ANDRITZ
Pulp & Paper

Mill story

Papierfabrik Albert Friedrich (Fripa), Miltenberg PM6, Germany

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Gathering impressions
Miltenberg in Bavaria

Miltenberg, Germany, where Fripa is located, belongs to the land Bavaria. Historic Miltenberg lies on the Main's left bank on the "left knee" of the Mainviereck ("Main Square") between the Spessart and Odenwald ranges.

Germany accounts with 82 million inhabitants for the largest population among the member states of the European Union. Its territory covers 357,021 m² and is influenced by a temperate seasonal climate. It is the seventh largest country by area in Europe and the 63rd largest in the world. Elevation ranges from the mountains of the Alps (highest point: Zugspitze, 2,962 m) in the south to the shores of the North Seas in the north. Germany is the largest national economy in Europe, the fourth largest by nominal GDP in the world.

Since the age of industrialization, the country has been a driver, innovator, and beneficiary of an ever more globalized economy. Most of the country's products are in engineering, especially in automobiles, machinery, metals, and chemical goods. But, like almost all countries in the world, the economic crisis affected Germany as well. It officially entered recession in December 2008. The country is heavily reliant on exports and a decline in global demand is at the root of Germany's economic difficulties. Despite the country's economic problems, consumers in Germany seem disinclined to modify their spending habits and during 2008 and the early part of 2009 retail spending remained stable.

While the prudence of the German consumer has served to provide a cushion for the growth of tissue products, it also shapes the competitive landscape of the market, accounting for the high share of private label.

German consumers are typically well informed and aware that the difference between branded and private label products is often minimal, since they are also aware that the same manufacturer often produces both. As a result, consumers no longer stand by the school of thought that quality costs more and private label products lead every tissue category, accounting for almost 67% of the overall tissue products market, driving price competition and stifling value growth. Miltenberg, where Fripa is located, belongs to the land Bavaria.

▲ The river Main.

▲ Miltenberg in Bavaria, view of the old town @Karsten Kilian

Historic Miltenberg lies on the Main's left bank on the "left knee" of the Mainviereck ("Main Square") between the Spessart and Odenwald ranges. Since the Main riverbed in the Miltenberg area is relatively near the foot of the Odenwald, only a narrow strip of usable land is left, which in bygone centuries was time and again flooded by the Main. The Old Town, which stands on this land, sustained sometimes considerable amage in these floods. From about the beginning of the 20th century, after buying land from the neighboring community of Großheubach, Miltenberg has been spreading itself out over on the right bank. The economy is characterized by tourism and trade.

▲ The region of Miltenberg is rich in wood.

Development of Fripa

A history of growth

With an annual output of around 120,000 t of finished product from its ultramodern converting plant, Fripa serves the global tissue market.

The German tissue producer Fripa is an important player in the German domestic tissue market. In addition, Fripa has a small but important business making specialty tissue as a component for absorbent hygiene products.

Fripa is actually one of three paper mills owned by the same family and traces its roots back to a paper mill in Berlin which was established in 1911 by Hermann Friedrich.

The operations moved to Miltenberg, about 75 km southeast of Frankfurt, in 1948 under the leadership of his son Albert Friedrich. Albert got Fripa into the tissue paper business through the installation of the first crepe paper machine in 1950. Today the company is led by Albert's granddaughter Ursula Queck-Glimm, a qualified graduate in business economics. She works closely together with the management Andreas Noack and Torsten Bahl. The other two paper mills owned by the family are Papierfabrik Cartaseta- Friedrich + Co located in Switzerland and Fabryka Papieru Czerwonak in Poland. While the three companies share common ownership, they are totally independent of each other.

Today Fripa employs about 290 people and is the biggest source of jobs for the town of about 10,000 inhabitants.

Sales are based on three main product lines: Private label tissue products for German retailers, AFH tissue sold under the Fripa brand and specialty tissue sold to other converters for use in absorbent hygiene products such as diapers, incontinence and feminine care.

