit generations to come.





THE COURAGE TO TAKE NEW PATHS

A NEW BUSINESS AREA EMERGES AND BEGINS WITH A MAJOR INVESTMENT

Koehler invested 300 million euros in the new paper and coating machine. Barely any other family-run company of Koehler's size can cover that kind of investment. Koehler itself is only able to do so thanks to its sustainable management in the past.

»» Joachim Uhl, Koehler Paper Mill Director at Kehl: "With the decision to invest in a new production line and enter a new business area for the company, all those involved showed courage – the shareholders, the supervisory board, the board of management and, not least, all employees who were involved in the decision."

The decision to invest in a new business area was a strategic one. Koehler has centuries of expertise in papermaking and is now transferring this knowledge to a new field – a field that is rapidly gaining importance in times of climate change and sustainability commitments.

»» Dr. Stefan Karrer, Chief Operating Officer of the Koehler Group: "We saw the signs of the times early and chose to back sustainable products. We did this not only to expand our portfolio, but also as a supporting pillar of Koehler Paper, which will help us achieve further growth."

Once the decision to invest in a new production line for flexible packaging paper had been made, we had to choose a suitable partner. Voith, as a full-line provider for the paper industry, was our first choice.

»» "We are delighted that Koehler chose us for this trailblazing investment," says Dr. Michael Trefz, President Projects at Voith Paper. "Koehler and Voith are connected by a solid, trustworthy long-term partnership. State of the art technologies are used in the production line. Due to our shared large pool of experience, we were able to successfully implement the high-speed plant in Kehl."

For many years now, Voith has been firmly committed to the development of sustainable products and processes. With its innovations, the company has taken on the role of technology leader.

»» "Perfectly matched components ensure production is particularly energy- and resource-saving. Koehler's corporate objective of achieving a pioneering role in the field of sustainable packaging paper was therefore consistent with Voith's DNA and Voith Paper's corporate vision to improve the world with sustainable and efficient technologies," adds Dr. Michael Trefz.



Joachim Uhl
Koehler Paper
Mill Director at Kehl



Dr. Stefan Karrer
Koehler Group
Chief Operating
Officer



Dr. Michael Trefz
Voith Paper
President Projects





JOINT DEVELOPMENT WORK

FROM INITIAL IDEA TO MARKET MATURITY

When the decision was taken to construct the new production line 8, extensive research and development work got underway at Koehler. In the in-house laboratory, around 200 material screenings were implemented under high pressure and, with a lot of inventive talent, new target applications were defined and, ultimately, product concepts for new markets were established. The challenge was to find materials that not only met regulatory requirements, but also continuously retained the desired application properties when further processed. Strength and durability as well as aroma protection and content protection are particularly important factors for flexible packaging paper.

» Dominik Hoferer, Head of Specialty Paper/Process Development at Koehler Paper, Oberkirch site: "The first base coats and barrier coats had already been developed at the start of the project. These were used to prepare the new system for its future challenges. We had to figure out which coating units and drying capacities were required to develop the new packaging paper."

Only the materials and raw materials that passed all hardness tests were checked for their recyclability and sensor technology in the next step and, ultimately – if the target values were met – tested on the in-house trial coating machine.

» Dominik Hoferer adds: "We performed the first tests on the pilot system at Voith. We then gradually set up our own test machine in Oberkirch in order to replicate approximately the same conditions as on coating machine 8. This gave us the crucial advantage that we were able to perform all tests flexibly, quickly, and cost-effectively ourselves. For us developers, these are luxury conditions that are unique in the industry."

In this way, the varied product portfolio of flexible packaging paper, which is being continuously optimized and updated, gradually came into being. Whether it's the Koehler NexCoat® with its one-sided coating, the uncoated NexPure® paper, or sustainable Koehler NexPlus® barrier paper – Koehler relies on variety to best meet customer demands.

