VOITH

Leading technologies for specialty papers



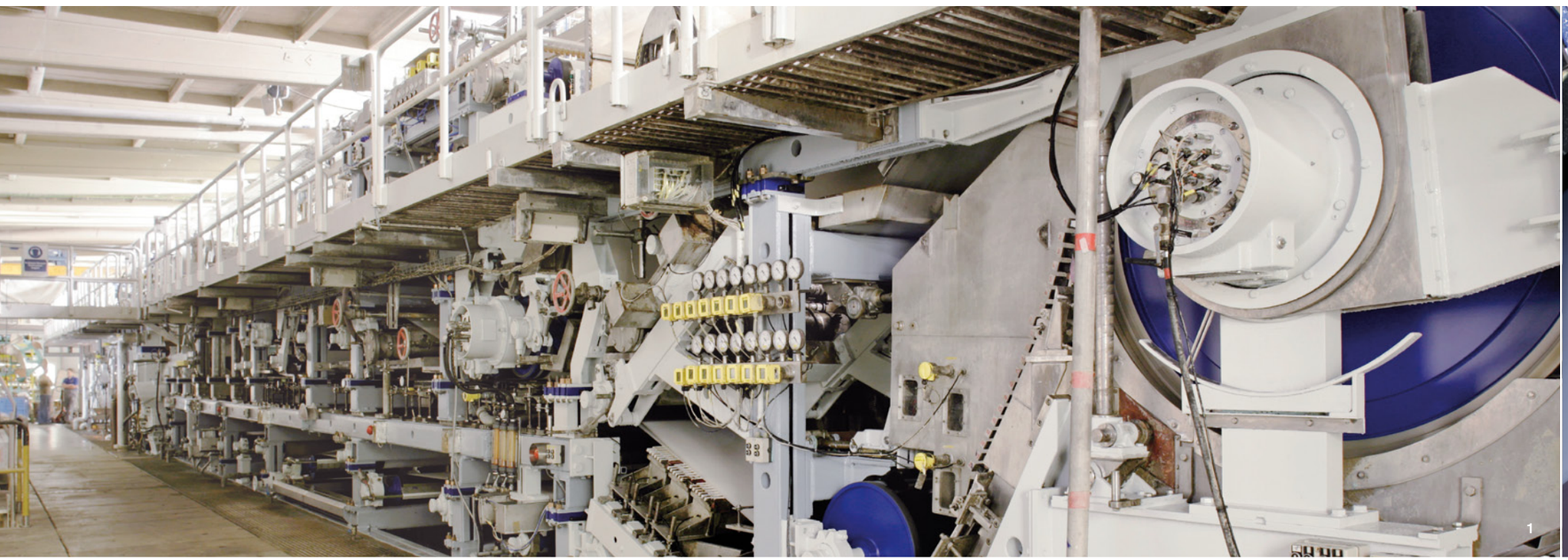
This brochure provides an insight into Voith's activities in research and development for specialty paper machines, innovative products and machine concepts as well as successful projects.

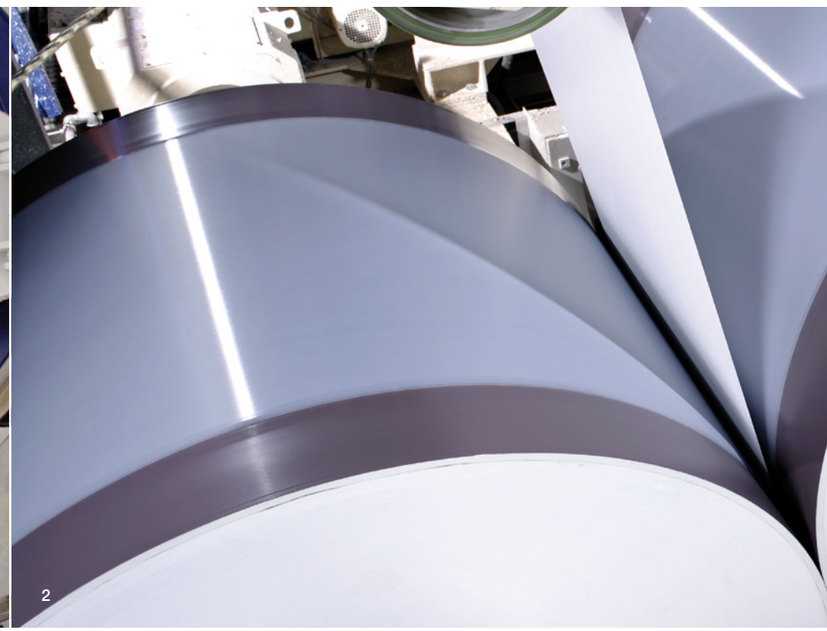
Leading technologies for specialty papers

Paper machines not only produce volume grades such as newsprint, they also provide paper for tea bags and gasoline filters, bottle labels, wallpaper and décor coverings for furniture as well as backing paper for vinyl wallpapers... Specialty papers normally create much greater added value compared to commodity paper grades, however their production process is very demanding.

The challenges involved in the manufacture of specialty papers are diverse. With some exceptions, specialty grade tonnages are quite modest compared with commodity grades. Specialty papers typically place heavy demands on technology throughout the production line, from stock preparation to the paper machine and the finishing process, including all auxiliary equipment required as well as environmental aspects. Voith supplies products and technologies for all grades of specialty papers. The high and consistent quality requirement for coated and uncoated specialty papers is always a key consideration. This is why our production technologies for each specialty paper are tailored to every specific case. With its full package of R&D and pilot facilities Voith Paper provides cutting edge technology to meet the most exacting demands from the market.

PILOT PLANTS





1 Single and multiply papers can be demonstrated on the pilot paper machine in Ravensburg, Germany.

2 The pilot coater in Heidenheim offers the opportunity for all kinds of surface applications using various application systems.

Maximum investment security for new plants and rebuilds

Voith‘s pilot machines offer the ideal way to demonstrate the advantage of new developments for existing processes and maintain maximum investment security.

From stock preparation, different paper machine concepts, coating units and calenders to the reel, new concepts can be tested before an investment decision is made. The test facilities are available at the following locations:

- Düren: HydroFormer
- Ravensburg: stock preparation and pilot paper machine with Fourdrinier, hybrid former and gap former
- Krefeld: calender technology and winding process
- Heidenheim: pilot paper machine and coating unit

Test facilities for non-woven materials

At the Düren location, Germany, there is a HydroFormer inclined wire test facility available for customer tests. This pilot facility consists of a stock preparation that is suitable for supplying various furnish compositions to the HydroFormer in three-layer operation. The centerpiece of the facility, the HydroFormer, is built for optimum flexibility. Both the forming angle as well as the relative angle between the headbox table and forming fabric can be adjusted so as to find optimal operating angles for an actual production facility. There is a double-felted press section with one nip behind the HydroFormer. Sheets of paper or non-woven materials are removed after the press section and dried offline or wound up wet in the machine.

Since April 2013, Voith has been working with the German non-woven expert Trützschler for wet laid non-woven lines in combination with hydroentanglement technology. Within the framework of this joint cooperation, the Voith inclined wire test facility was supplemented with a Trützschler AquaJet water bar, which allows preconsolidation of the non-wovens produced. Wound up wet, the non-woven materials are transferred to Trützschler’s technical center where they are hydroentangled, dried and wound up.

Testing and comparing machine configurations

The Pilot Paper Machine VPM 5 in Ravensburg, Germany, offers the possibility of testing different former concepts such as the Fourdrinier former, DuoFormer D II and DuoFormer Base or press concepts such as the Single NipcoFlex press. The production capability of the VPM 5 covers a broad basis weight range from 20 to 1,000 g/m² and a speed of 50-2,000 m/min. On the VPM 5 one-and two-ply paper grades can be tested. In combination with the stock preparation test facility, the influence of raw material, raw material treatment and additives can be investigated. The VPM 6 pilot machine at the Paper Technology Center (PTC) in Heidenheim, Germany, is equipped with a gap former. Here, too, there is an option for optimally dealing with raw materials in the fiber design.

Due to the modularity of the VPM 6, the raw material can then be processed to base paper with the most varied machine configurations. Production of paper rolls facilitates further processing of the paper at the pilot coating machine and on the pilot calender. The VPM 6 is constructed for a design speed of 3,000 m/min. It produces paper with a cut roll width of 800 mm and basis weights between 26-200 g/m². ▷

PILOT PLANTS



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1 The pilot Janus MK 2 calender with up to 11 nips allows calendering at web speeds of up to 1,500 m/ min.

