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The Siemens logo is displayed in a bold, teal, sans-serif font. It is positioned in the upper left corner of the image, which shows a large industrial paper mill with complex machinery, metal walkways, and a large roll of paper being processed. The scene is overlaid with digital graphics, including binary code (0s and 1s) and glowing orange lines that resemble data flow or energy patterns.

**SIEMENS**

*Ingenuity for life*

Increase efficiency.  
Improve quality.  
Reduce energy consumption.

With SIPAPER – the tailored products  
and solutions for the fiber industry.

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# Maintain and improve competitiveness

Pulp and paper has been one of our most important business focal areas for more than 100 years. With the SIPAPER product family, we offer perfectly coordinated solution modules to meet today's requirements and those of the future – with advanced technology for optimal efficiency, maximum plant availability, and long-term security for your investment. This means highest quality at minimal costs, and sustainable efficiency. Develop your full potential – with SIPAPER.

## Sustainable improvement

Cost pressure, increased quality requirements, environmental regulations, lower margins, and intense competition are creating an increasingly tough environment for manufacturers and affecting the entire process chain. What you need is a concept that offers you perfectly coordinated performance modules.

SIPAPER offers you exactly this: a portfolio of precisely aligned solutions that can be precisely tailored to fit your processes. This enables you to reduce your costs and comply with strict environmental regulations, and at the same time also significantly increase the productivity, energy efficiency, and availability of your plant, thanks to our SIPAPER technology.

Whether as an individual high-performance module or in conjunction with other SIPAPER products, SIPAPER can provide exactly what you need to boost your business: a lastingly competitive solution for your processes that

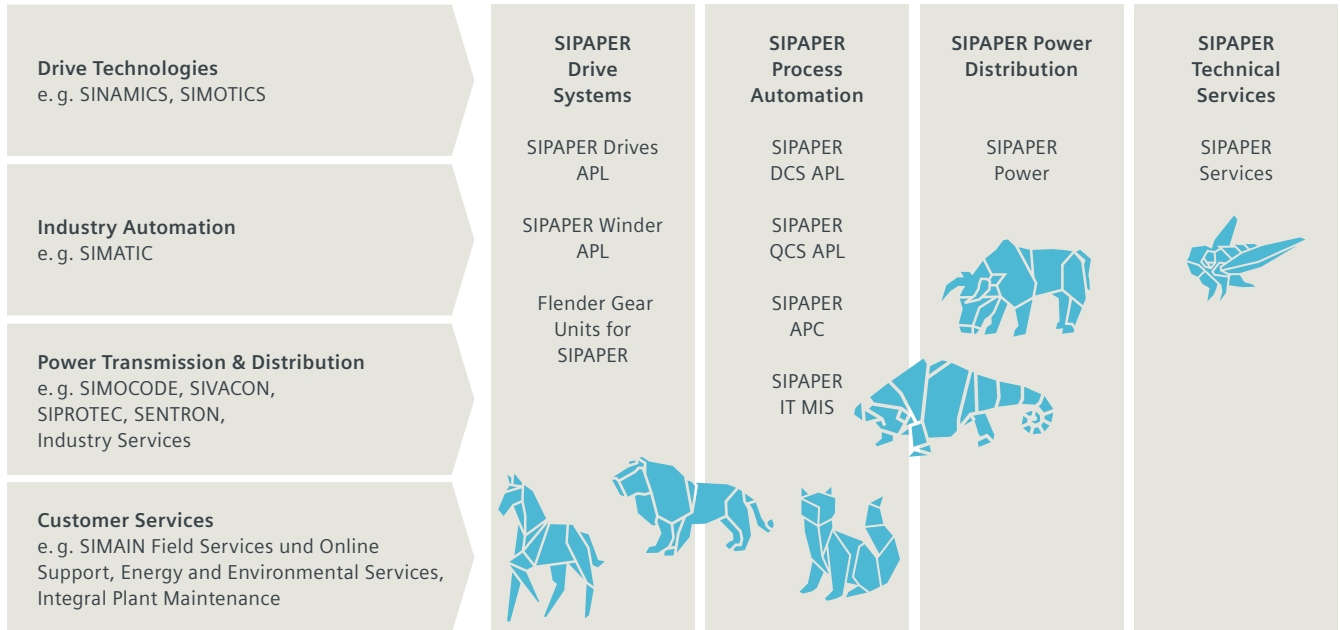
- raises your productivity
- increases your availability and minimizes downtimes
- improves the quality of your products
- reduces the number of rejects
- optimizes your energy requirement.