» "Of course, there are also lots of setbacks in the development work, before stock or a product reaches market-readiness," says Aljoscha Föll, Head of Innovation Management at Koehler Paper, Oberkirch site. "But when you then hold the finished product in your hands, like the printed packaging in this case, it's a major success story for everyone and validation of our huge innovative talent and development capability."



Dominik Hoferer
Koehler Paper
Head of Specialty
Paper/Process
Development



Aljoscha Föll
Koehler Paper
Head of Innovation
Management



“How are we supposed to buy sustainably when there are no alternatives to all that plastic packaging?”



The process steps required for production are just as varied as the paper itself. For example, blade coater, flatness correction, and softnip satinage are sufficient for barrier paper coated on one side. Multi-layer barrier coatings, on the other hand, require a multilayer curtain coater, long contactless drying sections, as well as a flatness and web run concept tailored to the sensitivity of the barrier layers. These are just two examples of a total of six types of paper to be produced with different process technology.

»» *"The challenge was to develop a concept that met all requirements without compromising on the overall efficiency of the coating machine."* says Thomas Kuchinke, Application Manager Coating and Reeling, Voith Paper.

In commonly used production systems, the process steps that are not constantly required, such as one or two blade coaters, are passed through freely or are circumvented by a bypass. But this type of concept was not suitable because of the variety of grades here.

»» *"If almost all grades always take the same*

route through the coating machine despite the different number of process steps, it has a negative impact on efficiency. Therefore only those process steps that are technologically required for the grade in question should actually be executed – without long transfer sections. This reduces the paper length in the coating machine, the free draws, and thus tearing, in particular when it comes to light grammages," continues Kuchinke.

Overall, the coating machine has three pull ropes on the operator side for different web runs (web threading).

»» *"In combination with the clever layout of the individual components, this means all modes of operation can be mapped – without time-consuming set-up times due to grade changes. Another advantage of the layout is that the units that are not currently required can be maintained or serviced during running production, such as changing the roll in the soft nip calender,"* says Franziska Ferrer, Technology Manager Coating Voith Paper.



Thomas Kuchinke
Voith Paper
Application Manager
Coating and Reeling



Franziska Ferrer
Voith Paper
Technology
Manager Coating



NexFlex[®]
Nex Generation Paper Packaging

But there are. More and more consumers want sustainable packaging. The innovative paper solutions by NexFlex are **the** environmentally friendly packaging alternative. 100 % recyclable, 100 % on trend. And extremely versatile in their application. More at www.nexgenpaper.com



RECORD CONSTRUCTION TIME FOR RECORD PRODUCTION LINE

HOW TO INSTALL ONE OF THE WORLD'S MOST EFFICIENT SPECIALTY PAPER MACHINES IN TWO AND A HALF YEARS

Once the research and development work as well as the design were completed, production line 8 at the Kehl site was installed within just two and a half years. The high level of trust between Koehler and Voith played an important role during the construction phase. The combination of technical expertise from both companies

was essential to the successful implementation of the project with its ambitious time scale. Designed for around 100,000 tons per year, production line 8 produces a broad portfolio of standard paper and paper with functional surfaces for flexible packaging.

» » "As a full-line supplier, Voith was responsible for all aspects of project processing," says Thorsten Heidt, Senior Sales Manager at Voith Paper. "Voith supplied the complete mill, from stock preparation, to the paper machine, through to the offline coating machine. The scope of delivery also included the latest automation and digitalization solutions from the Papermaking 4.0 portfolio as well as consumables and services. The full-line concept brings the mill's production efficiency in terms of quality, capacity, and energy consumption to a new level."

Installation of the 150 m long paper machine with a wire width of 5,000 mm required 4,000 tons of reinforced concrete in the carcass, 28,000 m³ of concrete, 120,000 limestones, 1,250 km of cables, as well as 62.6 km of pipelines. There were 750 employees in total working at the construction site.