2 Various calender concepts are available for calendering tests at the Paper Technology Center in Krefeld.

▷ **Evaluating coating processes under realistic conditions**
The pilot coating machine at the PTC in Heidenheim offers the unique opportunity to evaluate various coating processes under realistic conditions, such as film, blade and curtain coating. The paper reels can be subsequently calendered and printed. The pilot coating machine facilitates coating tests with all current coating processes at web speeds of up to 2,500 m/min. Two color mixers, two starch cookers, a jet cooker plus cyclone and vacuum deaerators are available for preparing the coating color.

Calendering tests with Voith calender technology
There are various calender concepts available for tests at Krefeld, Germany, from soft- an hard-nip configurations, NipcoFlex calender to the Janus MK 2 with up to 11 nips.

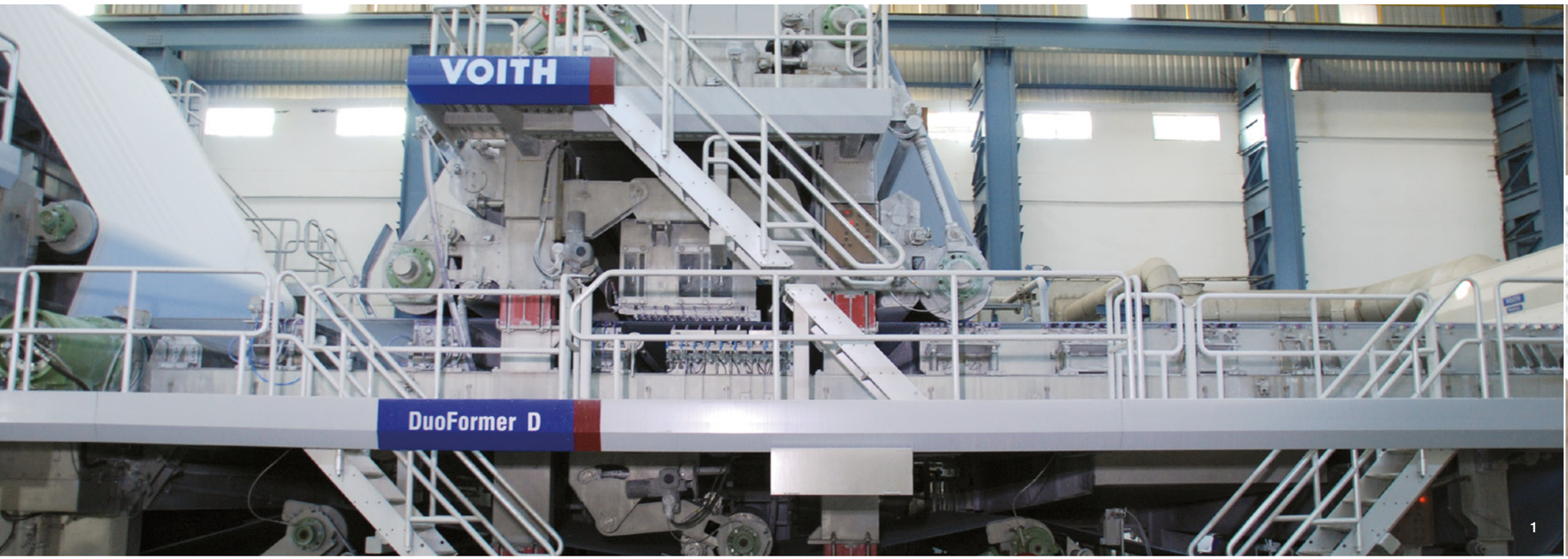
The Janus MK 2 calender allows calendering at web speeds of up to 1,500 m/min, while the other calenders can be operated at up to 2,500 m/min. The Janus MK 2 and the soft- and hard-nip calenders achieve a line load of up to 500 kN/m and a surface temperature of the heated roll of up to 250°C. The NipcoFlex calender can be loaded with up to 1,500 kN/m and can achieve a surface temperature of up to 260°C.

Moreover, a pilot winder is available at the Paper Technology Center in Krefeld that can be operated as a VariFlex two-drum winder or VariPlus single-drum winder. This also, of course, offers the option of using various roll covers to investigate their influence on the winding result. In addition, an extensive range of laboratory equipment is available at all locations for determining the necessary parameters of wet and dry samples. The entire process chain “from the fiber to the print” can be demonstrated at the Voith test facilities – the raw material can be prepared (including recovered paper) and paper rolls can be produced from it. They can then be coated and calendered ready for printing to show how the produced paper raw materials perform in the print test. //

Customer benefits of the Voith test facilities

+ Testing and comparison of the most varied process conditions and machine concepts
+ Optimization of raw material formulas or raw material treatments for different paper grades
+ Optimization of filler formulas for different paper grades
+ Optimization and testing of clothing (fabrics, felts, press sleeves, transfer belts)
+ Evaluation of corresponding quality or runability potential of materials and/or machine concepts
+ Determination of operating parameters for start-up preparation
+ Minimization of investment risk with process tests under realistic conditions
+ Tests for development of new paper products
+ Employee training

THIN PRINT PAPER



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1 Some 200 DuoFormer D hybrid formers are installed worldwide, operating over the entire grade range from graphic paper, board and packaging paper to specialty paper.

2 Instruction leaflets are typical applications for thin print paper.

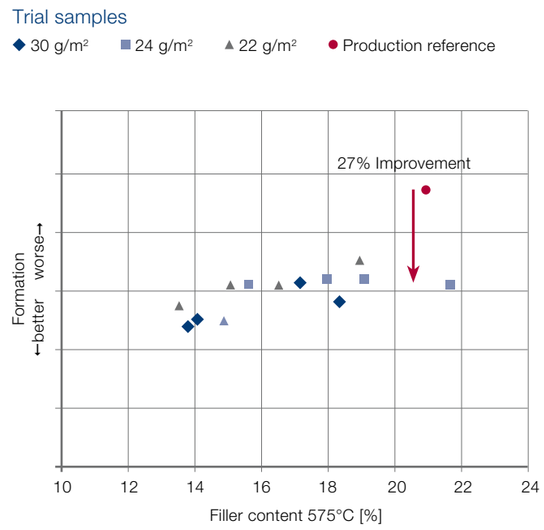
Best formation of light-weight paper with DuoFormer D

DuoFormer D provides optimum formation over a very wide operating window of basis weight and machine speed. Worldwide there are 38 installations producing paper with a basis weight of less than 45 g/m².

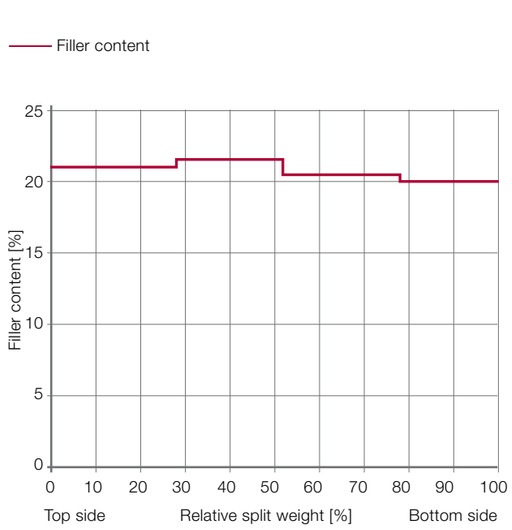
What are the limitations of use of the DuoFormer D and what quality can be achieved within the parameters of the operating window? These were the questions posed by a customer within the framework of a project for thin print paper. The customer's main objectives were improvement of formation and an increase in dewatering capacity. Another project goal was to produce light-weight paper with a basis weight of 22 g/m², a filler content of 19% and at a speed of 1,000 m/min. For this, trials were performed on the VPM 5 pilot machine in Ravensburg, Germany. The pre-dewatering section was configured to replicate the customer's planned system in terms of length and equipment. The fabrics were also specifically selected for this test. In order to optimize filler retention, a three-component retention system was used. In the process, various dosing points and additive quantities were tested so as to optimize the required formation with its corresponding filler content.