# The SIPAPER portfolio

## World-class products

+ perfectly coordinated, industry-specific IDS\* modules



## Integrated SIPAPER APL solutions

\* IDS = Integrated Drive Systems



### Changing demand and opportunities

Due to the rise of digital media, the need for newsprint and office paper has declined by 5 percent annually. On the other hand, demand for pulp, packing paper, and tissue paper is increasing by 7 percent a year. By-products of pulp production such as electricity, biogas, and turpentine are also becoming an economically viable market. The natural fibers used are also increasingly being utilized in the chemical and textile industries. Fibrous material is becoming the engine driving the bio-economy. This is opening up new business opportunities for the pulp and paper industry, but it also requires adaptation of industry expertise. As a long-term partner, we make all our industry expertise available to you on everything from process heat recovery, dynamic energy storage and intelligent process automation to efficient drives.

### Comprehensive digitalization solutions for the fiber industry

Digitalization offers you numerous options for ensuring your lasting competitiveness throughout the entire lifecycle of your plant. These comprise, for example, substantial cost savings when you use our COMOS engineering software for efficient planning, commissioning, service, and maintenance – including the analysis of production and machine data, which provides you with valuable information about potential quality improvements.



# New opportunities through digital solutions

**How can you remain competitive and produce faster, more flexibly, and more intelligently, even when the market is changing rapidly? The answer: With our solutions for digitalizing your production and SIPAPER. This is the key to better quality, more flexible production, systematic plant optimization, and a shorter time-to-market.**

#### Digitalized production with added value

The SIPAPER APL product family is based on SIMATIC PCS 7 and thus on a globally applicable automation standard. The integrated software solution for model-based process management and control is tailored to the pulp and paper industry and boosts quality, efficiency, and environmental compatibility in production. In addition, SIPAPER APL and COMOS Process & Automation ensure integrated process and automation technology through a common database.

#### High process quality via simulation

SIPAPER DCS APL with SIMIT simulation software increases engineering quality and accelerates commissioning and the start-up phase thanks to flexible design simulation. Quality parameters are reached faster after start-up or a change of grade. Optimized

process management also ensures lasting product improvement and helps homogenize the fibrous material.

#### Flexibility with a digital twin

Our SIPAPER Drive systems and specially developed SIPAPER Process Automation systems are ready for digitalization. You can simulate a virtual twin of your plant throughout all project phases even before commissioning based on a consistently uniform data model. This allows you to optimize, refine, and even duplicate as needed without risk.



# Ensure success through energy-efficient production

The manufacturing of paper, pulp, and fibers is energy-intensive, but it also offers enormous potential for renewable power generation, which should be exploited to the maximum extent. This reduces operating costs and simultaneously satisfies international laws and regulations concerning environmental protection and reduction of CO<sub>2</sub> emissions. SIPAPER offers you a wide range of future technologies.

## Process innovations for improved energy use

With SIPAPER you benefit from innovative technologies for the generation, conversion, and storage of energy. Many paper and pulp plants generate excess steam and electricity with their black liquor boilers, gasifiers, or reject recycling. Excess electricity can be converted to hydrogen, stored, and used in many different applications highly efficiently with our SILYZER systems. We're also further advancing heat recovery by means of high-temperature heat pumps as well as dynamic energy storage with SIESTORE lithium-ion battery installations. In this way, you can make a contribution to a decentralized power supply – and further improve your CO<sub>2</sub> footprint.

## Greater operating efficiency through energy management

With SIPAPER, Totally Integrated Power, and SIMATIC Energy Manager PRO for your energy management, you can achieve optimum transparency of your energy consumption and greater energy efficiency. Our power supply solutions can be seamlessly integrated into your process automation and building automation. The intelligent energy management system supports you in achieving your efficiency targets, for example through monitoring the current energy situation in the processes, determination of optimization and savings potentials, load control, and participation in electricity trading.