As far as tissue products, the production program covers essentially all grades including toilet rolls, kitchen towels, hand towels and handkerchiefs. Large diameter cleaning rolls for AFH use, as well as medical examination table rolls and napkins, are also included in the assortment. Although Fripa is small, the efficient and flexible plant at Miltenberg is certainly impressive.

The extremely clean and fresh facility, with numerous state-of-the-art converting lines and a very high level of automation, is among the most modern in the tissue industry.

1911
Foundation of a converting company by Hermann Friedrich in Berlin.

1932-1944
Take over by Albert and Kurt Friedrich and formation of the "Converting Company Gebrüder Friedrich"; Ruin of the mill and re-build in Coburg by Albert Friedrich.

1948
Start of paper production and converting in Miltenberg with a crepe paper machine and different converting lines.

1960-1987
Installation of a new long-wire paper machine in Düren; start-up of a tissue machine at Miltenberg; modernization of the tissue converting lines for special tissues grades; new machine for crepe qualities.

1996
Complete rebuild of the tissue machine PM 5 by ANDRITZ within only 19 days.

2007-2008
Start of the construction for the new paper machine PM6. Board management change from Ursula Queck to her daughter Verena Queck-Glimm, management change from Robert Thelen to Andreas Noack. Start-up of the new PM 6, celebration of "60 years paper production in Miltenberg".

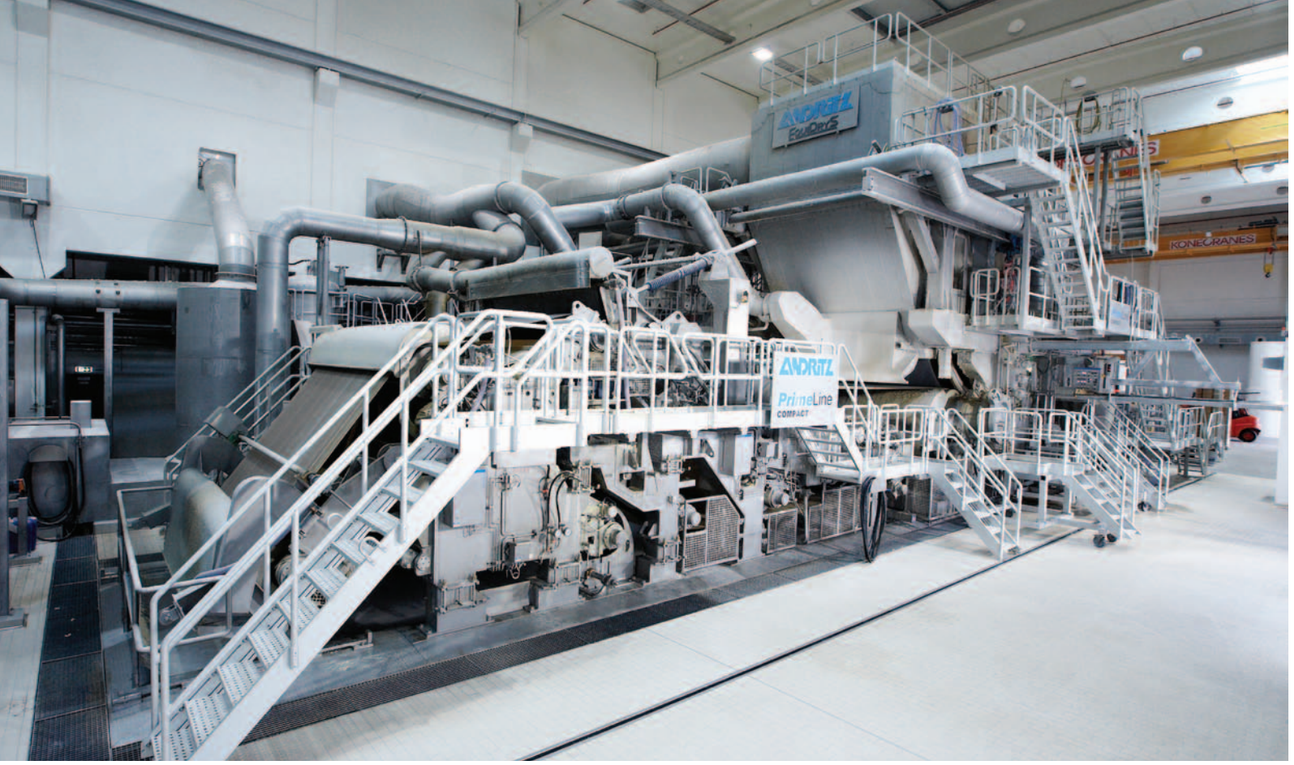
2009-2014
Continuous development: new high rack warehouse and new rewinder. Several DIN ISO as well as IFS (Household and Personal Care) certifications.