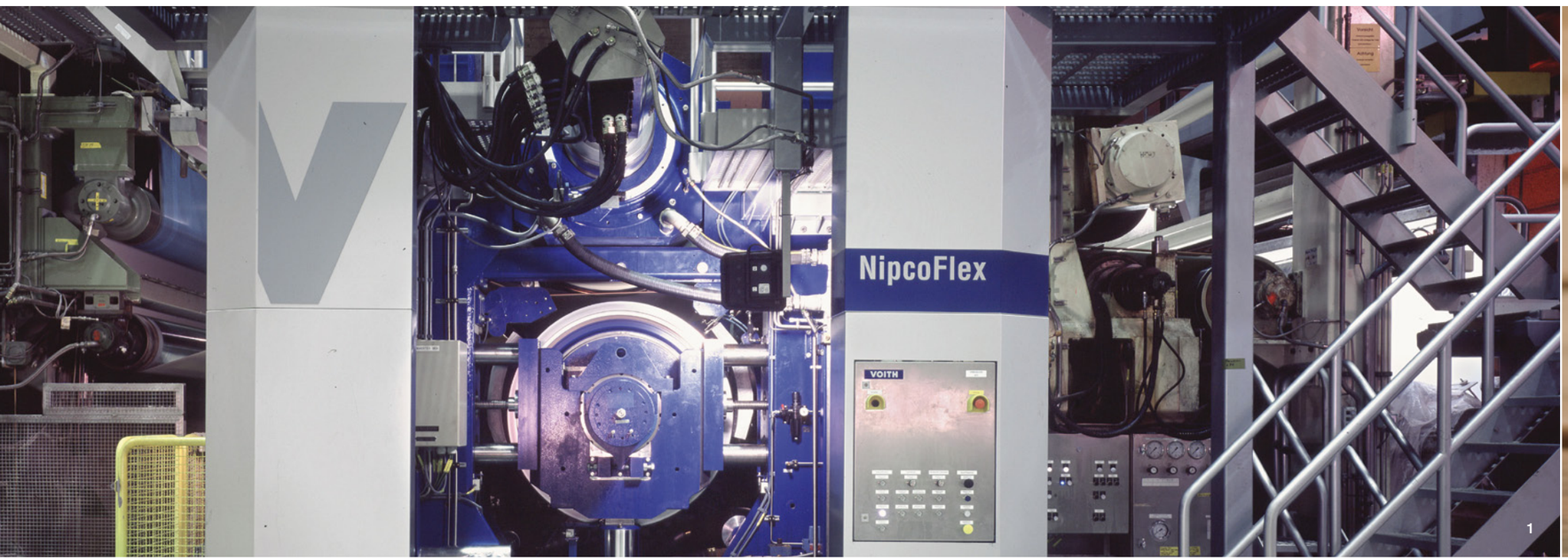
Very good formation was achieved: the formation index of trial samples with DuoFormer D was 27% better than the formation of production samples produced on the Fourdrinier wire. Both the opacity and the porosity were within the desired range. In addition, the amount of pinholes was clearly lower than in the production sample. The test results convinced our customer and led to two further installations of DuoFormer D for production of low basis weight thin print paper with filler content up to 20%. More than 200 reference installations for the DuoFormer D are in operation. In view of the proven benefits Voith expects an increasing number of installations on specialty paper grades. //

Test results thin print paper with DuoFormer D



Test results filler twosidedness in z-direction





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1 The NipcoFlex shoe calender enables the production of flexible packaging paper at noticeably higher speed.

2 Flexible packaging papers are used for a variety of applications.

Higher production speed for flexible packaging paper

Flexible packaging is the fastest growing segment within the packaging market and flexible packaging papers play an important role. New calendering technologies using a shoe calender enable a significantly higher production speed.

In the packaging industry “flexible packaging” or simply “FlexPack” stands for non-rigid packaging solutions for unlimited applications made from a variety of packaging materials. Of these, paper-based flexible packaging is one of the most important and widely-used. Wrappings, bags or pouches: paper based flexible packaging is part of our daily life. Depending on the final application the base paper can either be coated, metallized or laminated, or the paper can be used as a machine-finished single-side smooth grade.

Packaging as a marketing tool

Besides protection and transportation the key role of FlexPack is marketing. Articles are promoted on the basis of the visual impression conveyed by the package, so printability is a key quality characteristic.

That’s why an essential quality feature of FlexPack paper is its single-side smoothness and uniformly glossy surface to meet the high requirements for printability. Common machine concepts for production of FlexPack paper include either a MG cylinder, which limits speed and production, or a multinip calender, which achieves smoothness and gloss but at the expense of bulk, stiffness and two sidedness.

Shoe calendering for speed and quality

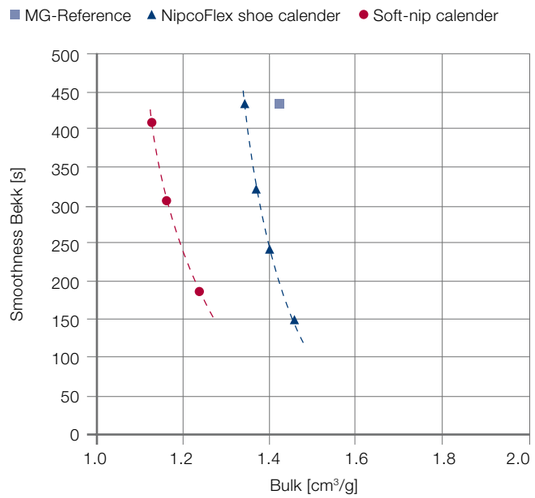
When replacing the MG cylinder with a conventional dryer section and a shoe calender, it will be possible to produce FlexPack paper without speed limitations. Due to the long dwell time of the web in the shoe nip at high temperatures similar smoothness and gloss values are achieved with NipcoFlex shoe calender as with a MG cylinder. Bulk and stiffness are on a comparable level, too. Shoe calendering offers significant advantages compared to calendering with multiple soft nips. The calendered side has excellent visual appearance without gloss mottling. The back side remains mainly uncalendered, keeping the roughness two sidedness on a high level.

Optimum concept for rebuilds at low specific costs

A particular advantage of this machine concept is the position of the NipcoFlex calender at the end of the paper machine. The work involved to install a shoe calender in this position is relatively limited, which keeps investment costs low and makes this concept an excellent rebuild solution for repositioning of existing paper machines. In addition the comparison of operating costs shows that the specific costs per ton of paper are lower for a high speed machine with NipcoFlex shoe calender compared to conventional concepts. //

Trial results

With NipcoFlex shoe calender and soft-nip calender




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1-4 MG papers accompany our everyday life.

Economical machine concept for light-weight MG paper grades

The NipcoFlex T shoe press has proved its high dewatering potential in the production of MG paper. This machine concept is also economically very attractive.

We use it every day – light-weight MG paper – whether in the form of a grocery bag, flower tissue or shoe wrapping paper. The uses for this paper are as varied as the machine concepts for its production.

A common feature of operating machine concepts is sheet formation on a Fourdrinier. Also standard is the MG cylinder with a diameter of 4-6 m and a gas-heated or steam-heated hood. The production capacity of a MG machine is limited above all by the dry content of the web after pressing against the cylinder surface, and this is determined by the MG diameter, steam pressure and hood temperature. So we need to ask, which press concept can achieve both high dry contents as well as the best possible runability with light-weight MG paper?