# Higher throughput with an integrated solution

Pulp and paper production is a complex system of consecutive process steps. A good example is the paper machine, which incorporates a large number of individual drives. For this, we offer a highly efficient, optimally coordinated solution through our integrated multi-motor drive, which can also be integrated perfectly into the process management.

## Integration beats interface technology

With the SIPAPER drive family, Integrated Drive Systems (IDS) covers all frequency converters, motors, couplings, and gear units from a single source of supply, for every performance class, every torque range, and all voltage specifications from a single source. All these components are perfectly coordinated and work together smoothly in the drive system. Above and beyond these standard solutions, we can also customize configurations to provide drive trains tailored to your precise needs.

## Harmony delivers better results

Integrated Drive Systems can be seamlessly incorporated into every automation environment over the entire lifecycle, thereby reducing time-to-market and time-to-profit. At the same time, you can harness the entire productivity potential of a harmo-

nized technology landscape, improve energy efficiency, and profit from reliable system performance in widely varying automation environments.

## Faster route to success

Integrated Drive Systems proves that the whole is greater than the sum of its parts. Our holistic approach enables you to drastically improve the key performance indicators at your plant. For example, you can substantially reduce migration times with the advantages of the PCS 7 for vertical integration. IDS offers you further cost advantages through simplified maintenance of the entire system, with everything from a single source. Can there be stronger arguments?

## Horizontal integration

Integrated drive portfolio: All frequency converters, motors, couplings, and gear units come from a single source. Perfectly integrated, perfect in interaction. **For all performance classes.** As a standard solution or as a totally individualized solution

You can boost the availability of your application or plant – by up to

 100%

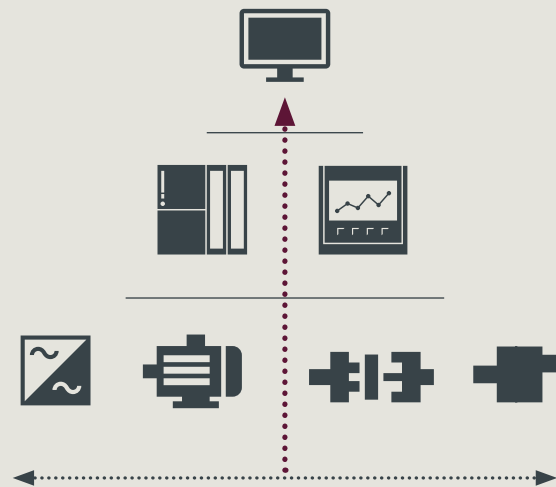


## Vertical integration

Integrated in the automation technology: from the field level, to the controller level, to the MES, thanks to PCS 7. **For every application.**

With PCS 7, you can cut your engineering time – by up to

 30%

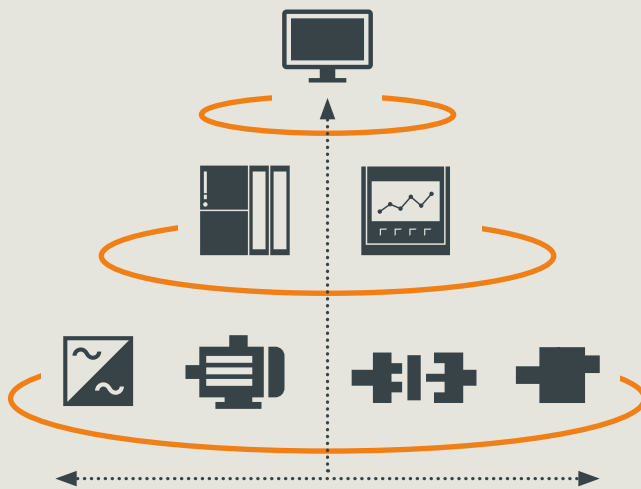


## Lifecycle integration

Integrated software and services throughout the entire lifecycle. **For more performance and maximum investment security.**

Thanks to Integrated Drive Systems, you can cut your maintenance costs – by up to

 15%





# “Highly Efficient Drive Systems Have Reduced our Power Requirements. Thanks to SIPAPER.”



## SIPAPER Drives APL – our drive is your success

Achieving consistent paper quality with continuously increasing throughput and greater diversity of grades are central challenges facing the pulp and paper industry. To meet these challenges, the functional modules of the Advanced Process Library of SIPAPER Drives APL offer open-ended, modular drive solutions. The range of applications of SIPAPER Drives APL extends from partial modernization right through to complete turnkey solutions.