A particular technical highlight of production line 8 is the MG cylinder with a diameter of more than 7,300 millimeters. It is the world's largest of its kind. During production, this ensures unrivaled paper smoothness, which is crucial in further processing. An innovative Nipcorect full-flex roll, as a press roll on the MG cylinder, enables ideal line load distribution over the whole width. The MG cylinder was manufactured by Voith Sao Paulo and reached the Port of Kehl by HGV transport, seagoing vessel, and barge. After the required bearing pins had arrived by air freight, Voith assembled the cylinder in front of the paper machine hall. On April 24, 2019, the 200 ton MG cylinder was lowered through the opened hall roof on the hook of one of the biggest mobile cranes in Europe and placed in its final position in the paper machine. Shortly before commissioning, the specialists from Voith Paper then metalized the cylinder surface and superfinished it until it was as smooth as glass.

While the paper machine was being constructed, the team in the adjacent hall was assembling the coating machine, which lends the production line its unique flexibility.

» » "The large components, such as the flying splice roller, the Sirius winding system, calendar, and coating units were pre-assembled and supplied factory-tested."

» » **Thorsten Heidt**
Voith Paper
Senior Sales Manager



» » **Werner Buttschardt**
Voith Paper
Project Manager



» » **Michael Trautmann**
Corporate Director
Central Engineering Plant



This was the only way to ensure that the first tambour could be coated with the coating machine just 6 months after the start of installation," says Werner Buttschardt, Project Manager at Voith Paper responsible for the implementation of the new production line 8. In addition, the MasterReel winder and the new VariPlus roll cutting machine were commissioned, in order to supply coating machine 8 with raw paper from paper machine 1 and cut the coated tambours. The team used the head start to optimize the three different process workflows (paths) of the coating machine, so that the raw paper from paper machine 8 could be further processed directly from the first tambour on.

» » "During the construction phase and implementation, we were able to successfully handle all challenges that arose and are delighted with the outcome of the project," says Michael Trautmann, Corporate Director Central Engineering Plant at Koehler Paper. "We made the right decision in choosing the full-line provider Voith. The project team has achieved an impressive feat in the short construction phase."



SUCCESSFUL TEAM EFFORT

FROM COMMISSIONING OF THE PRODUCTION LINE TO PAPER READY TO SELL

Production line 8 was commissioned by teams consisting of production, engineering, and technology employees from Koehler and Voith. The individual segments of the paper and coating machines were tested chronologically, initially without paper, but with water instead. From the 'stock on wire' date, the team started to add raw paper mixture from the pulper to the paper machine. In time frames of up to several days, the individual machine segments were thoroughly tested one after the other and challenging machine sections, such as the press section and drying section, were successfully commissioned.



» Georg Streif, Project Manager for Commissioning of Production Line 8: *"Commissioning the paper machine so promptly was a team effort. Employees young and old, experienced and inexperienced, were all involved. Knowledge was passed on and developed together."*

The very first paper to be wound on the tambour was already of very high quality. And the best thing was that the paper was ready to sell from the very first day.

» Thomas Peter, Technical Director Flexible Packaging Paper Division, Koehler Paper, Kehl site: *"It's a great feeling to see the white paper on the machine for the first time and to know that we did it! That's also the highlight for the entire team, because they can feel relief but also a sense of pride in what has been achieved."*

After the line's commissioning, however, comes optimization. It's now time to face the real challenges by producing grades that previously didn't exist. Our entire paper-making expertise is required every day, with the implementation of new functional surfaces and barrier coatings.



Georg Streif
Koehler Paper
Project Manager for
Commissioning of
Production Line 8



Thomas Peter
Koehler Paper
Technical Director
Flexible Packaging
Paper Division Kehl site





PRODUCTION LINE 8 IN EVERYDAY USE

A TECHNICAL MASTERPIECE

Comprising BlueLine stock preparation, a wet end process, XcelLine paper machine, offline coating machine, and VariPlus roll cutter from Voith, production line 8 is one of the most powerful specialty paper machines in the world. Around 4,000 measuring instruments and just as many moving cylinders, flaps, and control elements interact on a highly automated basis to produce the specialty paper. In keeping with the Koehler motto 'optimization down to the finest detail,' the paper and coating machines are continuously fine-tuned to achieve the maximum output and further optimize the entire process.