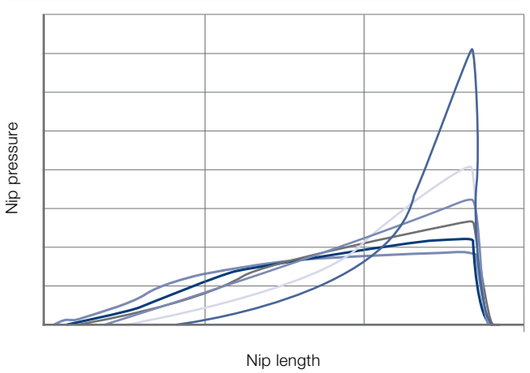
Increasing dry content and runability

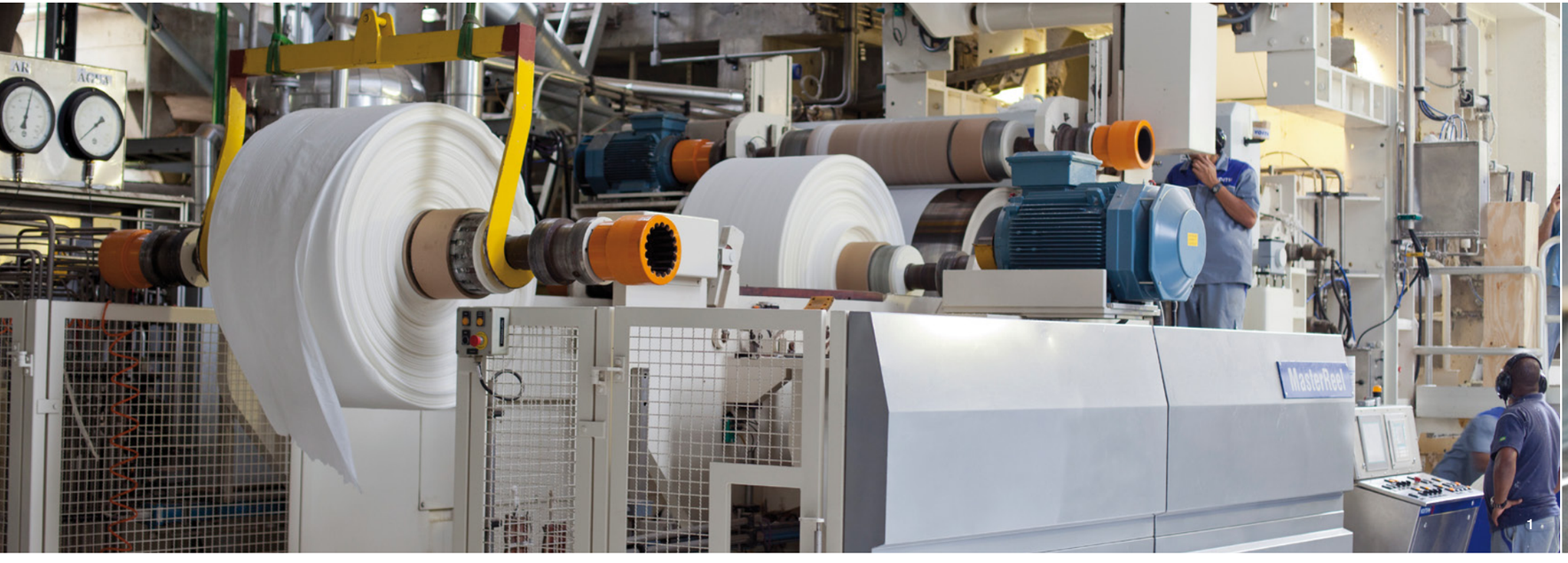
Due to its expertise and know-how as a process supplier for all paper grades, Voith also has a wealth of experience in tissue paper production. It has been established that tissue machines with a NipcoFlex T shoe press as press roll against the Yankee cylinder can achieve high dry contents at comparatively low press loads.

With this in mind, extensive tests were performed on the pilot machine at the Voith Tissue Innovation Center in São Paulo, Brazil. The aim was not only to determine the dry content achievable with a NipcoFlex T press according to the basis weight and refining, but also to investigate the suitability and operating window of a Crescent former for production of MG paper grades. During the trials MG paper was produced in the basis weight range 15 to 55 g/m² at speeds up to 1,000 m/min from a mixture of bleached long- and short-fiber pulp and at freeness levels from 30 to 50 SR. The Crescent former achieved impressive formation, even at maximum basis weight.

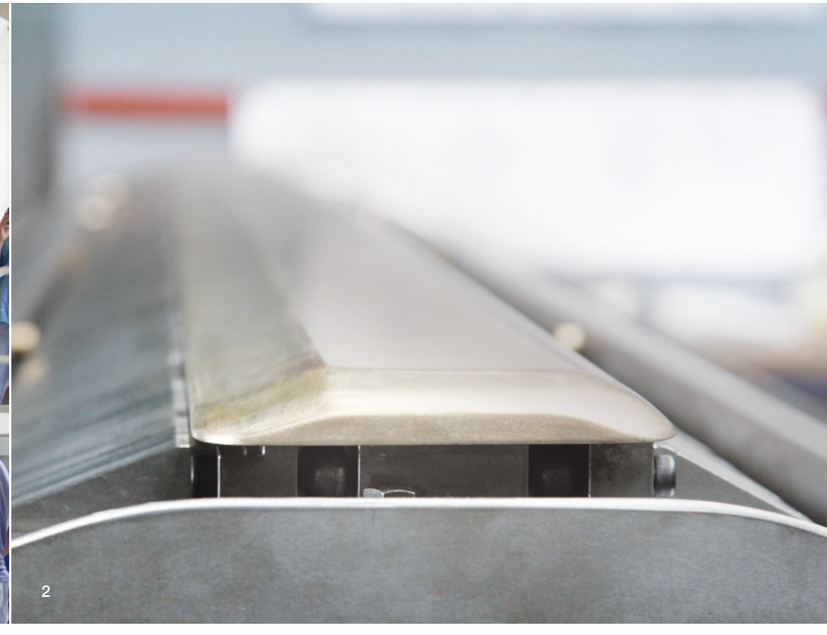
Thanks to the ability to adjust the pressure profile by tilting the press shoe, the dry contents after the NipcoFlex T press exceeded expectations, especially at basis weights up to 35 g/m². With freeness of 30 SR and press loads of approximately 100 N/mm, dry contents above 45% were achieved with the NipcoFlex T shoe press, and even at 50 SR the dry content reached 40%. There is still potential for noticeably higher dry contents with a well-conditioned press felt optimized for MG production. ▷

Adjustable pressure profiles with NipcoFlex T by shoe tilt





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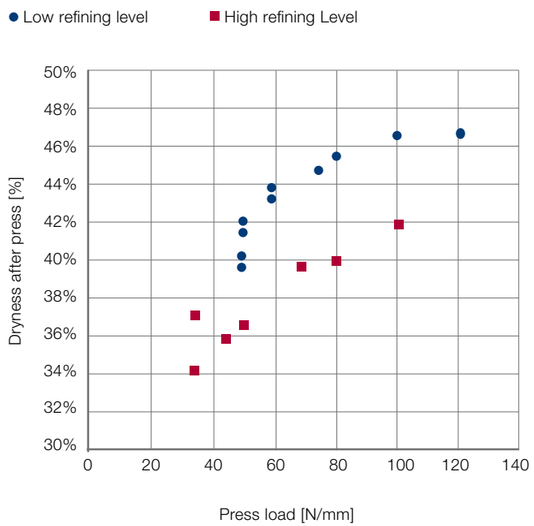
1 Pilot machine at the Tissue Innovation Center in São Paulo, Brazil.

2 NipcoFlex T press shoe

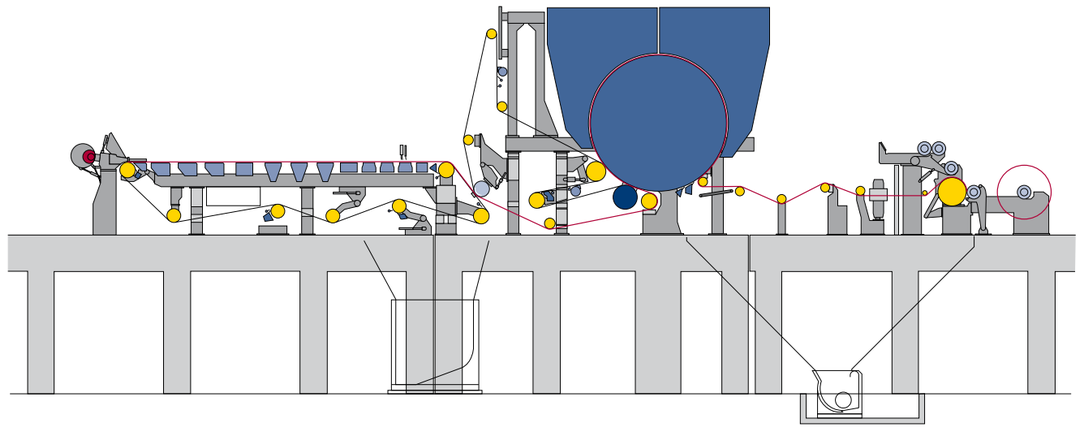
▷ **Low investment and operating costs**