Whether it's through improved automation on the basis of SIMATIC PCS 7 or through the use of more energy-efficient SINAMICS drives – with SIPAPER Drives APL, you can bring your plants up to peak performance.

## Save energy with no loss of performance

If your objective is to specifically improve the energy efficiency of your plant, SIPAPER Drives APL, with gearless drives coupled directly to the machine, provide you with a solution that also minimizes maintenance costs. The perfectly harmonized inter-operation of control system and SINAMICS frequency converters offers you other advantages as well. Not only can you better observe and monitor your processes, you can also take advantage of the control precision of modern three-phase a.c. motors.

The result: The SIPAPER Drives APL, with its industry-specific control and diagnostic functions, ensures production with maximum availability. In this way you achieve optimum control quality and significantly reduce the risk of web breaks.

## Safety for your drives in accordance with EN 1034

By means of a patent-pending procedure, SIPAPER Safety Integrated offers you the solution to meet all EN 1034 requirements without additional hardware. SIPAPER Safety Integrated is a fixed component of our proven, future-proof SIPAPER Drives APL and SIPAPER Winder APL drive solutions.



If the product quality demanded in international competition cannot be achieved with existing technology, budgets are under cost pressure, and costs for energy and raw materials are increasing, there is only one solution that makes sense: increasing the system performance with specific investments in your control technology and in modern, energy-efficient drive technology.

#### **SIPAPER Winder APL – efficiency and flexibility**

SIPAPER Winder APL is an intelligent, modular solution that offers you the opportunity to bring your finishing machines and reel slitters up to peak performance and efficiency. Thanks to highly developed technologies, the modular system offers you maximum flexibility with everything from partial modernization to complete turnkey solutions, from simple rewinders to complex reel slitters, and from long-serving, proven winders to high-end machines of the latest generation.

#### **Everything under control: for more productivity**

With our proven, perfectly coordinated components and standardized technology modules, you can also integrate higher-value control functions with minimum engineering input. And with the industry-specific control and diagnostic functions of SIPAPER Drives & Winder APL, you also benefit from high-availability paper production with optimum quality across all plant components, from the paper machine to the finishing machine and reel slitter.

SIPAPER Drives APL and SIPAPER Winder APL comply with all legal safety requirements as standard.

#### **Your advantages:**

- Energy-efficient system design optimized to prevent system perturbation
- Reliable, technologically advanced components
- Modular construction, scalable and expandable
- Highest operating reliability and availability
- Low spare parts and maintenance requirement
- Increased throughput, reduction in web breaks
- Identical software basis for paper machines, coating machines, and finishing machines
- Uniform control system for drives, power, and process control
- Proven components, optimum availability
- Global service from a single source throughout the entire lifecycle
- SIPAPER Safety Integrated – the safety solution for meeting all safety requirements in accordance with EN 1034, fixed component of SIPAPER Drives and Winder APL.