ANDRITZ and Fripa

- 1996: ANDRITZ rebuilt Fripa's PM 5.
- 2006-2008: As the demand for small, compact installations became more and more important, ANDRITZ responded to this challenge and launched, in 2006, the *Prime*LineCOMPACT concept, a standardized complete tissue mill. Just a few months after the official market introduction, Fripa ordered the first unit — continuing its strategy of investing in ultra-modern production lines to meet changing customer requirements. The COMPACT machine was delivered in combination with ANDRITZ stock preparation systems, which saved Fripa time and money.

"In 1996, ANDRITZ rebuilt our PM 5 and did a great job. The cooperation was very good and they proved their technical competence to us. They also have excellent references for delivering tissue machines with good price-performance ratios. Based upon this trust, we did not feel there would be extra risk to install the first PrimeLineCOMPACT line."

Andreas Liebich
Division Manager Paper Production
Fripa



▲ The new *Prime*LineCOMPACT machine at Fripa, Miltenberg.

Project outline

The combination of cost efficiency and quality

Fripa's investment goal, according to CEO Andreas Noack, was to install a new line capable of producing approximately 100 t/d of high-quality tissue that was easy to install, easy to start up, easy to operate, and easy to maintain.

"The tissue industry is a dynamic business," says Noack. "Changing consumer habits have a more direct influence on tissue than on other paper grades. This means that the technologies we employ must be flexible to meet these changing requirements. For Fripa, these requirements can be reached more efficiently with flexible, middle-sized machines, like the COMPACT design. Even in business, there is an emotional side," Noack says. "Business is a matter of trust. You don't build trust with a company, but with people.

We have a good, stable relationship with ANDRITZ people that has been proven over the years. Our ANDRITZ contacts, both on the technical and commercial side have been excellent. This is important for us as a medium-sized business."

The idea behind

The idea behind COMPACT is to combine cost efficiency with proven quality. The key to COMPACT's cost efficiency is the level of standardization – which reduces engineering hours, manufacturing hours, installation time, and even transport costs.

Facing challenges

Like every project, this one had its challenges. "A big challenge for us was the federal law for emissions protection," Noack says. "We do not deal with that on a regular basis, so it was considerable work for us to go through the licensing procedure. Even with the support of our provincial government, it took one year to get all the permissions."

Limited space

Another challenge was the space issue. Fripa defined the place for the new machine and had to purchase some additional real estate. This impacted their existing infrastructure during the construction phase. "But despite these challenges on our side, the project was executed in an excellent way and progressed smoothly," Noack says.

Double workloads

"We did not have a dedicated project team to work solely on the new PM6," Noack says. "Our employees had to cope with double workloads, because they had their regular jobs to do. That is probably the situation in many small and middle-sized businesses, so we relied heavily on ANDRITZ's project team. What impressed me was that we were able to bring in our own ideas and know-how to the project. ANDRITZ was flexible and encouraged a true partnership. It's not just a commercial transaction for them, but an exchange of ideas and solutions."

"Changing consumer requirements can be reached more efficiently with flexible, middle-sized machines, like the COMPACT design."

Andreas Noack, CEO (left) shakes hands with Günter Offenbacher, Director Sales for tissue machines from ANDRITZ.

▼ Tissue on reel at Miltenberg.

Stock preparation
The ShortFlow system

Proven process solutions from the bale pulping to the paper machine headbox, including advanced stock blending and control systems.

The bale pulping system has one common FibreSolve pulper for both softwood and hardwood pulps.