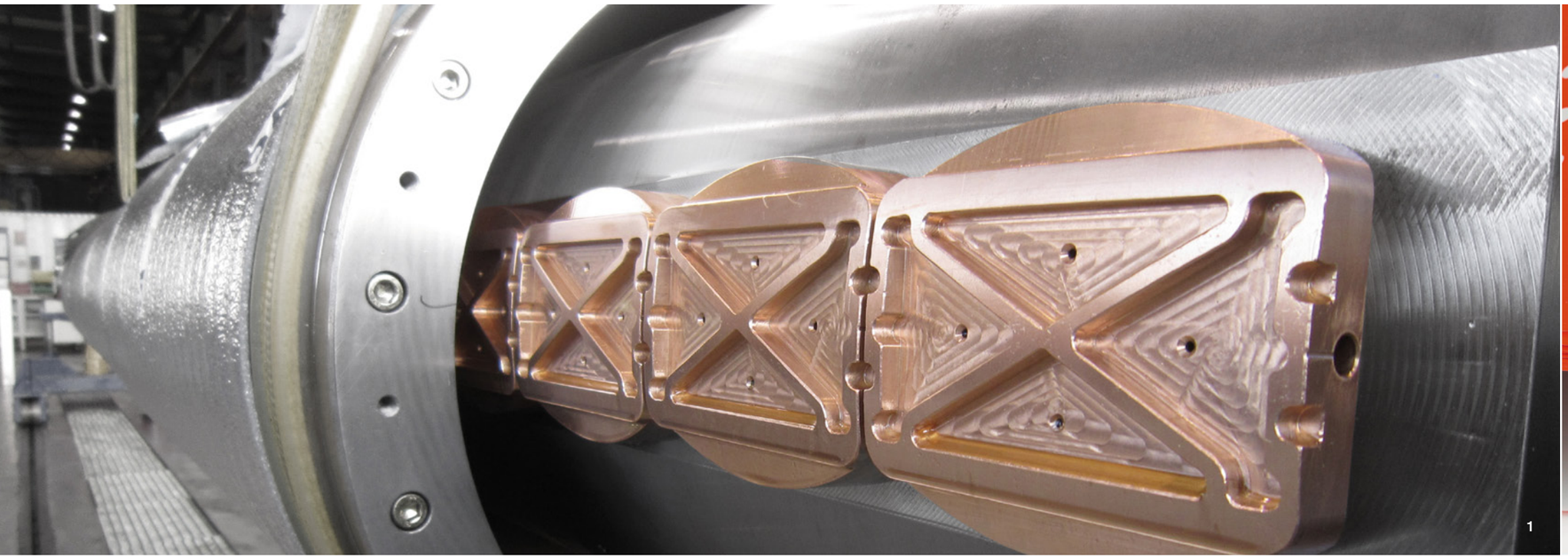
These results show that MG paper in a basis weight range of 13 to approximately 30 g/m² can be successfully produced with a Crescent former concept, provided the felt and web run are correspondingly adjusted. A wider basis weight range up to 50 g/m² and higher freeness levels require a separate sheet to be formed on the Fourdrinier. The NipcoFlex T has also proven its high dewatering potential as a press roll against a MG cylinder in the production of MG paper. For best smoothness and gloss values, a second press nip against the MG cylinder is recommended, optionally with its own felt run. Along with the proven MG machine concept with a Single NipcoFlex press such as the Steti PM 6 for a wide basis weight range of 23 to 90 g/m², the concept with NipcoFlex T press against MG cylinder is an optimal technological and economical solution, in particular, for the low basis weight range of 13 to 50 g/m², not just technologically but also economically. Along with significantly lower investment costs, the operating costs can also be noticeably reduced with this concept. //

Results MG paper trials



Machine concept for light-weight MG paper grades





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1 NipcoFullFlex roll loading pistons.

2 High uniformity in CD during production is required for uniform quality characteristics of the paper produced.

Flexibility under all conditions – NipcoFullFlex roll

Nipco rolls are well established in the paper industry and have been used for a number of years in demanding applications such as presses, calenders and supercalenders.

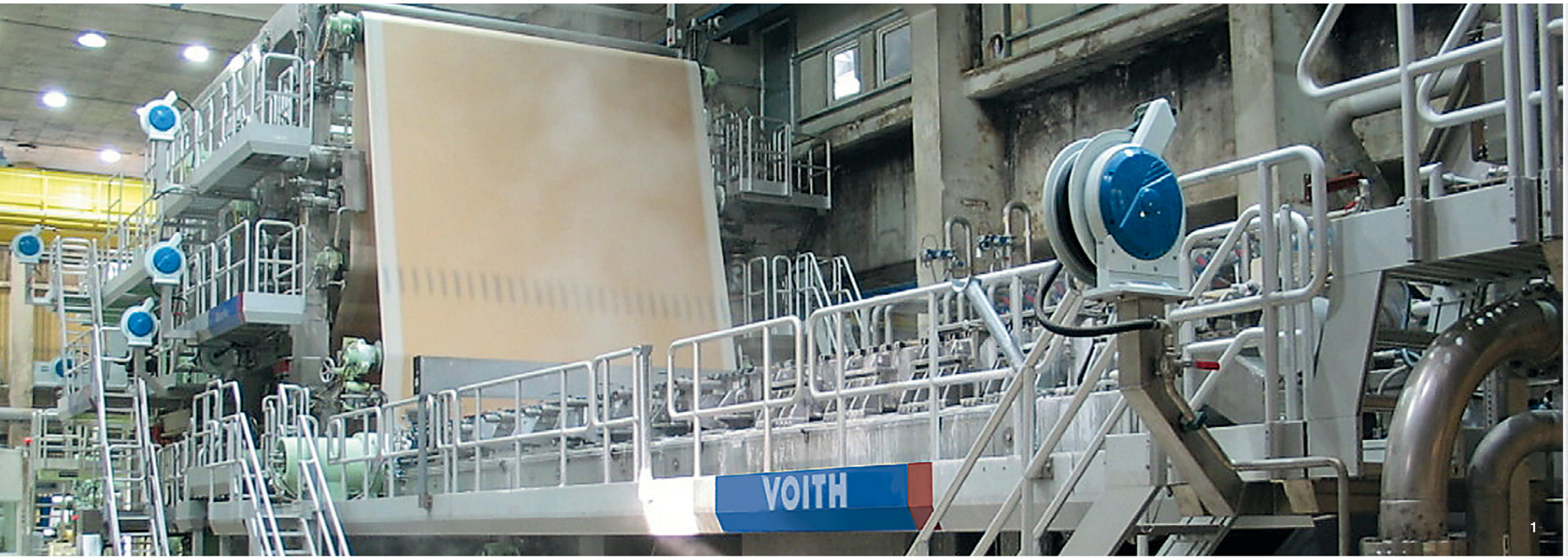
Nipco rolls are used to obtain uniform load distribution in the nip, compensating for deflection of the mating roll. The NipcoFullFlex roll is a new member of the Nipco roll family. With this roll Voith provides an efficient means for the paper maker always to operate the press against the MG cylinder in the most beneficial manner, resulting in optimum paper web moisture profiles.

Nipco rolls are characterized by a rotating roll shell which is supported internally over the whole width by hydraulic pistons which are housed in a static yoke. Hydrostatic lubrication is provided between the rotating shell and the supporting pistons thus ensuring reliable operation with low friction. The pistons are bundled in various zones. The line load in the nip and the load curve are adjusted by controlling the oil pressure to the pistons. The Nipco rolls are self-loading, which means that the nip can be opened and closed without external loading elements.

While pressing against a MG cylinder, the shape of the cylinder surface varies during paper production because of different steam pressures applied. Variation in steam pressure is required, because of different grades or changing press felt properties over their lifetime. Compared with a press roll a MG cylinder is quite elastic across the face length, but very stiff at the edges, and this results in a complex deflection when forming a press nip with a mating roll. Previously, the technical solution was to use a conventional press roll with an appropriate crowning in order to achieve a uniform nip load in the cross direction. Unfortunately, the crowning applied is applicable to a specific steam pressure and press load. Different settings always result in pressure deviations and uneven moisture over the width.

The new NipcoFullFlex roll was developed to overcome these deficiencies. The idea was to use a shell made from fiber reinforced synthetic material instead of a steel or cast iron shell. The nature of this material means it is possible to design the elasticity of the roll according to the requirements of the specific application.

As this material shows high elasticity, the shell can easily follow the deflection of the MG cylinder surface. In combination with the much lower mass excellent operational results are guaranteed, especially in terms of press load uniformity and very low vibration level. The first commercial installation of the new NipcoFullFlex roll will be as press roll against a MG cylinder in a new MG paper machine. NipcoFullFlex technology has already been specified for various other applications in the paper machine as well. //



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1 Excellent operational results of the press concept on Mondi Group's Steti PM 6.

2 Paper bags for candy are produced from MG paper.

From Vision to Reality – New press concept for MG Paper

On a MG machine the whole drying, or at least a substantial part of it, takes place on the MG cylinder. The production capacity of the MG machine is therefore defined by the evaporation capacity of this section.