# “More Availability, Less Wear. Thanks to SIPAPER.”



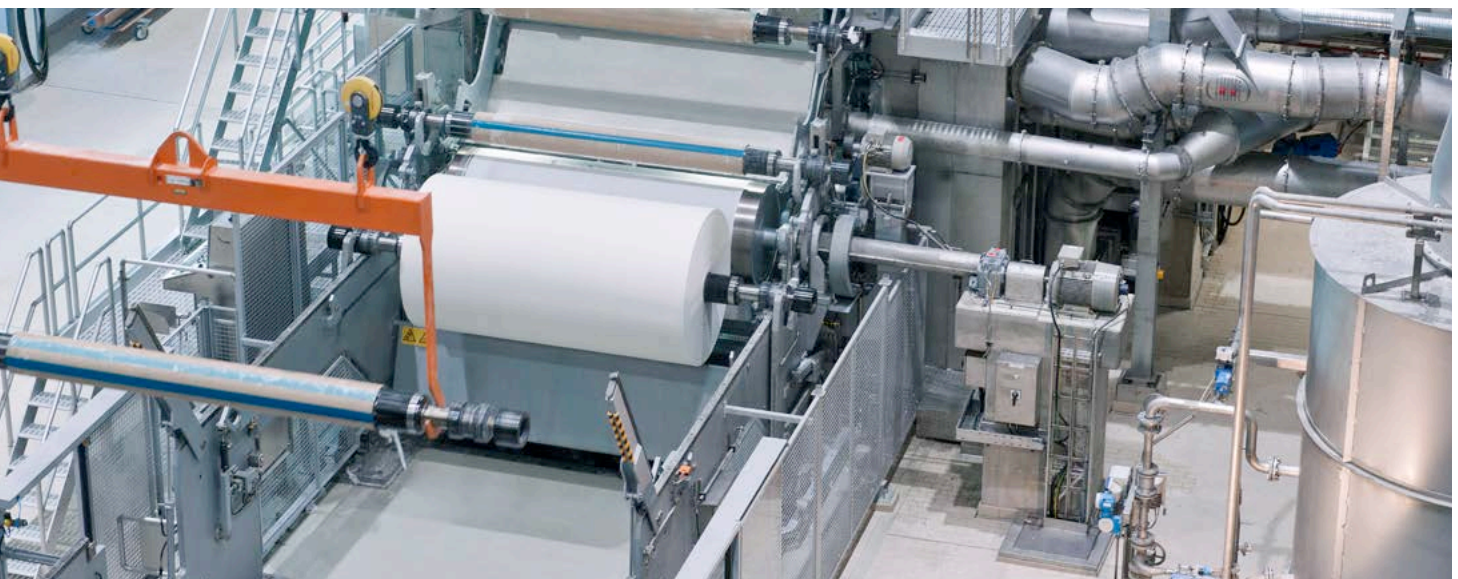
## Flender gear units for SIPAPER

The drive units used in paper production and finishing systems vary significantly regarding their size and type. This depends due in part on the plant size, but to a far greater extent on the type of paper to be produced, whether it's cardboard, newsprint, filter paper, bank note paper, or art paper. Based on decades of experience in the paper production domain, SIPAPER offers you standard and customized FLENDER gear units for every application in your pulp and paper production – from preparing the material from mechanical wood pulp, pulp, or recycled paper, to the paper machine and finishing, to the wastewater treatment plant. With experience from over six decades of designing and building more than 1,400 complete paper machine drives worldwide, we can optimally adapt our gear units to address your specific

applications. Thanks to the modular system, applications can be engineered especially quickly and cost-efficiently.

## Continuous progress

At the same time you can ensure your technical lead with Flender gear units for SIPAPER: We are continually optimizing and developing our products and solutions. For instance, with Flender gear units for SIPAPER, you benefit from low noise generation and optimized temperature characteristics – decisive criteria for comfortable operation and minimized wear. At the same time, the high degree of standardization of the modular system helps simplify your stocking of spare parts.



Costs are growing, margins are shrinking, and higher quality is demanded: To meet these challenges, you need to continually improve the productivity and quality of your production environment. That requires a strong technological foundation consisting of drives, gear units, and automation components that are intelligently linked with one another. Here Flender gear units for SIPAPER, perfectly coordinated with the other SIPAPER components, play a key role.



needs – assuming that these cannot be implemented from the standard components of our modular system.

The result is always a leading-edge drive solution with optimum power, performance and the highest availability, which is then perfectly integrated in the reliable and tested closed-loop control system of your paper machine.



#### Your advantages:

- Standard gear units that can be universally used
- Modular system as basis for developing customized gear units
- Quickly available worldwide
- High power density and reliability
- Extremely quiet operation
- Low wear and long oil service life for minimum lifecycle costs
- Highly qualified engineering based on decades of experience in the sector and related applications
- Highest quality through certified design and production processes
- IDS (Integrated Drive Systems) for perfect coordination and control
- Fast engineering without any interface risks

#### Reliability has a name

Is maximum availability one of your requirements? FLENDER drive technology is legendary for its reliability. Over 400,000 gear units around the globe have been reliably operating for decades without a problem – ensuring the highest plant and system availability and reliable, efficient production.

