



PULP & PAPER

**INNOVATIVE AND
SUSTAINABLE PAPER AND
BOARD PRODUCTION**

WITH *PrimeLine* TECHNOLOGIES AND SERVICES

ANDRITZ

ENGINEERED SUCCESS



ENGINEERED SUCCESS

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THE CONTENT IN BRIEF

- Technologies and services for sustainable paper and board production
- All from a single source: complete paper plants with pulp mills
- Organic growth and acquisitions lead to success
- Your reliable partner for complex rebuilds, upgrades, and conversions
- Enhancing fiber quality with economical use of resources
- Innovative key components for rebuilds or to create new state-of-the-art machines
- R&D works and trials on industrial scale
- Automation, digitalization, and comprehensive services to boost your production

We supply paper and board machines with a speed of up to 1,800 m/min, a working width of up to 10 m, and steel Yankees with up to 26 ft. diameter.

Sustainable solutions for environmentally friendly paper and board production

Like many industries these days, the paper and board industry is facing increasing pressure to remain cost-competitive while reducing the consumption of resources.

Sustainability isn't just about how many times a product can be used. It is also about reducing production waste, curbing energy consumption, and positively impacting both people and profits.

WATCH THE VIDEO
on our sustainable solutions and
service for paper production



FACING CHALLENGES

Every paper and board producer faces an endless stream of challenges – tons of paper/board to be produced most economically in the quality required, lowest maintenance costs and zero unplanned shutdowns, staying below environmental limits, and so on. In recent years, a lot has been invested in new machines as well as major machine rebuilds to produce packaging grades instead of graphic papers. As a result, there is more production capacity installed today than is required to meet demand, which puts some pressure on our customers and on ourselves to come up with new cost-efficient solutions. The paper machines with the best combination of high paper quality and low costs will most certainly prevail.

With the latest technologies and solutions, which are innovative, efficient, and minimize consumption of raw material and resources, ANDRITZ helps you improve your operations, without you having to compromise on product quality thanks to the well proven technologies.

ENGINEERED SUCCESS

We at ANDRITZ are in the business of helping you meet these challenges head-on. We have the technical know-how, experience, and passion to do so. Once committed, we deliver on our promises. This brochure is a collection of product information and success stories about paper and board machines. We hope you enjoy exploring our broad range of capabilities, and we look forward to an excellent partnership.

Your competitive advantage with a new complete plant

Gain a competitive advantage with our new, complete plants for paper or board production. From fiber preparation to the machine, including fabrics and rolls, pumps, automation and digitalization, and services, all from a single source.

Partner with us and profit from fewer interfaces, complete process know-how, innovative technologies and our vast experience in major rebuilds and conversions. In addition we are one of only two suppliers worldwide able to handle completely independent greenfield projects: pulp and paper plants together.

COMPLETE RANGE OF PRODUCTS AND SERVICES

We can supply processes and equipment from the woodyard to finished paper production, including the pulp mill, recycled fiber processing, stock preparation, approach flow, paper machines for grades including cartonboard, containerboard, and specialty papers, pumps, automation, and some components for graphic paper machines.

“From a plot of land to a highly-efficient paper production plant. We deliver solutions complete.”

GERALD STEINER

Vice President Paper and Board
ANDRITZ

SEEING THE COMPLETE PICTURE

The strategic home of innovation at ANDRITZ is ANDRITZ Ventures, the dedicated corporate innovation and start-up arm of the group. ANDRITZ Ventures is about marshalling the internal and external innovation network. It harnesses the fact that the ANDRITZ Group has diverse end-use technologies, from paper, board, and tissue to nonwovens, and these technologies often have synergies. This opens the mind to new ways of thinking and can bring real benefits to customers.



Gerald Steiner joined the ANDRITZ paper and board team a while ago with many years of experience in the paper industry as a former customer.

Tradition meets innovation

What started as a much narrower niche a decade ago (tissue machines and paper machine approach systems) has expanded into our full-line supply of solutions and services to the paper and board industry.

THE BEGINNINGS

In the 1950s, ANDRITZ was a licensee for paper machines designed by Escher Wyss. The first complete paper machines from ANDRITZ were installed in the 1990s. In 1991, we installed our first coated board machine (FS Karton, Germany) and an Asian producer ordered four new board machines, each with a capacity of 200,000 t/a.

RENEWED FOCUS

After focusing primarily on tissue machines from 1996 to 2004, ANDRITZ reentered the paper and board market in 2005. The product portfolio was strategically renewed through internal design developments and expanded through acquisitions enabling us to become a full-line supplier.

SHOE BLADE GAP FORMING

Shoe blade gap forming was first introduced by ANDRITZ in 2004. Initial applications focused on publication grades. ANDRITZ launched the first shoe blade former producing linerboard in the industry in 2011. The current shoe blade gap forming portfolio covers publication grades as well as packaging grades over a wide speed and basis weight range.

FIRST SHOE PRESS

The first *PrimePress X* shoe press was sold in 2001. Today, there are more than 100 references worldwide.

FIRST FILM PRESS

Following the successful installation of the first film press in 2007, additional *PrimeFilm* presses have been installed worldwide.

WORLD RECORDS WITH STEEL

In 2008, ANDRITZ focused its R&D activities on the development of steel Yankees and steel cylinders for energy-efficient production. Today, ANDRITZ is the record holder

for large steel Yankees (up to 26 ft. diameter) and has installed drying cylinders made of steel in production lines worldwide.

NEW HEADBOX GENERATION

The first *PrimeFlow* headbox was sold in 2009 and, to date, more than 40 additional units have been started up and are operating successfully.

NEW HYBRID FORMER

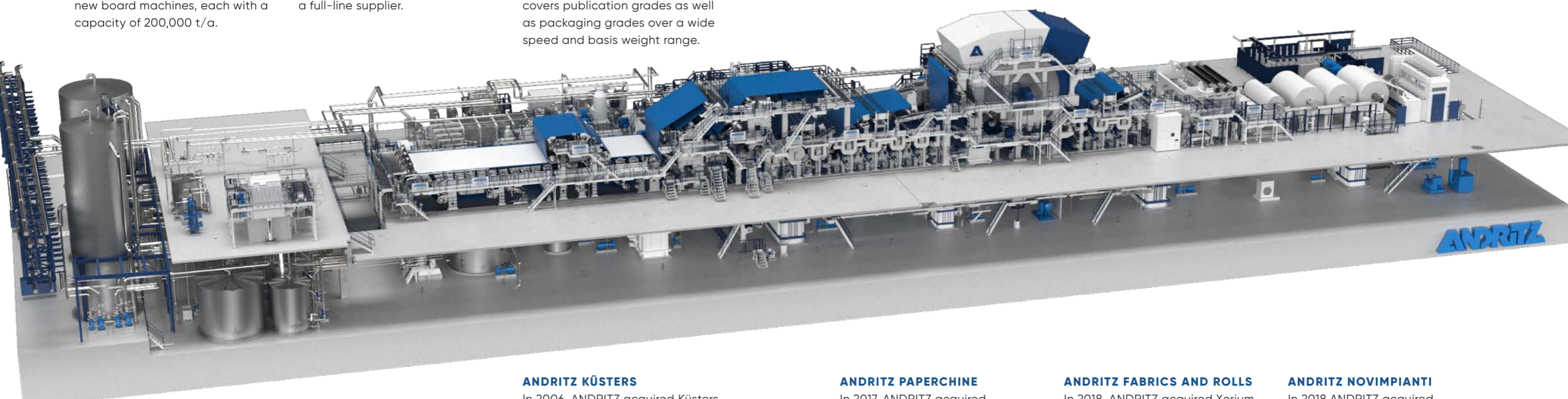
In 2012, ANDRITZ launched a new hybrid former concept. It was a state-of-the-art hybrid former, designed for an operating speed of up to 1,200 m/min.