Pulping is done at higher consistency, made possible by a high efficiency FSV type rotor which is designed to achieve complete defibering even with shortened batch cycles. High slushing consistency enhances the fiber-to-fiber friction which results in efficient fiber bundle disintegration. A homogenous fiber slurry makes it possible to have low pulping times and high production efficiency from the compact pulper unit.

"Minimizing chest volumes, together with the ShortFlow blending system, has helped us optimize production."

Helmut Hofherr
Head of Paper Production
Fripa

Protection system

A single-stage protection screen, type ModuScreen C with perforated holed cylinders, provides excellent protection of all subsequent machines that are subject to damage from non-fibrous debris, i.e. refiners and headbox approach flow screens. Wire pieces and other heavy debris or coarse contaminants are effectively removed by the ModuScreen C, which has a rotating cylinder and operates with intermittent rejecting from the junk trap.

Refining

Refining is the only mill process that actually develops the fiber, so the importance of refining cannot be overemphasized. ANDRITZ provides even and gentle refining with no cutting of the fibers or generation of non-papermaking fines. The refining area ensures that the refining conditions (refining speed, net refining energy, pressure, etc.) remain constant over all the plate surfaces.

The result of refining under these conditions is excellent pulp quality and more stable fiber properties going to the tissue machine.

ShortFlow blending

ShortFlow blending is the process of combining two or more stock flows by intensely mixing incoming pulp streams with the pulp already in the blend chest. Pulps fed into the ShortFlow agitator enter the blend chest through an engineered premix manifold, which ensures efficient stock mixing and minimum stock quality variations. These features make ShortFlow blending an excellent tool for the papermaker to make fast grade changes with short transition times on the paper machine.

The blending system integrates the incoming pulp fractions from the stock preparation system by injecting them into the premix manifold on the blend chest. Automatic control adjusts the incoming flow according machine production requirements. Automatic control of the blend chest provides outstanding basis weight stability and paper machine runnability.

The blend chest is the final step to produce the proper fiber mix demanded on the tissue machine. Online fine consistency control after the blend chest and before the fan pump guarantees the stock consistency in the headbox, which is critical to machine performance.

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▲ As part of the package ANDRITZ delivered the stock preparation system for virgin fibers, a broke processing line, and the systems for water recirculation and fiber recovery.

Approach system

The ShortFlow approach system is a compact system with the smallest possible water amount circulating in system. Thick stock from ShortFlow blending is diluted by injecting the dilution water directly into the suction pipe of the fan pump, with the flow rate controlled to the desired set point for headbox consistency. The stock suspension is finally prepared to create the optimum formation in the dewatering zone of the paper machine, but the last step is to pass it through a low-pulsation headbox screen. The headbox screen protects the headbox from damage, deflocculates the pulp, dampens systemic pulsations and in doing so, establishes the basis for best possible tissue machine efficiency. The tissue machine headbox screen has only a single stage where rejecting from the screen is done intermittently through pressure release cyclone to channel.

ShortFlow COMPACT concept

The ShortFlow concept is a simple, space and energy saving solution that is applicable to a broad range of different mill surroundings and production requirements. The fast ShortFlow process speeds up grade change times and improves the controllability of the total process. Furthermore, it creates opportunities to develop the basic process in a new, reliable, and very useful way.

Tissue machine
The COMPACT line

Standardized and easy-to-scale modules that deliver an attractive return on investment. Choose your line based upon your capacity requirements!

Headbox
The headbox is a two-layer design. The step diffuser turbulence block enables high formation quality even at high stock consistency in the headbox, which contributes to a high portion of energy saving of the fan pump. Excellent CD profiles are enabled through precise manufacturing.

Former
The *Prime*Form CrescentFormer has a very high dewatering capacity. White water flow from the former is controlled by special guide vanes so that the energy of the water jet is broken outside the machine. This improves the web section's housekeeping. The *Prime*PickUp leads to a remarkable improvement of the machine's runability and allows for a more homogeneous sheet over the whole paper width.

Press
The press section consists of a single suction press for high product quality. Roll changes are easy, since the vacuum suction is on the drive side and the suction pressure roll is not driven.