» Jens Panther, Production Manager for Production Line 8, Koehler Paper, Kehl site, says: "It's really fun to work with such an ultra-modern machine. Of course, we have also done everything that is technically possible in terms of energy efficiency."

That's because the entire production process, and not just the paper produced, should be sustainable. Koehler takes this very seriously.

» "The achievement spurs us on, and we are proud of it. Not without reason have we set a new speed record with paper machine 8 in this way. And that's also reflected in the result: The paper produced is of a very high quality and exhibits unrivaled smoothness and regularity – with very low grammages," continues Panther.



Jens Panther
Koehler Paper
Production Manager
Production Line 8



In recent years, Voith experts have optimized the BlueLine products through intensive development work at the Voith Technology Centers. These products are now successfully being used in paper machine 8.

» "Optimized stock preparation is important to guarantee the high quality requirements of specialty paper," says Axel Gommel, Global Product Manager at Voith Paper. "Our tried-and-tested BlueLine product portfolio is being used on paper machine 8. The customized process concept and high-performance components make a significant contribution to the efficient operation of the mill."

Coating machine 8 uses multi-layer coating to differentiate between the premium qualities. The extensive range of different paper grades and grammages between 22 gsm and 95 gsm is unique.

The new DynaLayer curtain coater from Voith enables gentle, highly efficient contactless drying thanks to the MCB air dryer. An innovative calender concept ensures final smoothing of the specialty paper. In addition, the coating machine offers further crucial added value: It allows three coats in one pass. This is unique and makes it possible to produce new paper products with excellent surface qualities.



Axel Gommel
Voith Paper
Global Product
Manager

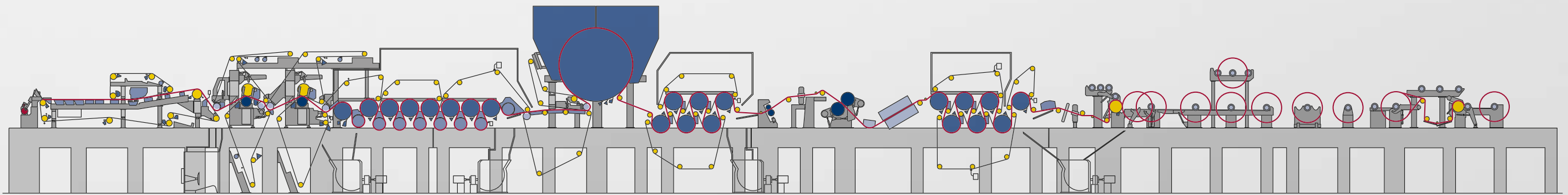
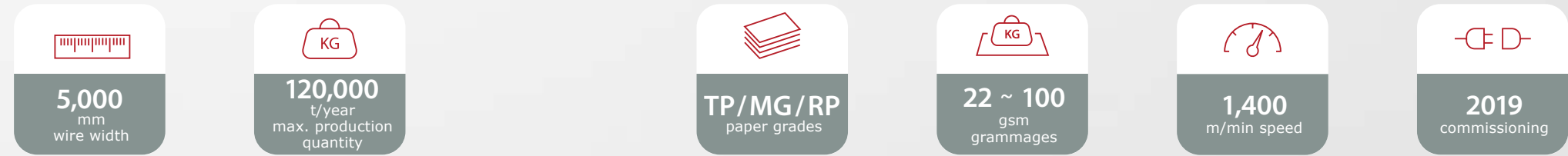