UPGRADE FOR CURTAIN COATERS

In 2015, ANDRITZ launched a nozzle for curtain coaters. It allows precise sectional volumetric correction of flows to ensure even coating across the entire web surface. Another new development makes it possible to apply barrier layers in the inboard mode without defects at the edges.

SUSTAINABILITY COUNTS

Today ANDRITZ is launching innovations for the press, drying, and finishing section that enable remarkable resource savings.



DID YOU KNOW THAT

ANDRITZ is the number one supplier for MG paper plants? Recent orders include a complete new line for a European customer with the world's largest steel Yankee (26 ft.) and the PM2 and PM3 MG paper production lines at Heinzl Pöls that rank among the world's most modern and most flexible packaging paper machines.

ANDRITZ KÜSTERS

In 2006, ANDRITZ acquired Küsters, Germany, the expert for paper finishing technology and services with unique roll and press concepts, all kinds of calenders, coaters, threading systems, and film and size presses.



ANDRITZ PAPERCHINE

In 2017, ANDRITZ acquired Paperchine, USA, the specialist for forming technology, services, and troubleshooting – as well as technical auditing and design work required for machine rebuilds, conversions, or upgrades.



ANDRITZ FABRICS AND ROLLS

In 2018, ANDRITZ acquired Xerium, USA, the global manufacturer and supplier of machine clothing and roll covers for all kinds of paper machines, including maintenance and aftermarket services.



ANDRITZ NOVIMPIANTI

In 2018 ANDRITZ acquired Novimpianti, the Italian expert for air and energy systems and services: highest drying capacity, lowest energy consumption, and environmentally friendly production.



**VAST
EXPERTISE**

Rebuilds, upgrades, grade conversions and even re-locations of complete production lines! We've done it all.



Elite class: major rebuilds and conversions

Paper and board mills increasingly seek to automate and maximize the sustainability and performance of their processes, so the skills required from technology companies have needed to evolve to ensure effective and productive partnerships with customers.

It is important to be a supplier not just of machinery, but of sustainable and innovative solutions based on know-how. A gap former or a shoe press, for example, is not just a piece of equipment, but part of a process. As these processes are digitalized and automated, this binds know-how into the process, and we take this responsibility very seriously. We have to ensure that we stand side-by-side with our customers as they evolve the skills to run ever-more complex paper machines. Passion, expertise, open culture, and closeness to the customer enable great results to be achieved in this context.

"Major rebuilds are the elite class for machine suppliers as there are often a lot of uncertainties and challenges."

ALBRECHT MILETZKY
Head of Paper and Board Technology
ANDRITZ

MUTUAL BENEFITS AND KNOWLEDGE BASE

The benefits of such a partnership approach are mutual. Customers gain access to a knowledge and service support network that ensures their assets run at peak efficiency, and use the minimum amount of energy to maximize the sustainability of their processes. In turn, ANDRITZ receives invaluable input for its R&D efforts, helping the company to support customers even more effectively in the future.



Albrecht Miletzky is an experienced paper engineer and former production manager with several leading global paper and board brands.

DID YOU KNOW THAT

ANDRITZ has a record of which it can be proud? Recent orders include Mayr Melnhof Karton in Frohnleiten to increase production, improve quality, and to secure a smaller environmental footprint for KM3. Then there is the reference at Laakirchen Papier which, following the ANDRITZ rebuild, has become the fastest converted containerboard production machine in the world, with speeds of up to 1,420 m/min.



Full range of recycled fiber technologies for the production of excellent stock for various paper grades; modern deinking lines; state-of-the-art systems processing low-quality waste paper to produce high-quality packaging grades.

Superior fiber processing for all paper/board grades

ANDRITZ knows how to meet the challenge of enhancing fiber quality with economical use of resources and offers complete mechanical pulping and fiber preparation systems comprising highly efficient equipment in every process step.

MECHANICAL PULPING SYSTEMS

ANDRITZ P-RC APMP technology for superior chemi-mechanical hardwood-based pulps. ANDRITZ ATMP (Advanced Thermo Mechanical Pulping) technology for enhanced fiber development of softwood pulps at reduced energy consumption. Semi-chemical pulping lines and special processes for annual fiber processing.



FibreFlow DRUM PULPER

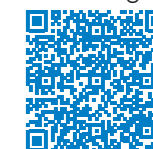
The FibreFlow drum pulper is used for fiber slushing and separation of coarse contaminants for all kinds of recycled fibers. The unique combination of pulping and screening in one compact unit leads to high production capacity and low power consumption.



DID YOU KNOW THAT ANDRITZ has recently launched a series of new fiber technologies for sustainable fiber treatment and savings? Here is a short overview of our latest innovations including QR-codes to webpages and videos for more detailed information.

TX68 REFINER

With unmatched design capacity of up to 1,800 t/d, the TX68 refiner is exceptional when it comes to HC refining.



TwinFlo Prime

LC refiner with higher energy input than the market standard, reduced need for maintenance, and increased refiner plate lifetime.



STOCK PREPARATION AND PMA SYSTEMS

Integrated stock preparation and approach flow systems for the production of all paper and board grades. Key equipment for every process step – from bale pulping through to screening, cleaning, refining, thickening, deflaking, and fiber recovery. Innovative machine concepts for highest efficiency and availability at minimum impact on the environment.



PrimeFilter D

Disc filter perfectly suited to all system applications with many different pulp types; for upgraded performance in thickening and in fiber recovery.



PrimeScreen X

The next generation in screening and fractionation is ideal for all coarse and fine screening applications, including broke and thick stock, regardless of the raw material.



SLUDGE AND REJECT TREATMENT SYSTEMS

Key unit equipment from fiber recovery, shredding, separation, fractionation, and thickening through to drying and pelleting. Waste-to-value processes, converting rejects and mill waste into renewable energy and valuable by-products – thus helping to improve a mill's profitability.



The new *PrimePress X* shoe press at Merati's BM1 (Italy) is operating at a line load of 2,000 kN/m – a world record! It enables Merati to achieve extraordinary dry contents of up to 59%. In addition, the runability of the machine increased and the specific energy consumption decreased significantly. Photo: Marco Merati, Managing Director, A. Merati & C. Cartiera di Laveno

Spotlight on latest key component technology

Our core *PrimeLine* components are designed to work in two ways: stand-alone as part of an upgrade to existing machinery, or integrated together to create a state-of-the-art new machine. This chapter presents a selection.

PrimeFlow AT HEADBOX

The new *PrimeFlow AT* (accelerating tube) headbox reflects to successful combination of ANDRITZ and Paperchine's history and experience in papermaking. The patented accelerating tube headbox with unique nested trapezoid outlets features a rugged design structure, sheets in the nozzle for turbulence control, and capacity for high resolution dilution profiling. This provides excellent jet quality, fiber dispersion and

fiber orientation control over a wide grade and speed range, which leads to excellent 2 sigma results over a wide operating range. The headbox also includes flexible lamella and is available with or without the indirect consistency profiling injection.

The *PrimeFlow AT* headbox is available for new machines, conversions, and rebuilds, for all kinds of paper and board machines.

PrimeForm HB HYBRID FORMER

Paper properties are strongly influenced by the spatial distribution of raw materials in the sheet. The optimized design of all *PrimeForm* products, especially when working in combination with *PrimeFlow* headboxes, delivers excellent paper quality and uniformity.

PrimeForm SW FORMER

The *PrimeForm SW* family for Fourdrinier formers offers a range of solutions tailored to the requirements of the paper or board grade. Designs are available to accommodate a broad range of machine speeds and widths for single and multiple Fourdrinier sections. The design of the *PrimeForm SW* is compact, simplifying its installation in rebuild situations. The result is the production of high-quality paper.