"From our point of view, the two-layer headbox in combination with a suction roll and high-temperature hoods offers the best combination to produce high-quality toilet paper with a relatively low chemical input."

Andreas Liebich
Division Manager Paper Production
Fripa

Yankee
The ANDRITZ *Prime*Dry Yankee is ribbed and optimized for a high heat flow and an even drying profile.

Hood
The design of the EquiDry Hood utilizes an extensive FE-analysis to provide results of stress and elongation. The optimized nozzle geometry and air flows of the EquiDry Hood, together with the internally grooved Yankee, result in a uniform and high efficiency drying performance. The hood installed at Fripa is designed for 600° C and has automated Correcta-zones which allow regulation of the moisture profile.

◄ Wire and felt changes can be accomplished quickly due to the modular, compact machine design.

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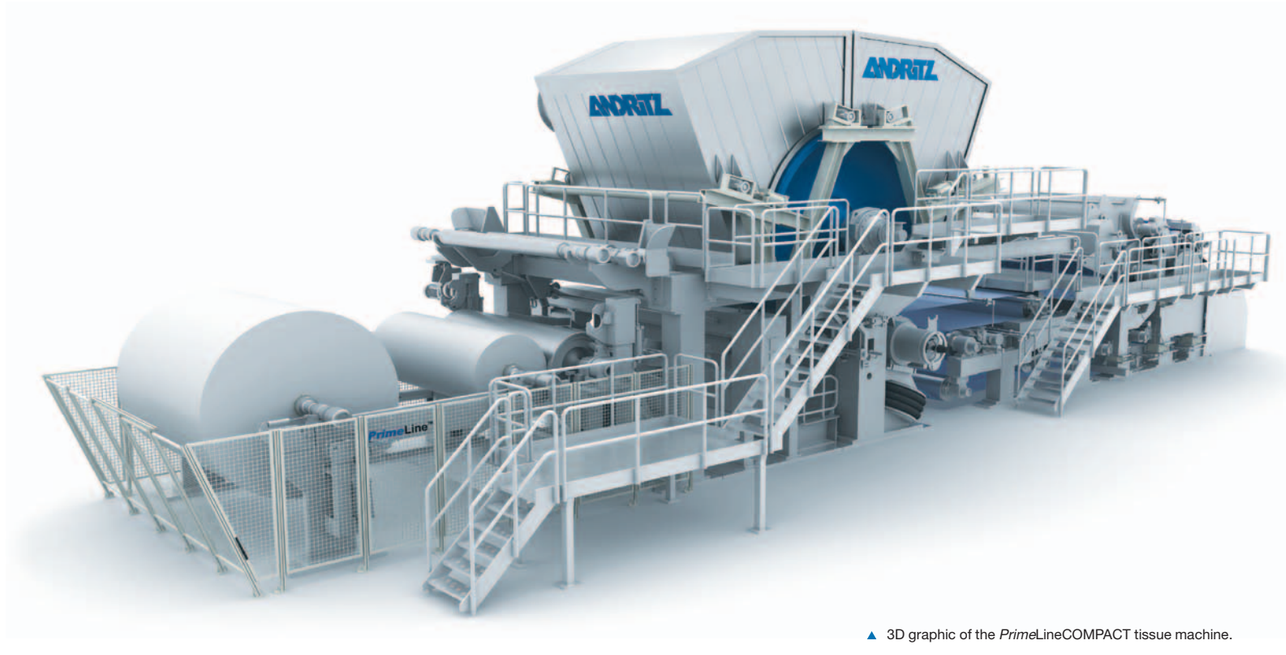

▲ 3D graphic of the *Prime*LineCOMPACT tissue machine.

Sheet run
Beginning at the creping doctors, the sheet run is equipped with threading and sheet support equipment, and a highly efficient dust removal system.

Reel
The *Prime*Reel is pneumatically controlled and includes linear primary arms and pivoting secondary arms.

A nip load compensation system in the secondary arm ensures even winding pressure. Load relief during the transfer process, together with precise electronic controls, ensure consistently high tissue quality right down to the spool.