The typical press concept for MG machines is a double felted suction press in front of the MG cylinder. The disadvantage of a double felted nip is the loss of dryness due to rewetting, especially for light-weight grades, since the sheet stays in contact with the top felt after the press. The advantage of this concept is the closed web run to the MG cylinder with no open draws. This reduces the risk of web breaks, especially at low basis weights. The task for the new press concept therefore was to avoid rewetting and to minimize the risk of web breaks by using a closed web run. On the basis of excellent operating results on graphic grades, the idea was to install the Single NipcoFlex shoe press in a MG machine and to replace the bottom felt with a transfer belt. The web is separated from the top felt directly after the nip and is transferred by the belt to the 2nd pick-up position.

Pilot trials confirm good runability

Pilot trials were carried out on the VPM 5 pilot paper machine in Ravensburg, Germany, in order to verify the anticipated advantage in post-press dryness compared with the double felted concept. Two different press configurations were tested: a Single NipcoFlex press with transfer belt in bottom position and for the second series, a bottom felt was installed instead of the transfer belt. The trial results showed excellent runability and confirmed the expected advantages in dryness. The concept with the transfer belt showed a significant higher dryness for a basis weight of 30 g/m². At press loads from 800 to 1,000 kN/m the advantage in dryness for the concept with transfer belt was 4 to 6% compared with the double felted press.

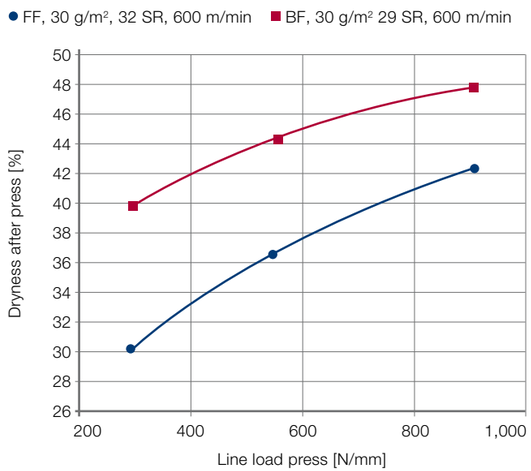
This advantage diminishes for the higher basis weights, however. For a basis weight of 90 g/m², both concepts achieved the same high dryness level at maximum press load. So the innovative new press concept with NipcoFlex and transfer belt has the greatest impact on dryness when applied to typical MG grades with basis weights from 30 to 70 g/m². Other important quality aspects are roughness and densification. The contact of the paper with the transfer belt results in a better smoothness value. The low roughness level also ensures good smoothness levels after the MG cylinder. The densification of the sheet at the high line loads in the shoe press resulted in low porosity.

20% higher production rate possible

The trial results proved convincing for Mondi Group and the new press concept was implemented with excellent operational results on Steti PM 6 in the Czech Republic. Approximately 5% higher dryness could be achieved compared with conventional double felted press configurations which means 20% higher production rate on the same energy consumption used for operation of the MG cylinder. //

Dryness vs. line load 30 g/m² Single NipcoFlex press

Furnish: 80% LF – 20% SF – 32± 2° SR – WRV125 ±3%



MG PAPER



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1 High gloss and smoothness values are achieved due to the contact of one paper side with the MG cylinder.

2 Medical paper belongs also to the MG paper grades.

Most modern MG paper machine will startup in Asia

Four years after the start-up of the most efficient Voith MG paper machine in Europe at the Mondi Group's mill in Steti, Czech Republic, Voith will install another ultra-modern production line for MG paper in the spring of 2014 in Asia.

The new paper machine will produce single-side smooth paper in a basis weight range of 20-80 g/m², with a design speed of 800 m/min and a working width at the reel of 5,130 mm.

MG paper is suitable for a wide range of applications, from flexible packaging and labels to various technical papers. The contact of one paper side with the MG cylinder gives high gloss and smoothness values while retaining high bulk. MG paper represents approximately 50% of global specialty paper production, and enjoys high growth rates. New capacity is being created and efficient production facilities are being installed, particularly in the Asian region.

The most modern paper machine for MG paper will soon go into operation in Asia. Voith is supplying the complete Process Line Package (PLP) that includes the entire production line with pulp feed, stock preparation, wet end process, paper machine, winder and all auxiliaries. In addition, Voith's delivery includes all tanks and chests, process pipes and other accessories as well as the entire detail engineering. With PLP Voith assumes overall responsibility for the project as general contractor through delivery of the complete system. Interfaces are thus reduced and smooth handling of the project is ensured.

Highest dry content with excellent runability

The new production line is equipped with a Single NipcoFlex press. The excellent track record of this concept on PM 6 at Mondi Group's Steti mill was decisive in this respect. The concept consists of a NipcoFlex press with a felt in the top position and a transfer belt in bottom position. With this configuration, high dryness values are achieved with minimal rewetting, particularly at low basis weights. The closed web run provides for excellent runability.

Optimal CD profiles due to NipcoFullFlex roll

The innovative NipcoFullFlex roll is used as a press roll at the MG cylinder. The Nipco roll, which has been known and trusted in the paper industry for decades, has now been further developed with a roll shell made from fibre reinforced synthetic material . The enormous flexibility of the roll shell allows ideal line load distribution at the MG cylinder over the width of the paper web and the entire line force range, regardless of paper grade and production conditions. The short-wave correction behavior ensures optimal CD moisture profiles. The combination of Single NipcoFlex press and NipcoFullFlex roll offers the most efficient production concept for high tonnages of the best paper qualities. ▷



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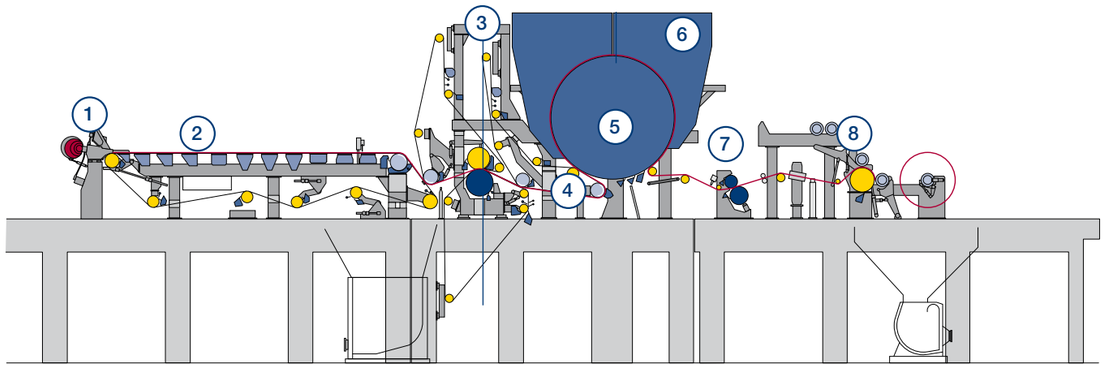
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1-3 MG paper represents a wide range of applications, from flexible packaging and labels to various technical papers.

Machine concept of the new production line



Scope of supply

1 MasterJet Pro headbox with ModuleJet
2 Fourdrinier wire with DuoShake
3 Single NipcoFlex press
4 NipcoFullFlex press roll
5 MG cylinder
6 Steam-heated high efficiency hood
7 EcoSoft calender
8 MasterReel

Furthermore

- 2 bale dewiring and conveyor lines with downstream fresh fiber pulper
- Short and long fiber refining
- Advanced wet end process
- Water systems
- Broke pulper and broke preparation
- All vats, tanks, chests and pipes
- OnQ ModuleSteam steam box with OnQ Profilmatic
- Prevo threading system
- Steam-heated high efficiency hood
- Steam and condensate system
- Mechanical drive
- Central lubrication systems
- Vacuum system
- Paper machine clothing
- Automation with MCS and all field instrumentation



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1+2 Doubled production speed and improved product quality on Heidenau PM 4 for non-woven wallpapers.

Heidenau PM 4
The success story continues

Glatfelter Dresden GmbH in Heidenau, Germany, produces high-quality non-woven wall-cover base on PM 4. The expectations of Voith were high: the production speed of the old PM 4 had to be doubled at a reasonable investment cost and with improved product quality.

Based on its positive experience of collaborating on previous rebuild projects on Heidenau PM 4, which have already led to an increase in production speed from the original 300 m/min to 500 m/min, Glatfelter Dresden commissioned Voith to undertake two additional audits. The aims of these audits were further optimization and modernization of the machine and an increase in production speed to 600 m/min. For the audits, Voith made its experts from all fields available to Glatfelter Dresden, whose exacting requirements were met thanks to the integrated solutions proposed. Reliable budget figures were provided for all the rebuild measures suggested by the machine audits, which allowed Glatfelter Dresden to carry out an accurate ROI calculation of the recommended measures.