PrimeForm TW GAP FORMER

The *PrimeForm TW* gap former performs superbly at high speeds with minimal two-sidedness and the highest dewatering performance. Basis weights from 70 to 160 g/m² are accommodated. Gentle dewatering in the forming roll area ensures high retention. The increased fines content is beneficial for strength development in the final sheet. Forming shoes on both the top and bottom generate optimized dewatering within a wide operating window.

PrimeForm TW SHOE-BLADE GAP FORMER

The *PrimeForm TW* shoe-blade gap former is the latest offering in the *PrimeForm* family. Its patented design combines the best characteristics of both single wire and gap forming: excellent strength and formation at high capacity, up to 250 g/m². The low installation and operating costs coupled with wide operational flexibility make it the preferred choice for many projects.



PrimeFlow AT headbox at the ANDRITZ workshop in Austria. The headbox provides excellent jet quality, fiber dispersion and fiber orientation control over a wide range of grades and speeds.

DID YOU KNOW THAT

ANDRITZ rebuilt the world's fastest Kraftliner machine? At New Indy Catawba PM3 we rebuilt headbox, gap former, and dryer sections. The machine has a design speed of 1,400 m/min and a working width of 9.10 m.

TransForm FORMING FABRICS

The new generation of forming fabrics delivers superior performance on even the most demanding machines. The *TransForm* portfolio includes designs to maximize efficiency on all fabric positions.

PrimePress X SHOE PRESS

The *PrimePress X* is the ideal shoe press for increasing production with reduced drying energy. Nip loads of up to 2,000 kN/m and shoe lengths from 120 to 400 mm are engineered for each application to maximize press dryness and sheet properties. The *PrimePress X* counter roll can be a conventional roll or a *PrimeRoll HV Smart* anti-deflection roll making all machine speeds and widths possible. Different configurations and customized solutions are available.

StrataPress PRESS FELTS, Impulse SHOE PRESS BELTS

StrataPress press felts are designed with a game-changing combination of materials, base fabric structures, and unique batt concepts. *Impulse* shoe press belts' features include superb structural stability with enhanced abrasion and wear resistance.

PrimeSteam VIB PROFILING SYSTEM

The *PrimeSteam VIB* product family of profilers includes solutions for the forming and press sections, as well as for precision steam finishing at the dry end of the machine.



**THE ONE
AND ONLY**

ANDRITZ is the only supplier worldwide being able to deliver steel Yankees with diameters up to 26 ft.

PrimeDry DRYING SECTION

The *PrimeDry* ST is a single-tier design that can be arranged without open draw to ensure maximum runability. The advantages of the *PrimeDry* ST can be exploited not only at the beginning of the drying process, but also throughout the entire drying section. The *PrimeDry* DT is a double-tier design to obtain the highest water evaporation rates. Depending on the machine speed targets, the runability is ensured by optimized configuration of the fabric guide rolls supported by the ANDRITZ *PrimeRun* stabilizing systems.

MasterDry DRYING FABRIC

The MasterDry portfolio includes fabrics specifically designed for the fastest low-caliper single tier positions, high temperature, contamination resistance, all with extended fabric durability and lifetime.

PrimeDry Steel CYLINDERS

Steel cylinders perform up to 10% better than the same sized cast iron cylinders at the same operating pressure – to either increase production or lower energy consumption. The web is dried uniformly without bad edges. Steel cylinders can be run with a higher operating pressure than comparable cast iron models. This is beneficial in rebuilds and upgrades, since it is possible to increase production without extending the dryer section.

DID YOU KNOW THAT

ANDRITZ delivers steel cylinders with paper widths of up to 10,500 mm and diameters of up to 2,200 mm? In addition, we are the only supplier worldwide able to manufacture, transport, and install steel Yankees with a diameter of up to 26 ft.

PrimeDry MG STEEL YANKEE

This high-performance drying cylinder is made entirely of steel, resulting in greater safety and better machine performance than a cast Yankee. The performance of an ANDRITZ *PrimeDry* MG Steel Yankee exceeds the performance of a cast iron Yankee of the same size. Steel Yankees have an evaporation rate that is 10-15% higher than that of cast iron models, which results in 8-10% better machine performance.

LISTEN TO OUR PODCAST
on the *PrimeDry* Steel
Yankee and services



PrimeSpray VIB SPRAY SYSTEMS

From fine paper to paperboard, from moisture profile control to enhanced surface applications, each of our VIB systems ensures highest levels of performance. The innovative dual-phase nozzle, utilizing air-atomization technology to deliver a full cone spray pattern, delivers one of the smallest droplet sizes available.

PrimeDry MG HOOD

The hood uniformly distributes drying air at the proper impingement velocity across the sheet to obtain high drying rates while maintaining an even moisture profile. The constant distance between the nozzle and the sheet enables optimum heat transfer. Drying temperatures up to 400° C and impingement velocities up to 130 m/s are achieved.

PrimeDry AirFlow IMPINGEMENT HOOD

The impingement hood can be arranged on both the upper and lower cylinder rows to boost the water evaporation rate. In unfelted dryers, the CD stretch profile will be improved (e.g. sack paper). The impingement velocity is adjusted by fan speed so that drying can be tuned to the desired paper qualities. The risk of over-drying the edges can be avoided with separate edge zones. Drying temperatures up to 300° C and impingement velocities up to 120 m/s are achieved.

PrimeFeeder ROPELESS TAIL THREADING

This ropeless tail threading system significantly reduces machine downtime and threading time compared to conventional feeding systems. These installations work with different tail cutting and transfer systems, as well as blowing devices to ensure entirely ropeless tail threading from the wet section to the pope reel. All operations are remotely controlled to keep operators a safe distance from the potentially hazardous areas of the machine.

PrimeRun Evo WEB STABILIZERS

This new generation of web stabilization controls and improves the runability of the web while saving energy in single-tier drying sections. It does this by gradually reducing the vacuum from the opening nip. This not only improves web control, it also reduces energy consumption.

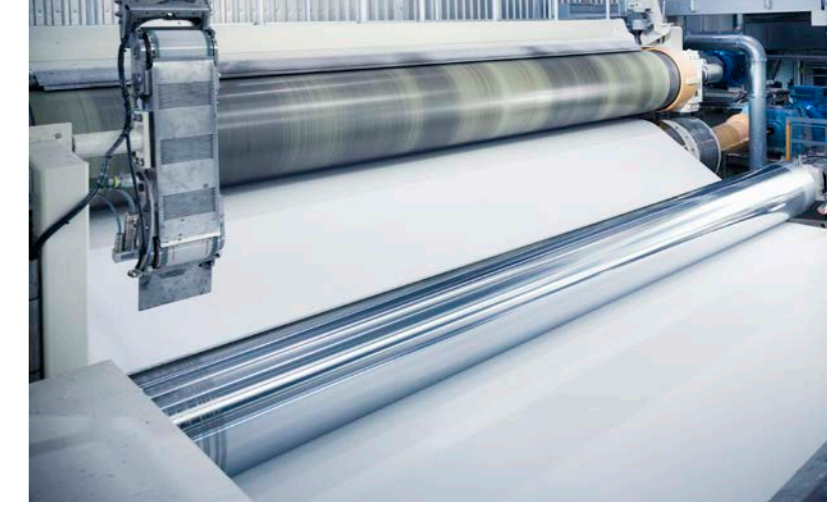
One core component in the web stabilizing system is the *PrimeVac* vacuum roll. It uses vacuum to fix the web on the fabric, resulting in stable guiding of the web through the single-tier drying section. The roll has a drilled roll shell. Doctor blades on the bottom box are employed to seal the area between the roll and the box across the machine.