Automation
The required consistent and stable operation is ensured through a specia l control philosophy, which is implemented in the *Prime*Control automation system.

ANDRITZ Automation
- Complete DCS system for the entire production line
- Service including start-up, commissioning and maintenance. Fripa can easily monitor the plant.

Successful start-up

Flexible production based on customer needs

Fripa began the start-up of the COMPACT line on a “stop-and go” basis with the machine running at 1,000 m/min. Only about 5 t of off-spec paper was produced.

The small amount of rejects and the fast start-up were impressive accomplishments. Within a few days, production was continuous, with the machine reaching incremental speeds of 1,300 and 1,500 m/min. After only two weeks, operational speeds of 1,800 m/min were achieved.

Also, after two weeks, the machine was operated completely by the Fripa team, without ANDRITZ personnel on site. ANDRITZ supported with 24-hour telephone availability for any questions or problems, but there were few occasions to use it. “Minimizing chest volumes, together with the ShortFlow blending system, has helped us optimize production,” says Helmut Hofherr, Head of Paper Production at Fripa. “Changes in the ratio of fiber input or strength properties are conveyed to the machine very quickly which results in faster grade changes and more efficient optimization work.

Fripa PM6, Germany
Start-up: March 12, 2008
Furnish: Virgin fiber
Width reel: 2,750 mm
Drive speed: 2,000 m/min
Design speed: 2,100 m/min
Headbox: 2-layer
Press section: Single press
Yankee: 4,877 mm
Capacity: approx. 30,000 t/y

„We had an excellent start-up and could achieve a high level of production capacity within a short period of time. I was particularly surprised by the ANDRITZ automation systems, especially in the stock preparation area. The sequencing of start-ups, grade changes, and shutdowns all run perfectly.“

Andreas Liebich
Division Manager Paper Production
Fripa

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Looking forward

“The new machine is not as high as conventional machines and is engineered in a very compact, modularized design,” Liebich says. “This configuration has several advantages. Wire and felt changes can be made with minimal downtime. The machine is easier to clean than a conventional machine, as it is smaller and more open.” One of the design goals of the COMPACT design was energy efficiency. According to Offenbacher of ANDRITZ, the COMPACT concept with ShortFlow leads to less energy consumption, and also contributes to a faster return on investment. “In the future, papermaking in Germany will not be possible without taking energy factors into consideration,” Noack explains. “Energy will become the decisive question, as it highly influences the product from the cost side. The energy input on PM6 is as low as we estimated, but our goal is to get it even lower. We have done a very good job of optimizing PM5, and I believe we can be as successful with the new machine.”

The same can be said about effluent volumes. “On PM5, we have about 1.8 l per kg of production,” Liebich says. “For the new PM6, we installed special components to further close the effluent loop. The amount of effluent is below what ANDRITZ estimated, but we are sure there are further optimization possibilities.

Flexibility in the market

As for Fripa’s markets, Noack is optimistic. “Before you can discuss the overall market, you always have to ask what your own position is,” he says. “There are companies that strongly focus on Europe. And, there are others that are positioned locally. We consider ourselves to be in the second category. We’re a middle-sized business with our main focus in Germany. Due to acquisitions and takeovers, the competitive situation is tough, but there are advantages as well. As a result of mergers, customers are seeking alternative suppliers. From this point of view, new and interesting relationships will be initiated.”