The outcome of these audits was a set of tailored rebuild suggestions which can be implemented step by step. A selection of the recommendations from the audits is presented below.

Increase in headbox flows

One rebuild suggestion was a cost efficient increase in headbox flow. This had become a limiting factor due to the constant increase in production capacity relative to the maximum permissible throughputs. By increasing the stock consistency, the maximum throughput could have been kept nearly constant, but the resulting decline in formation would have been unacceptable. In order to increase the maximum flow without exceeding the hydraulic limits and maximum permissible pressure losses, the existing MasterJet F/L headbox at the bottom wire was rebuilt. With a new flow header and adaptation of the diffuser inserts, the maximum flow of the bottom wire headbox was increased by around 25%.

Video analysis covers improvement potential

Using a camera and high-performance stroboscope, video analysis is carried out which identifies the improvement potential in operating processes that cannot be followed with the naked eye. One area of analysis on Heidenau PM 4 was the cutting of the edge trims in the wire section and at the pick-up position. This analysis showed that the edge trims were inadequately cut and the pick-up separation was not completely ensured. In the following sections, this also leads to deposits in the edge area and thus to a decrease in runability. In addition, the danger of the trim running with the pick-up felt also increases. The solution in this case was a change in the setting of the edge squirt nozzles and installation of a TrimGuard edge trim guiding unit within the bottom wire across from the pick-up roll.

Maximum heat energy in a limited space

Voith has been carrying out rebuild measures on PM 4 over the past few years, continuously expanding or replacing the contactless drying unit after the coating units. To increase the production speed to 600 m/min, the existing MCB dryer was replaced by an extended variant and the operating temperature increased. In addition, the existing infrared dryer after the second application unit was replaced by a modern insulated qDry IR system with V6 radiators. Later expansion to V10 radiators is possible. This rebuild measure connects all the contactless drying equipment to achieve excellent system efficiency despite very high energy densities. Contactless drying on Heidenau PM 4 has thus been upgraded to a qDry Pro system. With a qDry Pro system, the hot exhaust air of the two infrared dryers is fed directly into the circulation air system of the MCB dryers and thus substantially reduces the necessary heating energy of the combustion chamber. The unique insulation of the new IR system eliminates the effective energy loss to the atmosphere and maximizes heat recovery for the air dryer.

Vibration analysis minimizes risks

An important module of the machine audit was the vibration analysis of the production line. This allows the mechanical ▷





1 Heidenau PM 4 produces high-quality non-woven wallcover base for wallpapers.
2 Glatfelter Dresden GmbH in Heidenau, Germany.

▷ system to be optimally adapted to future requirements, and risks to be minimized. The experimental condition analysis consisted of two parts: first, the vibrations were measured during production at 500 m/min, and secondly, the natural frequency was determined by means of bump tests during a machine shutdown.

After this vibration analysis, specific rebuild recommendations were proposed to Glatfelter Dresden. Vibration measurement revealed felt barring in the press section, and installation of felt shifting units on the two top press felts was recommended. Furthermore, rebalancing of paper rolls and felt roll replacement was recommended on the basis of this analysis. Another recommendation was dynamic rebalancing of the MG cylinder for the new target speed and overhaul of the mechanical drive.

Another milestone reached

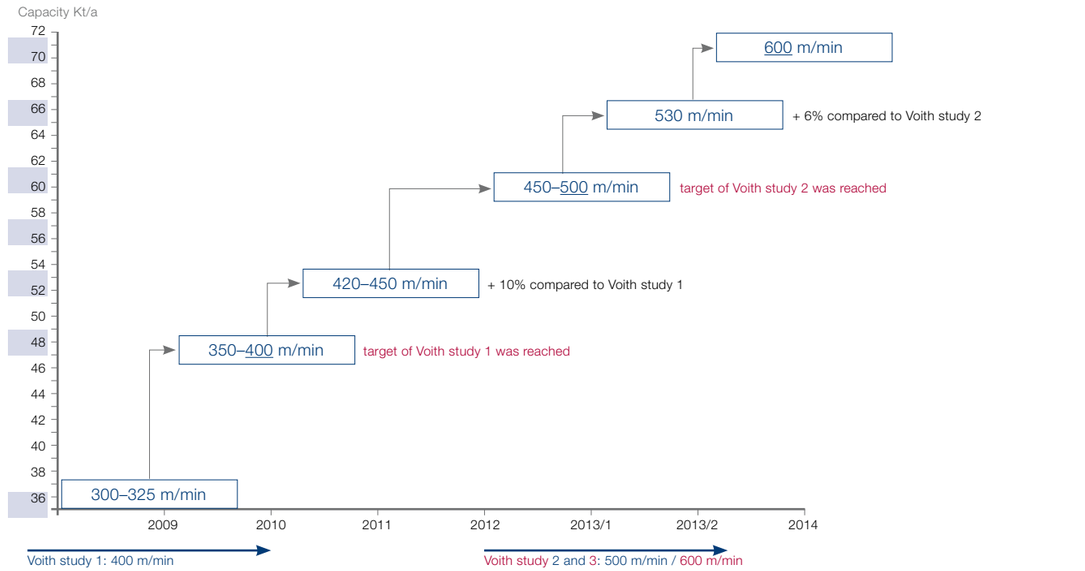
Heidenau PM 4 was optimized not only in terms of increased production speed, but there mechanical engineering improvements were also undertaken. For example, the run-out wire section was converted to a modern cantilever design and the dryer section was upgraded to direct drives. So from a mechanical engineering point of view, the whole PM 4 was transformed into an efficient modern paper machine. The first rebuild step was taken in the summer of 2013, while the second step is planned for 2014. The doubling of output to 70,000 metric tons per year will represent a continuation of the success story that is Glatfelter Dresden, and will be another milestone in the mill's history. //



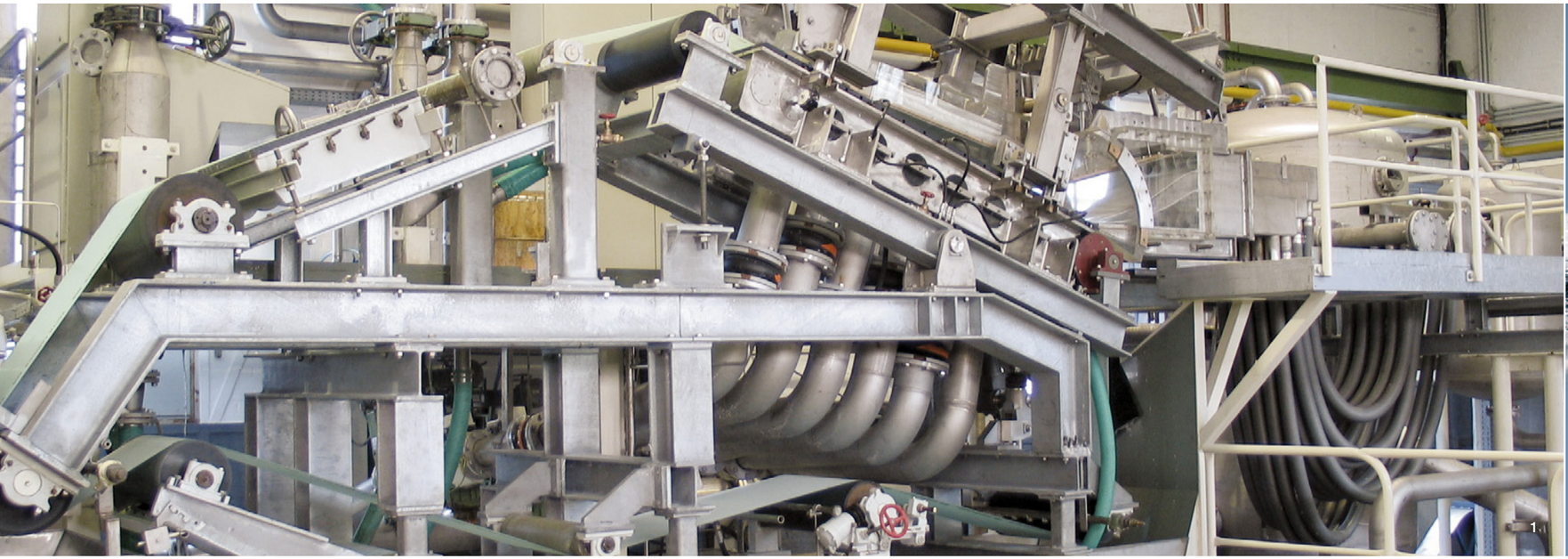
„The Voith experts developed PM 4 in Heidenau together with our team to a recognized specialty paper machine for non-woven wallpaper. The respective goals for performance and quality have been achieved in several rebuild stages. Voith was also a reliable partner in solving difficult technical and technological tasks."