**QUALITY
INCREASE**

Film press installed in rebuilt test liner and fluting machine. Smurfit Kappa Hoya PM2, Germany.



The compression zone in this *PrimeCal* Soft calender consists of a heated thermo-roll and soft-covered multi HV calender roll. This ensures excellent sheet smoothness and density with an even cross-direction profile.



PrimeUnit MC EXTENSIBLE UNIT

Installed in the dryer section at a dry content of around 60–65%, this unit is the most important tool to produce high-stretch sack paper. The moist web passes through the nip between a moving rubber blanket and a rotating dryer cylinder. The rubber blanket is pressure-loaded by a “nip bar” so that the gap in the nip is less than the thickness of the rubber blanket.

The rubber then acts as a fluid passing through a venture, accelerating so that the flow volume remains constant. The paper web faces a significant creping resulting in a very high stretch effect giving the paper highest Tensile Energy Absorption which is the crucial parameter for special sack paper qualities.

PrimeFilm FILM PRESS

This film press is meant for simultaneous double-sided sizing, pigmenting, and coating. Different coat weights can be applied to each side. The coating color or sizing solution is metered onto the roll surfaces by means of metering rods and transferred to the paper or board web in the roll nip. It can also be used for single-sided applications. *PrimeFilm* has a compact design, enabling easy integration into the existing paper or board machines. In addition, it is easily accessible to allow rapid coating weight changes.

PrimeSizer SIZE PRESS

PrimeSizer is a device for the simultaneous application of sizing solution directly to both sides of paper and board. The sizing solution is applied as a pond before the roll nip and transferred to the paper or board web.

DID YOU KNOW THAT

ANDRITZ's latest R&D works is focusing on enhancements in the sizing section for more sustainable production? And that the *PrimeFilm* Sizer combines both application methods, film and size, in a single unit? This offers the widest possible range of coat weights.

PrimeCal Soft CALENDER

The *PrimeCal* Soft calender provides soft calendering for a wide range of applications. It is based on proven Mat-On-Line technology and uses rolls with soft, elastic covers that form a nip replicating the surface of the tempered roll with a hard surface – thus improving the paper properties. The finish in general enhances the performance characteristics and printability of the sheet.

PrimeCal Hard CALENDER

This type of calender is well suited for precalendering and final calendering of all paper and board grades. It creates a consistent CD caliper profile, allows bulk control, and produces an excellent surface finish.

PrimeCal ProSoft calender

This multi-nip calender is ideal to exceptional paper qualities. Since it employs a higher number of individually driven rolls, the highest gloss and smoothness qualities can be achieved. Depending on the required qualities, it can be operated with a variety of nips and soft covers within a wide range of operating conditions, (e.g. line loads), suitable for online and offline calendering.

PrimeCal X SHOE CALENDER

At the normal speeds of paper machines today and at a nip load up to 15 MPa, the *PrimeCal* X shoe calender is the best product for increasing production with longer dwell times in the nip while still maintaining volume. This volume conservation can lower the cost of raw materials (fibers).

The *PrimeCal* X is highly suitable for the final calendering of thermo-sensitive papers, coated testliner and board, and for calendering specialty papers. Homogenous print images (without mottling) are produced by surface temperatures of up to 280° C. Nip lengths from 50 to 170 mm are available to meet specific customer requirements.

GET TO KNOW
the *PrimeCal* family and
watch our latest video





REELING SECTION

Maintaining even paper quality from the first to the last wrap on the jumbo roll.



ANDRITZ reel experts in the workshop at the headquarters in Austria. Our reeling systems ensure constant paper quality thanks to high reeling uniformity in cross direction, with reliable synchronization of operator side and drive side.

PrimeCoat Roll and PrimeCoat Jet COATER

PrimeCoat Roll uses an applicator roll to apply the coating color to the paper web, and *PrimeCoat Jet* makes use of a jet nozzle for this function. In both cases metering is performed with a blade or metering rod. During the metering process, the web is supported by a polyurethane-covered backing roll that is motor driven. This way, variations in web tension have no direct influence on the final coated product.

For different coating applications such as pre-coating, middle, or final top coating ANDRITZ supplies the appropriate metering components, such as a bent/stiff blade or rod.

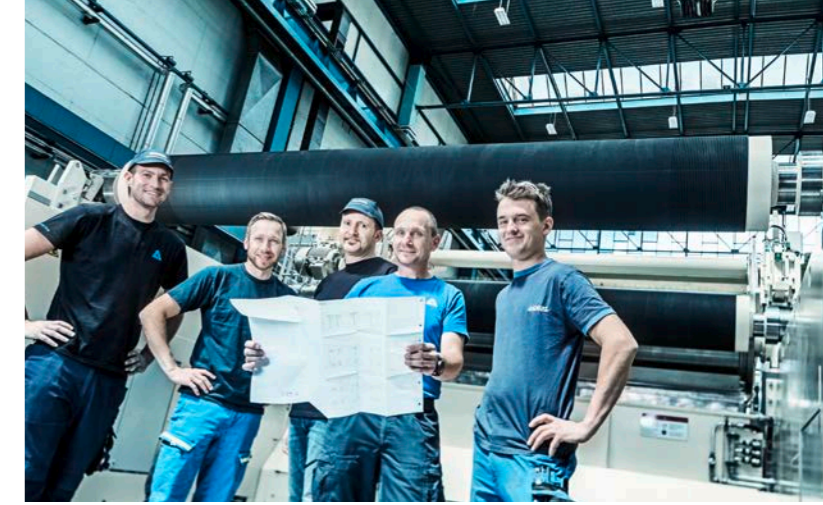
PrimeCoat Curtain COATER

Curtain coating is an alternative to conventional coating technologies. The advantages of curtain coating are excellent coverage, saving of energy through higher solid content, saving of coating color and less web breaks through a noncontact process. The multilayer curtain coater enables the application of several coating layers simultaneously using only one coating station. The number of coating and drying stations is reduced, resulting in a compact and efficient design, which leads to remarkable cost savings.

Due to its compact design, the *PrimeCoat Curtain* is ideal for integration into existing machines. The curtain coater applicator can be operated with a slot die for single layer coating or with a slide die for multilayer coating. The coating can be applied in overboard and inboard modes.

DID YOU KNOW THAT

the new edge guide of the *PrimeCoat Curtain Coater* enables the application of barrier layers in inboard (with multilayer slide die) and overboard (online coating with slot die) operation? It offers utmost flexibility for highest end-product quality.



PrimeReel REEL

Constant paper quality thanks to high reeling uniformity in cross direction with reliable synchronization of operator side and drive side. Controlled nip load during the entire wrapping process. Make use of the paper right from the first wrap. The *PrimeReel* has the best performance level for all types of corrugated base paper and uncoated fine paper under perfect reeling conditions, and it can easily be upgraded to a hybrid reel.

PrimeReel Hybrid REEL

This type of reel handles larger jumbo roll diameters easily, enables higher speeds, and is perfect for winding sensitive paper grades. With the *PrimeReel Hybrid*, low nip loads down to 0.2 N/mm are possible. A torque transfer is established to the parent roll through the center drive. One center drive covers the primary and partly the secondary area.

PrimeReel Premium Centerwind REEL

This type of reel features two synchronized center drives with advanced controls. The full range is covered by center drives for both the primary and the secondary areas. The *PrimeReel Premium Centerwind* is perfect for reeling of grades with a sensitive surface in combination with large jumbo roll diameters.

DID YOU KNOW THAT

the *PrimeReel Centerdrive Hybrid* turns a standard reel into a centerwind reel? This plug-and-play system follows the tambour from the primary to the secondary area, enabling constant, Centerdrive-assisted reeling during the entire process with just one unit.