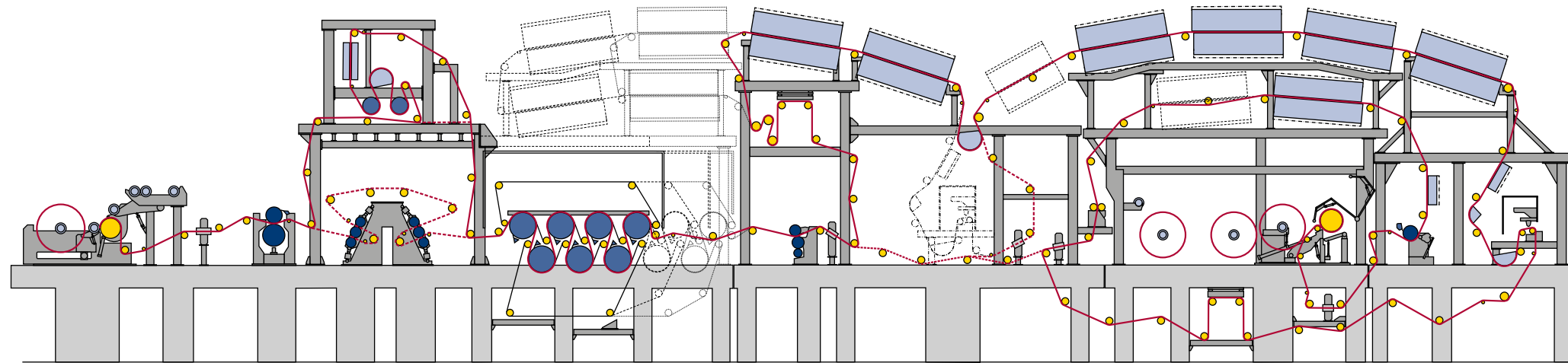
PRODUKTIONSLINIE 8

FACTS, FIGURES, DATA

PAPER MACHINE 8



COATING MACHINE 8







IN THE COCKPIT OF THE COATING MACHINE

THREE IN ONE

Production line 8 has significantly changed the way of working at Koehler. Things that used to be done by hand are now controlled automatically. Not only has this reduced physical labor, it has also increased occupational safety. Every process is now monitored fully electronically and in some cases logged in real-time. The processes are displayed visually and provide a huge amount of measurement data. The smallest of changes in the process, such as the temperature or humidity, are displayed immediately. But this high level of automation also means that much deeper technical knowledge is required, such as in the fields of pneumatics and hydraulics.

Only someone with exact knowledge of the interactions and control technology can operate the paper and coating machines to perfection, optimize the process, and eliminate redundancies in the context of process data analysis. This not only requires extensive and targeted training, but also a certain aptitude for IT.

»» Andreas Granieczny, Deputy Production Manager, Production Line 8, Koehler Paper, Kehl site: *"We deliberately decided to bring young talent on board at an early stage so that they could learn from more experienced colleagues, in order to keep the know-how in the company. This interaction between the generations has worked brilliantly and everyone has benefited from each other."*

Coating machine 8, which achieves perfect precision and quality, deserves particular mention.

»» Benjamin Gottschald, Machine Operator Coating Machine 8, Koehler Paper, Kehl site: *"It is absolutely fascinating how masterfully the different technical components interact and enable up to three coats to be applied in one pass, without mixing with or influencing each other. This not only reduces the number of work steps, but also makes the activity much more sophisticated."* For the customer, this means that coating machine 8 can produce a huge range of specialty papers and can do so in all common paper roll sizes.



Benjamin Gottschald
Koehler Paper
Machine Operator
Coating Machine 8



Andreas Granieczny
Koehler Paper
Deputy Production
Manager
Production Line 8



PAPER MACHINE 4.0

DIGITALIZATION ENABLES HIGHLY EFFICIENT MAINTENANCE

To maintain the mill, Koehler uses the OnCare.Health digital monitoring, analysis, and diagnostic system from Voith. The system combines Voith's expert knowledge in technology and maintenance with Koehler's many years of operational expertise. This means it is possible to integrate preventive maintenance, which is customized to the mill in Kehl. As a result, PM 8 is not only extremely reliable – it's also fully controllable. The level of digitalization is very high compared to other paper machines, and provides a large amount of measurement data.