Dr. Ulrich Paris,
Business Development Manager at Glatfelter Dresden GmbH

Increase in effectiveness non-woven wallcover base PM 4



HYDROFORMER



1



2

1 Tests on the inclined wire are possible on the HydroFormer pilot plant in Düren, Germany, under production conditions.

2 Filter papers for coffee pads are produced with the wet laid non-wovens process.

HydroFormer facilitates unique paper characteristics

With the multilayer HydroFormer, two- or three-layer long-fiber paper or non-woven material can be produced with one headbox.

The inclined wire headbox is provided with either two or three feed systems, consisting of a manifold and a turbulence block. The inflowing suspensions are separated after the turbulence block with flexible lamellas just before the paper forming zone.

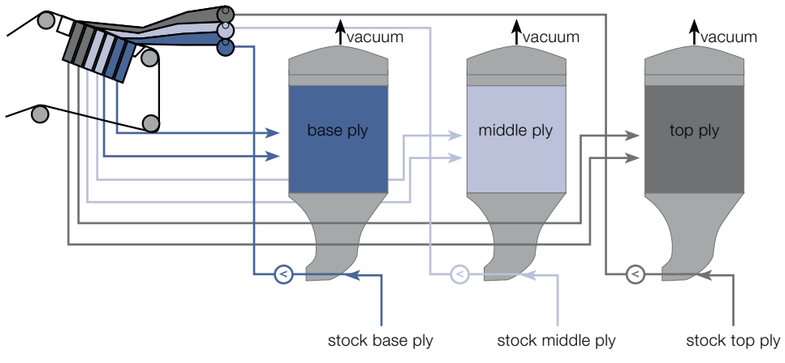
The inflow after the lamellas, comprising two or three layers, is subsequently dewatered in the paper forming zone. The fibers contained in the suspensions are then deposited during the process, so that first the bottom layer, then the middle layer and finally the top layer fibers are formed at the end of the headbox.

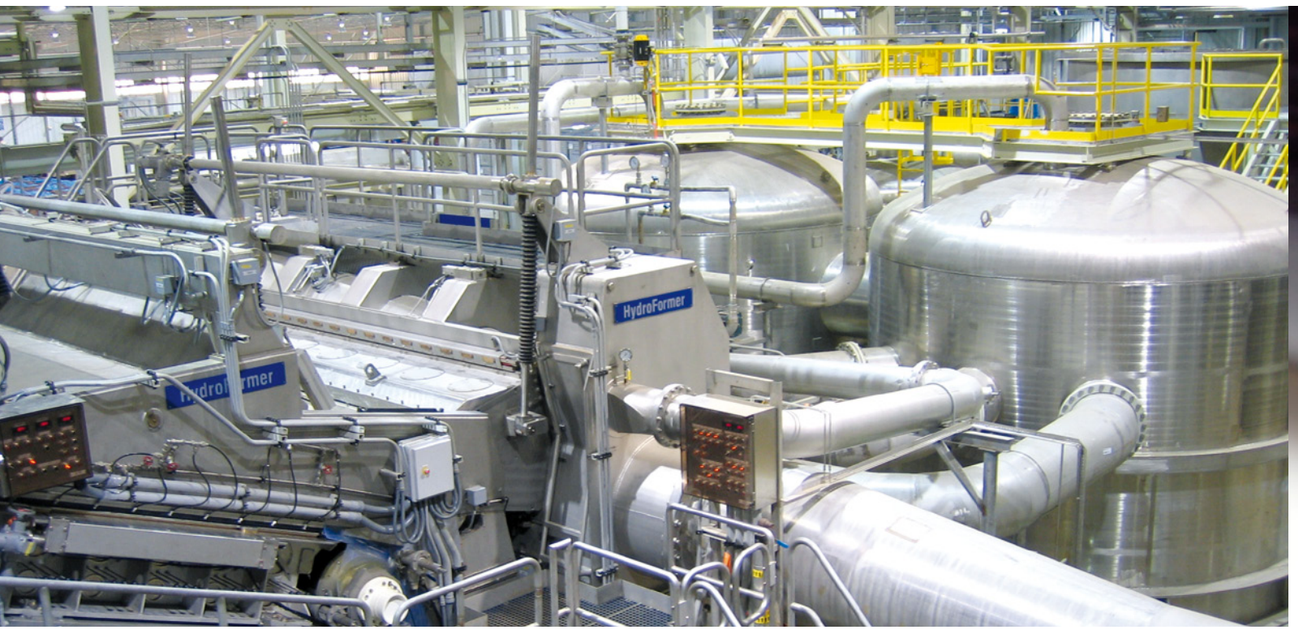
Due to the various possibilities for mixing fibers in the individual layers, products that offer unique new paper and non-wovens characteristics can be formed using a multi-layer HydroFormer. Promising applications include paper and non-wovens for the automobile industry and cleaning cloths.

Multilayer HydroFormers are used for following products:

- Heat-sealable tea bag and coffee pad paper (dual-layer)
- Overlay paper (triple-layer)
- Glass non-wovens (dual-layer)
- Cloths (dual-layer)
- Wallpaper non-wovens (dual-layer) //

HydroFormer M3





HydroFormer convinces in glass fiber mat production

Voith HydroFormers are inclined wire formers which enable a homogenous formation of long fibers with very low stock consistencies.

Long-fiber specialty papers account for most of the output from Voith HydroFormers, although another area of application is the production of wet lay non-wovens with a high share of mineral fibers. This includes glass mats, which are produced from 6-40 mm long glass staple fibers. The basis weight range of these products is 20-120 g/m². Up to 25% of the finished basis weight is binder. This is necessary to reach a bonding of the fibers and to obtain mat properties such as tear strength.

Johns Manville trusts in HydroFormer

Johns Manville, a Berkshire Hathaway company, is a leading manufacturer of premium quality products for construction and special applications. The company operates 11 glass mat lines worldwide which are all equipped with Voith HydroFormers. The glass mats produced are a base material for roofing, flooring and other special applications. In 1968 the first glass mat HydroFormer was delivered by Voith to Schuller GmbH, a subsidiary of Johns Manville in Wertheim, Germany. Two further inclined wire formers were delivered to Wertheim and Dettingen in 1970. In the following years more HydroFormers were installed in the US, Germany and China. In 2006 the largest glass fiber mat machine was installed at Johns Manville in Etowah, USA. A production width of 5.3 m, production speed of 400 m/min and capacity of 100,000 tons per year makes this the most powerful wet laid non-wovens machine in the world. In the last two years, two 30-year-old, open HydroFormers have been replaced by modern hydraulic, closed HydroFormers. Both new HydroFormers have started-up successfully. //



Excellent formation for high-quality tea bag and coffee filter papers

The production of long fiber specialty papers tor tea bags and coffee pads is a part of the success story of Glatfelter in Gernsbach. The HydroFormer is closely associated with this success.

In the sixties, the first Voith HydroFormer inclined wire machine was delivered to Papierfabrik Schoeller Hoesch in Gernsbach, Germany, which was taken over by Glatfelter in 1998. In the years that followed, the paper making facilities in Gernsbach grew continuously. Three Fourdrinier paper machines, which produced thin printing paper, were modified to inclined wire machines. All the paper machines in Gernsbach have a Voith HydroFormer at their heart.

The inclined wire former is the ideal solution with which to achieve excellent formation even with extremely long fibers. With white water consistencies below 0.02% it has proved possible to form the long fibers which the mill uses, including Abaca, to a very high level of homogeneity.

Important developments of the HydroFormer have often made their successful debut at Gernsbach, thanks to a strong partnership with the customer. One example is the 3-ply HydroFormer for the production of overlay paper. On this machine, different fiber furnishes can be run through each of the three layers within the single headbox in order to produce a multiply product. This allows paper properties to be selectively controlled. Glatfelter is the only company in the world which runs 1-, 2-, and 3-ply HydroFormers. With production speeds up to 500 m/min Glatfelter produces specialty papers in the basis weight range of 9-40 g/m². Some months ago the last fourdrinier machine in Gernsbach was rebuilt to an inclined wire machine. A 1-ply HydroFormer was started-up successfully to produce tea bag papers and coffee filter papers as well as overlay and other specialized technical papers. //

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