GET THE DETAILS
to our key components for
rebuilt and conversions





At the Paper Technology Center in Krefeld, Germany, you can choose between our *PrimeCal Hard/Soft* calender, *PrimeCal X* shoe calender, and *PrimeCal Y* belt calender, which can be configured in many ways to take papermaking to a new level. The pilot plant is available for running trials of printing/writing papers, special papers, cartonboard, and packaging grades with its 2x2 or 8+5 rolls and a maximum speed of 1,500 m/min at a surface temperature up to 220° C.

Research and development at ANDRITZ R&D centers

We help customers worldwide to comply with environmental specifications in the best possible way and to generate economic value added by reducing costs and increasing productivity. Our R&D development work is often conducted in collaboration with customers.

Our paper experts and R&D staff are directly involved in project development, preparation of quotations, and project execution as an essential factor for mutual success and in the search for innovations. Customers and paper experts worldwide can access our R&D centers and pilot plants and can conduct trials under industrial-scale conditions. Our research and development sector is also closely linked to an international network of research partners, R&D institutes, and key

equipment pilot plants that run equipment. Research projects with universities working on the relevant technologies are actively pursued and supported. In many cases, basic research is conducted that cannot always be pursued to an adequate extent in the course of project-related everyday business. Another advantage of these collaborations is that we gain access to highly qualified graduates who are well prepared to take on future tasks within the company.



FIBER R&D CENTER

At the Fiber R&D Center in Graz (Austria), Springfield (USA) and Foshan (China), papermakers and fiber specialists have a fully equipped area to test their ideas for equipment, processes, and products on a pilot-plant scale – without impacting mill operations.



PAPER TECHNOLOGY CENTER

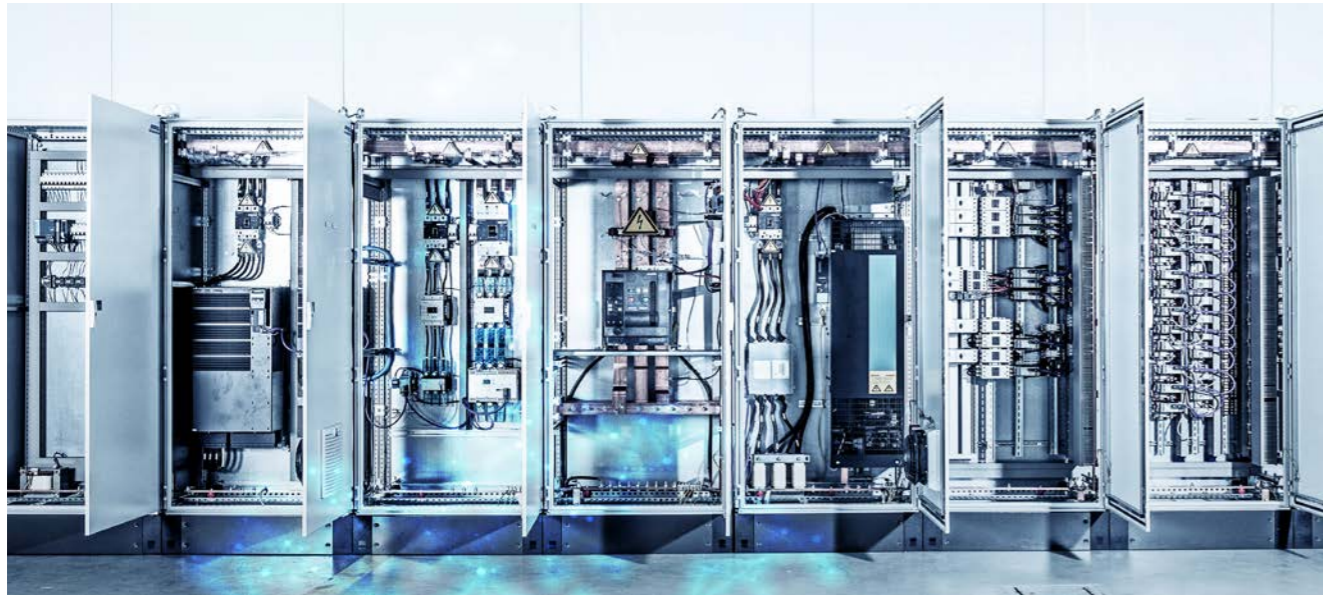
The laboratory calenders, roll test stand, and tail threading trial installation in the Paper Technology Center in Krefeld, Germany, are based on ANDRITZ Küsters' experience and are available to customers from all over the world to run trials with their products under actual operating conditions.



FABRICS R&D CENTER

Gloggnitz, Austria is home to the largest plant and R&D Center for fabrics and press felts in the world. The R&D center has its own laboratory. Research projects, investigations, analysis, and tests are regularly carried out to continually improve the quality and efficiency of the press felts.





Automation for all kinds of paper and board technology

Control, automation, and optimization are handled with a multi-disciplinary and holistic approach. All solutions are fully integrated to enhance operations, maintenance, information delivery, and quality assurance.

Modern mills require a very high degree of automation to monitor and control the flows, valve technology, machinery, drives, on-machine quality, speeds, throughput, and other important aspects of paper and board production. Systems with the flexibility to monitor and control everything from stock preparation to paper finishing are very important.

With over 110 different ANDRITZ Automation locations all around the world, the portfolio comprises both project concepts and execution throughout operations, starting with pre-feasibility studies and front-end engineering of controls, electrical and power systems engineering as well as estimating, scope development, and value engineering. This also includes project management, erection work, start-up and operator training, plus maintenance and engineering work for expansion and improvement projects.

The turnkey approach is interdisciplinary, closely linked with process design and uses well-maintained templates and consistent design data for plant engineering

and framework supply. With plant control systems, simulation and advanced control tools, automation experts help paper plants to become operationally ready within a short start-up period through comprehensive process know-how and pre-tested components.

The close cooperation between automation experts and other business areas consolidates the concentrated process knowledge that creates significant advantages and customer-focused solutions.

The drive for innovation continually improves both processes and plants in order to raise the efficiency, sustainability, and profitability of the plant and its processes while reducing costs and downtime.

GET AN OVERVIEW
on our automation and digitalization solutions for paper and board



Foresee digitally with Metris

ANDRITZ DIGITAL SOLUTIONS

As a technology leader with extensive and long-term experience in supplying industrial measurement, control, and optimization solutions for various industries, ANDRITZ combines process and equipment expertise with the latest enhancements in the digital era. The result of this powerful combination is Metris: a portfolio of ANDRITZ Digital Solutions.

METRIS OPP

One of the flagship solutions of Metris is to optimize industrial processes with Metris OPP - Optimization of Process Performance. Metris OPP has been developed over the past decade and is installed today in over 50 mills - mainly pulp mills - around the world. It combines powerful analytical and data mining software with the knowledge of the world's top process experts to deliver a smart service initiative for customers.

A CONSTANTLY GROWING PORTFOLIO

The depth and effectiveness of the Metris portfolio continues to improve thanks to ongoing R&D, collaboration with key customers and institutions, and venture activities. Portfolio options all rely on the three strategic focus areas of the Metris brand: Industrial IoT technologies, Smart Service concepts, and Venture activities.

The main technological advancements integrated into individual Metris products are derived from big data analytics, smart sensor technologies, and augmen-

ted reality solutions. The Metris UX Platform providing full support throughout the entire lifecycle of a plant is the most recent of our IoT developments. With Metris, customers look ahead digitally due to the continuously improved portfolio and its performance - and to ANDRITZ providing tailored and fully integrated digital solutions from a single source.