» *"The modular OnCare.Health monitoring system from Voith provides important information about the entire production line in real-time and evaluates and visualizes this information. This means we can detect faults at an early stage and respond to them in good time. Unplanned machine downtimes can therefore be prevented. The system even notices the smallest of anomalies, which can develop into significant damage in the long term,"* says Marco Wolber, Electrical Maintenance, Koehler Paper.

OnCare.Health immediately triggers an alarm in the event of unexpected measurements. Since all measurement data is saved for the long-term, it is also possible to identify trends and future developments. Thanks to a variety of interfaces, simple data exchange with external systems is also possible. OnCare.Asset from Voith guarantees a transparent maintenance process in the production line and inventory management throughout the entire paper factory. To stabilize and optimize the product quality and the entire production process of paper machine 8, Koehler also commissioned Voith to integrate the Quality Control System (QCS) OnQuality including scanners and sensors.

» *"Using the OnQuality quality control system from Voith, the overall efficiency of the machine has significantly improved. The system perfectly complements OnCare.Health and significantly increases productivity and paper quality,"* says Thorsten Schenk, Service Engineer at Voith.

The OnQuality (QCS) system controls and optimizes quality parameters such as grammage, moisture, and ash content using intelligent sensors. These are compact, robust, and equipped with state-of-the-art technology. The intelligent sensors can also be used for maintenance purposes and for system extensions. The modular ComCore automation platform is used as the basis for the QCS from Voith.

» *"Integrating Voith technology into the Koehler automation system ran without a hitch and now enables simple access to clear information during servicing,"* says Lucas Huber, Electrical Maintenance at Koehler Paper.

In addition, OnQuality.Scanners support accurate control of the longitudinal and transverse profile. The high traversing speed and fast signal connection ensure high-resolution profiles. The high degree of automation immediately detects irregularities and these can then be eliminated practically at the push of a button via the fully automated PC control system.



Marco Wolber
Koehler Paper
Electrical Maintenance



Thorsten Schenk
Voith Paper
Service Engineer



Lucas Huber
Koehler Paper
Electrical Maintenance





WORLD RECORD NOT ONLY THE FASTEST

In addition to setting new benchmarks, the paper machine has also broken a number of records. The most significant is that it is the fastest MG paper machine in the world, with a continuous speed of 1,400 m/min over a period of 24 hours. Its premium quality is matched by its technological sophistication. The figures speak for themselves: 67 drives on paper machine 8 bring it to a total output of 8.8 megawatts. Coating machine 8 has 162 drives with a total of 5.5 megawatts and the roll cutting machine has 7 drives with a total of 0.3 megawatts. More than 12 cranes were used in the record construction time of just 2.5 years. Almost 30 tons of brackets and nearly 30,000 individual parts, such as pumps, valves, and fittings, were installed. Particularly noteworthy is the PC-based

control system with around 5,000 process cycles, which enable almost fully-automated control for Koehler and make the paper machine the most modern of its kind. All in all, the construction of production line 8 was a fantastic achievement, which was ultimately only possible thanks to the brilliant team and strong partners.

The centerpiece of production line 8 is the Yankee cylinder with a diameter of 7.3 meters – the world's biggest of its kind at the time of installation. It produces paper with a unique smoothness, which is of great importance for optimal further processing.



» Thomas Peter, Technical Director Flexible Packaging Paper Division at the Kehl site: *"Hoisting the cylinder into place was an intense moment for sure, and triggered a very special feeling. I don't know exactly how much space was left on either side. Perhaps ten centimeters."*

Designed for around 100,000 tons per year, production line 8 produces a wide range of specialty paper and paper with functional surfaces for flexible packaging, as the new offline coating machine enables variable coating applications and combinations as well as different grammages (from 22 gsm to 95 gsm). It's clear that for Koehler, production line 8 has opened up entirely new markets that not only safeguard the future, but also make the world a little more sustainable.

»
Thomas Peter
Koehler Paper
Production Manager
Kehl site





Koehler
PAPER

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