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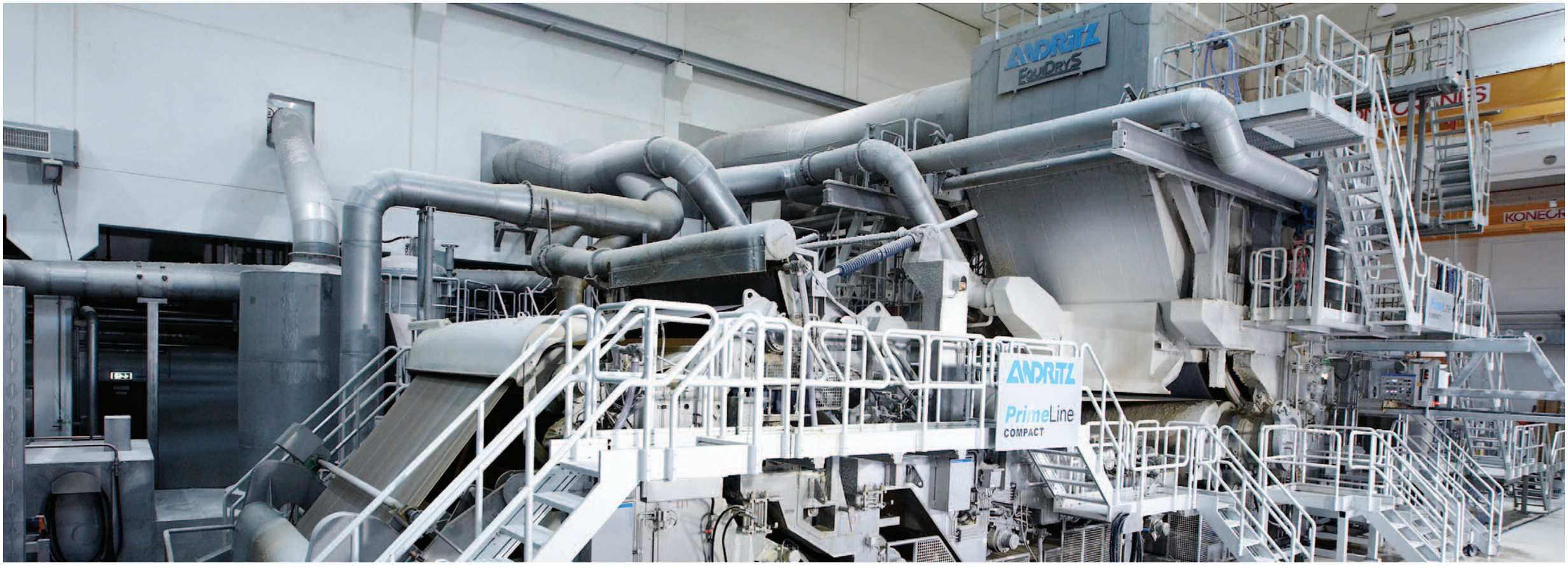
*Prime*LineCOMPACT Fripa PM6

Record breaking production results



2006
First on the market

As the demand for small, compact installations became more and more important ANDRITZ responded to this challenge and launched, in 2006, the *Prime*LineCOMPACT concept, a standardized complete tissue mill. Just a few months after the official market introduction Fripa ordered the first unit — continuing its strategy of investing in ultra-modern production lines to meet changing customer requirements.

2008
Impressive start-up

In mid-March 2008, Fripa began the start-up of the COMPACT line on a “stop-and go” basis with the machine running at 1,000 m/min. During the whole start-up phase, only about five tonnes of off-spec paper was produced. Within a few days, production was continuous, with the machine reaching incremental speeds of 1,300 and 1,500 m/min. After only two weeks, operational speeds of 1,800 m/min were achieved.

2009
Great suprises

“ I was particularly surprised by the ANDRITZ automation systems, especially in the stock preparation area. The sequencing of start-ups, grade changes, and shutdowns all run perfectly.”

Mr. Andreas Liebich, division manager paper production at Fripa. By 2009, the machine was already producing paper at the nominal capacity level.

2010
7% above nominal

The *Prime*LineCOMPACT configuration has several advantages: wire and felt changes can be made with minimal downtime. The machine is easier to clean than a conventional machine, as it is smaller and more open. The concept is proving a success: in 2010 the production level was more than 7% above the nominal capacity.

2011
12% record

Within the first months in 2011, the line exceeded the nominal capacity by 12% and is now very close to its max. design capacity. Mr. Andreas Noack, CEO at Fripa, stated:

“ The whole project was executed by ANDRITZ in an excellent way and progressed smoothly.”

Nowadays
Constant top speeds

The *Prime*LineCOMPACT tissue machine at Fripa is nowadays operated successfully at constant top speeds about 2,000 m/min and higher.

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