INDUSTRIAL IOT

Benefits

- IIoT solutions across business segments
- Combined know-how from ten years' experience with Metris OPP
- Use of the latest smart sensor technologies
- Big data analysis with tried-and-tested models for deviation analysis
- Provision of information locally with augmented reality
- Extensive solution and process engineering knowledge
- Cybersecurity solution to safeguard data on the network



PrimeService to boost performance and lifetime

To us, *PrimeService* means fast availability, individual service solutions and the use of our extensive knowledge. We are ready to take on your challenges, to help optimizing your machine's performance and to extend the equipment's lifetime. We supply spare parts and engineered wear products and provide customer-specific maintenance, digitalization, and upgrade services for your paper mill.

Our service specialists are skilled and experienced at raising the production efficiency of a machine, process step, or production line. Their knowledge helps protect and extend the life of your equipment and lower your overall operating costs.

The huge variety of ANDRITZ upgrade products provides performance improvements, energy and cost savings as well as return on investment (ROI) within the shortest time. We work closely with you to monitor, maintain, repair, and upgrade your assets.

Our 60 service locations for the pulp & paper industry offer you full service support. This support is provided to you – technically, mechanically, and personally – regardless of who originally manufactured your equipment.

GET AN OVERVIEW
on our service portfolio for
all kinds of paper machines

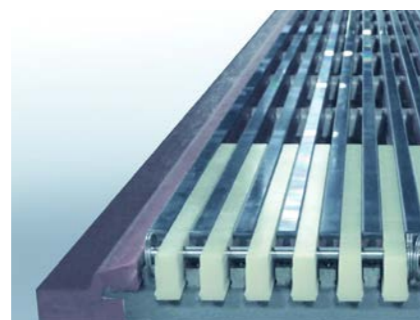


PRODUCT HIGHLIGHTS



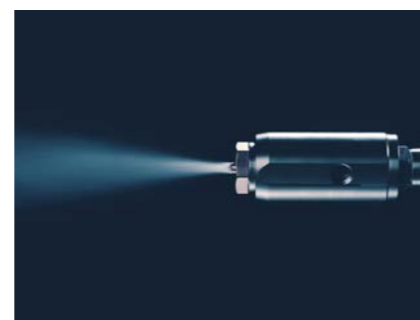
HEADBOX OVERHAUL

With our proven headbox overhaul program we inspect, recondition, and, if necessary, rebuild your headbox to extend the lifetime of this component, restore machine performance, and improve sheet quality. This is a cost-effective alternative to replacing the entire headbox.



CERAMICS

We deliver customized ceramics solutions as well as blades and engineered drainage systems with advanced design suited to all paper machine types and paper grades. Our goal is to optimize sheet formation and reduce drive load, while providing the best ROI for the selected types of ceramics.



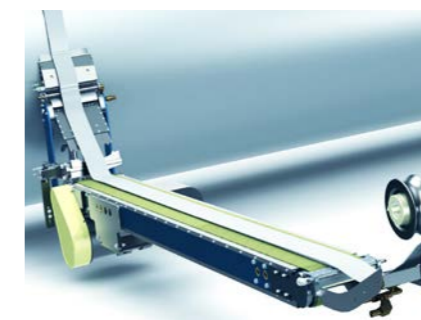
VIB PROFILING SYSTEMS

Improving the sheet's cross-directional moisture profile is one of the most effective and economical means of saving fiber and energy and improving overall quality levels, as demonstrated by our VIB product families.



ROLL SERVICE

We are experts in servicing conventional and deflection-controlled rolls of all designs and from any manufacturer. Our comprehensive roll services include roll and shoe press audits and repairs as well as new covers and coatings to enhance performance and increase lifetime.



THREADING SYSTEMS

We provide solutions for new equipment and rebuilds to suit all of your tail threading needs. This includes components, system design, in-depth threading audits, technical service, and start-up support with the aim of minimizing downtime and enhancing safe operations.



NOZZLES

High-pressure nozzles, trim squirt nozzles, edge trimming units, and pump systems contribute to high-precision machine operations and excellent product quality. Best application and maintenance support is backed up by our comprehensive knowledge of paper machine design and operation.

PrimeLine MG

The machine is Europe's largest new kraft paper machine and is equipped with the world's largest steel Yankee.

Showcase complete plant: Heinzl Pöls PM3, Austria with PM2 in 2013 and PM3 in 2019

With the additional production line (PM3), production has taken a giant step forward, and Heinzl Pöls AG is now focusing more than ever on the world market.

The customized concept of the *PrimeLineMG* paper machine, which is characterized by a specially designed wire section and a closed draw press, among other elements, is unique. It allows flexible production of paper qualities with maximum strength, high printability, and low basis weight.

HEADBOX

The *PrimeFlow* headbox has a lamella design and dilution water control to ensure uniform fiber distribution on the wire.

FORMER

The Fourdrinier section is equipped with a *PrimeForm* HB hybrid former. The hybrid former has a far higher drainage capacity than conventional formers and yields significant beneficial effects on the sheet quality, such as improved formation and improved z-direction distribution of fines and filler. It provides full operational flexibility and optimized handling.

PRESS

The press section utilizes a *PrimePress* Tri X press configuration and transfer belt. This kind of press configuration was developed together with the customer for extremely low basis weights, excellent dewatering and bulk/porosity savings.

PRE-DRYER SECTION

Moisture is reduced further in the *PrimeDry* pre-dryer section that consists of web stabilizers for high runability and steel cylinders for energy-efficient drying.

STEEL YANKEE

The heart of the paper machine is a true giant, made entirely of steel. A diameter of 24 ft. (7.315 m), a shell length of 6.25 m, and a weight of 197 t make the *PrimeDry* MG steel Yankee at Pöls the world's largest.



KEY COMPONENTS IN STOCK PREPARATION:

- Vertical Screw Thickener (VST)
- FibreSolve FSV pulper
- Five TwinFlo disc refiners (see picture above)
- Five-stage cleaner plant
- Five ModuScreen screens in the stock preparation and ShortFlow approach flow system



LATEST INNOVATION

Get to know the Vertical Screw Thickener!

YANKEE HOOD

The *PrimeDry* hood is steam-heated (190° C) using energy from a biomass boiler, thus saving energy and improving the cost efficiency of the drying process.

CALENDER

The compression zone in the *PrimeCal* Soft calender consists of a heated thermo-roll and soft-covered multi HV backing roll. This ensures excellent sheet smoothness and density with an even cross-direction profile.

REEL

In the *PrimeReel* section, the paper is wound onto reels. The turn-up process is fully automated.

"The PM3 is designed for high-quality papers with basis weights lower than 28 g/m². A perfect addition to the PM2!"

Werner Hartmann
COO & Managing Director Starkraft
Heinzel Pöls



The new PM3: an ANDRITZ solution from the headbox to the reel, including stock preparation, automation and pumps

PM2 and PM3: facts and figures

PÖLS PM2

Speed	1,200 m/min
Width	5.4 m
Steel Yankee	22 ft. diameter
Capacity	100,000 t/y
Product	kraft paper
Range	28-120 g/m ²

Products bags, shoppers, gift wrap or solutions such as flexible packaging paper for the food or pharmaceutical industry or release base papers for hygiene, medical, and industrial applications

PÖLS PM3

Speed	1,400 m/min
Width	5.4 m
Steel Yankee	24 ft. diameter
Capacity	100,000 t/y
Product	kraft paper
Range	20-70 g/m ²

Europe's largest new MG machine in operation

PM3 went into operation at the end of May 2019, two weeks before the scheduled project date, and has since been producing kraft paper for a wide range of packaging applications as well as release papers.

With an annual capacity of 100,000 t, a design speed of 1,400 m per minute, and a working width of 5.4 m, it is the largest machine of its kind in Europe.

SETTING A NEW BENCHMARK

The ANDRITZ PrimeLine MG plant produces environmentally friendly MG paper for flexible packaging and release applications at the Pöls location. PM3 is setting a new benchmark in the production of these paper grades. The unique machine design enables the production of grades with low basis weight and highest strength with good printability and smoothness levels.

EXCEEDING ALL EXPECTATIONS

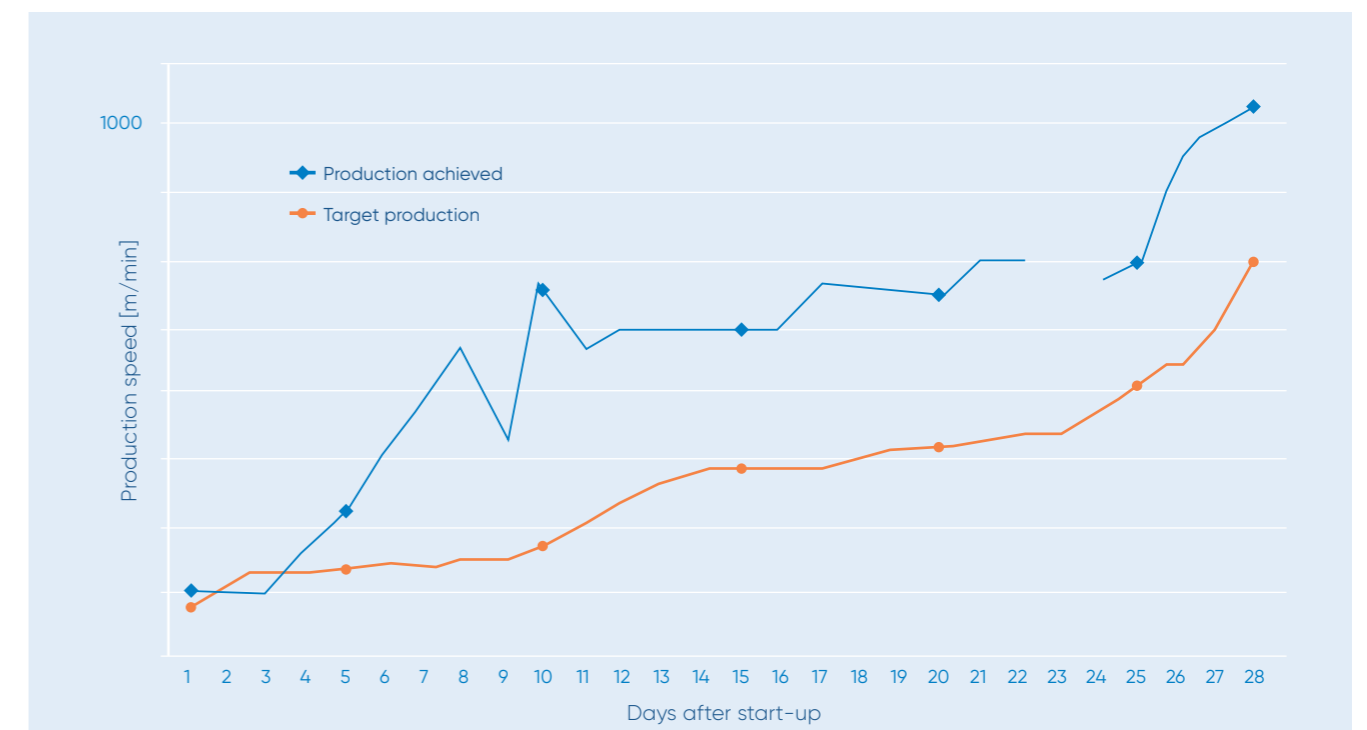
In terms of production and final product quality, PM3 exceeded all expectations right away in the first four weeks after start-up.

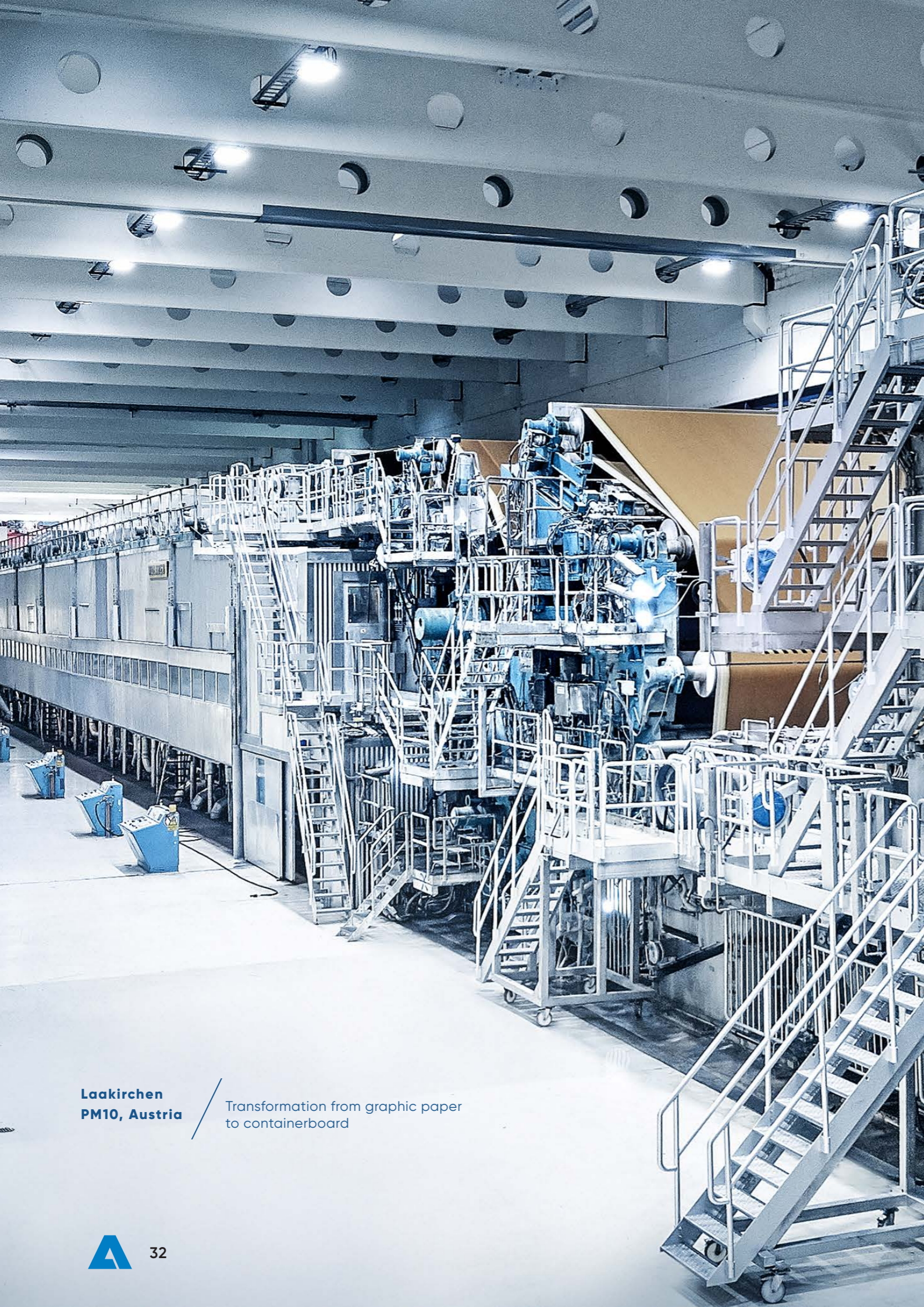
The design capacity was achieved in stable operation within three months, and the majority of paper grades with basis weights between 22 and 52 g/m² were produced successfully.

"Collaboration with the team from ANDRITZ was excellent, and this was also reflected in the outstanding PM3 start-up curve."

Siegfried Gruber
Head of Project Engineering
Zellstoff Pöls AG

Start-up curve: first four weeks ramp-up





Laakirchen
PM10, Austria

Transformation from graphic paper
to containerboard

Showcase conversion: Laakirchen Papier PM10

October 28, 2017 saw production of the first roll of corrugated base paper at Heinzl Group's Laakirchen Papier AG in Austria. ANDRITZ took on the challenge of the remarkable conversion of the mill's PM 10 from graphic paper to packaging paper, including a rebuild of the groundwood mill into a complete OCC line. The rebuilt machine is now performing well above the planned start-up curve, ready to capture a fast-growing market.

At Laakirchen, the prime concern of the parent company, the Heinzl Group, was to make the mill fit for the future. The history of this upgrade began in April 2013, after the Heinzl Group took over the location that was producing graphic paper grades on two paper machines. Mark Lunabba, CEO of Laakirchen Papier AG, remembers, "One of the first ideas our chairman, Alfred Heinzl, had was that we would have to improve our results and avoid being affected by the falling demand for printing grades."

Various possibilities were discussed, but it soon became clear that PM10 would be ideal for the production of corrugated base paper. Lunabba says, "Market volume was also needed that would match the capacity of the machine. And as a result, corrugated base paper became our specialty."

GOOD FOUNDATIONS

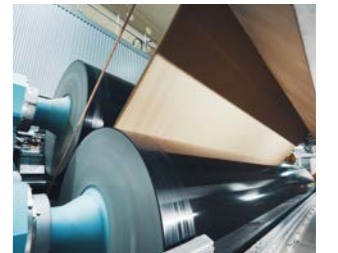
The final decision on the rebuild of PM 10 was made in August 2016. It was decided that the machine would now be converted to make 450,000 t/a of high-grade fluting and testliner with a grammage of 70-140 g/m² from 500,000 tons of recycled fibers (RCF). A budget of around 100 MEUR was estimated. The other machine, PM 11, was to continue producing graphic paper grades in a highly efficient production process.

"We didn't want to run any quality risks," says Lunabba. "So it was important for us to go with tested and proven solutions. ANDRITZ has a great deal of experience with RCF lines and had also proved that they know how to successfully convert machines. However, ANDRITZ was new to corrugated base paper so we also had to work together closely and help each other in determining solutions."

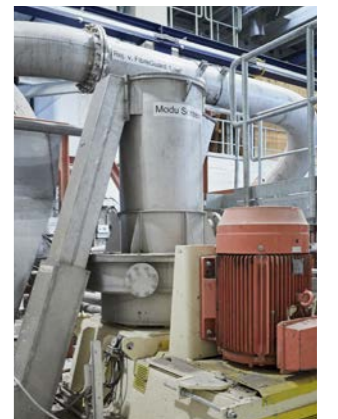
Another reason for placing the order in Graz, according to Lunabba, was the successful experience the Heinzl Group had with ANDRITZ and sister company Zellstoff Pöls, during installation of its PM 2 specialty paper machine, which went into operation at the mill in 2013.

Michael Pichler, Senior Vice President, Paper and Board at ANDRITZ, also emphasizes that it "was a project of high strategic significance, and Heinzl was the ideal partner for us. There is a great deal of mutual trust."

The rebuild covered the stock preparation system, the wet end and dry end of the paper machine, the film press as well as automation. In addition, ANDRITZ supplied the complete basic process engineering.



The PrimeFilm film press applies starch simultaneously to both sides of the paper web in order to achieve the desired strength values at high speed.



ModuScreens TD tailing screens are part of coarse screening. Efficient washing of fibers is done with a FibreWash Drum – one important part of the detaching system.



The fractionation section comprises a combination of existing equipment and a ModuScreen A with a matched screen basket/rotor concept.

CRITICAL PHASE

The rebuild phase was influenced by two special factors: the extreme time pressure – a corridor of only 12 months was defined between the decision to make the investment and start-up of the machine rebuild – and the customer’s stipulation to integrate as much of the existing equipment as possible at the same time as allowing PM 11 to continue running alongside the rebuild work.

“The actual time scheduled for the rebuild work itself was ten weeks. We were then four days late in getting stock onto the wire. In view of the intensity of the rebuild, that was a very brief delay,” says Mark Lunabba.

Johann Stadlmayr, head of technical planning, adds, “Completing this project within that time set new standards. After all, the shutdown phase was estimated at a point where we did not want as much rebuild work. Then more and more items were added in the course of the project, although the deadline remained the same because there was already a demand for the product on the market.”

NEW STANDARDS

Up to 600 people were working on the site over a period of four to five weeks, and there were actually more than 800 there during the peak phase. There was very little space, the second machine was running, and as if that wasn’t enough, building work, installation, and cabling had to be carried out simultaneously as well. “The overall logistics were an absolute masterpiece,” says Stadlmayr.

“And the overall result is very positive, ANDRITZ really proved that they were able to handle this project,” says Lunabba.

Stadlmayr adds, “Of course, there were some obstacles, but we were able to overcome them relatively quickly and professionally. Everyone involved went through a learning process in this project; however, drive never let up. The achievements of the ANDRITZ Project Manager, Franz Fischer, who did a very good job, were also very positive. He was extremely approachable, 24 hours a day, seven days a week, and was always able to suggest a swift solution.” Fischer describes the start-up itself as an emotional roller coaster ride, “One day we would make good progress only to suffer a setback again the next day.” However, now, the rebuilt machine is performing well above the planned start-up curve.

FAVORABLE FEEDBACK FROM THE MARKET

Jan Reibert, PM10 Production Manager, confirms, “The paper machine is now operating with 100% recycled fibers. That meant a fundamental rethinking process for all those involved. The film press was also new ground for us, but we had it well under control from the word ‘go’.” Two months later, the challenges involved in every start-up were resolved, and the paper machine is running very smoothly without any web breaks, according to all those involved. The highest daily gross production was recorded so far on March 17 at 1,360 tons saleable production. The speed was in the region of 1,200 m/min, and the operators have already set a target of 1,400 m/min. Since the beginning of the year, the plant has seen very stable production – considerably above the planned start-up curve.

“The market situation for our new product is currently very good. That’s why we also did not want to have any delays,” says Lunabba. The company expects the demand for corrugated base paper to increase by 5% per annum, so the timing is absolutely perfect. “We wanted to sign contracts at the end of 2017 for 2018,” he says, and refers to the positive feedback from the market, “The goods we sent to customers received top ratings. There was not a single complaint.”

GRAND FINALE

After 17 years at Laakirchen, Mark Lunabba is retiring. The PM 10 project was thus the grand finale of his career. “I am leaving on a high note and with confidence in the top-performance organization we have here.”

Johann Stadlmayr is also looking to the future with optimism, “This was one of the most challenging, intensive, and exciting projects for Laakirchen and one that involved major changes. It was a great achievement and we can all be proud of where we are today. This is a key project for the future!”



**FibreSolve FSR
PULPER**

The pulping system with detaching includes a 130 m³ FibreSolve FSR pulper – the largest LC pulper ANDRITZ ever installed in Europe



DISCOVER OUR FULL-RANGE PORTFOLIO FROM FIBER PROCESSING TO PAPERMAKING

An outstanding paper product requires outstanding production – matched with the particular needs of raw material and final product. Discover the full-range portfolio from ANDRITZ: Excellent stock preparation that allows best fiber development according to furnish and with economical use of resources. *PrimeLine* paper machines that are a synonym for producing top-quality tissue, paper, and board grades. Complete lines or single units, upgrades, and modernizations. Contact us and benefit from your individual package in papermaking technology.

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