#### A step ahead in the market

To increase your level of competitiveness with our systems and solutions, we start every project with in-depth consulting. This is the basis for selecting the sophisticated drive technology for your production plants and systems. In addition, it provides us with the basis for developing customized gear unit solutions precisely tailored to your

*“We Optimized our Processes and Improved the Quality. Thanks to SIPAPER.”*



**SIPAPER DCS APL – transparent automation**

Integration instead of an individual solution: SIPAPER DCS APL (DCS = Decentralized Control System) is based on functional modules that have been developed specifically with and for the paper and pulp industry, supplemented by functions of the Advanced Process Library (APL). SIPAPER DCS APL combines the entire process chain of your paper factory in a single, integrated automation system. Interface problems and increased maintenance and operating costs for inconsistent individual systems are now a thing of the past. SIPAPER DCS APL offers you a scalable, uniform automation solution from the field level all the way through to the ERP level. And thanks to the easy-to-operate and open-ended system, you are assured of

lasting cost advantages – a key factor for surviving successfully against global competition.

**Your advantages:**

- Uniform automation solution for all technical systems, based on world-leading components
- Increased efficiency and competitiveness
- Future viability and investment security
- Global support throughout the entire lifecycle
- Proven components, optimum availability



Perfect integration of individual products is the special strength of the SIPAPER family. For example, when it comes to optimizing process automation and monitoring and improving the quality of the products. With DCS APL, QCS APL, and IT MIS, SIPAPER provides you with solutions that are the perfect fit for your company.

#### **SIPAPER QCS APL – the quality is spot on**

End-to-end quality management with transparent monitoring and control systems forms the basis of all modern paper production. SIPAPER QCS APL (QCS = Quality Control System) offers you exactly that. Via a reliable interface connection such as Profibus or Profinet, quality-relevant measurement data from the paper machines is recorded continuously and adjusted by activating the correct regulator control elements.

That means you can minimize variations in quality quickly and reliably and continuously optimize the paper quality. SIPAPER QCS APL is integrated in the overall process along with SIPAPER DCS APL.

#### **Your advantages:**

- Systematic quality assurance, integrated in the SIPAPER family, directly at the paper machine
- Integration in standard automation system on the basis of SIMATIC PCS 7
- Rapid elimination of variations in quality
- Not a black box philosophy
- Simplified, fast change of grade for higher output

- 3D QRS (Quality Reporting System) tool that can also be used apart from the PCS 7 systems

#### **SIPAPER IT MIS – perfectly informed**

As an open management information system, SIPAPER IT MIS (Management Information System) links the real-time environment of your automation system with your business systems. SIPAPER IT MIS monitors and controls the various different production steps in real time. Thanks to the combination of standard modules for your specific processes, SIPAPER IT MIS provides the highly flexible, scalable information management system you need for lasting success.

#### **Your advantages:**

- Transparent overview of the production process in real time – for informed decision-making
- Universal connection to all automation and ERP systems
- Fast access through archiving, display, and analysis by one system
- Standardized and uniform documentation



# “Tailor-made Process Control Means more Economic Production. Thanks to SIPAPER.”



## SIPAPER APC – maximizes your success

Increasing cost efficiency always means taking the individual requirements of a plant into account as well. That's why SIPAPER APC uses process models developed specifically for the paper industry, as well as libraries and modules proven in industrial applications (for example, for optimization, adapted loop controllers, robust control, etc.).

Your advantage: You work with an integrated software solution for the model-based open- and closed-loop control of your processes, which is individually adapted to your plant conditions. This uses software that can be easily connected to all existing process control systems. There are also two detailed solutions – SIPAPER APC DrySec and SIPAPER APC Bleach – which enable you to increase the cost efficiency and environmental compatibility of your production.

### Your advantages:

- Process optimization through cost-optimized operating points of all units
- Increased quality and homogenization of the fibrous material
- Lasting improvement of the process and higher environmental compatibility
- Proven components, optimum availability
- Global service from a single source of supply over the entire lifecycle
- Integral component of SIPAPER PCS 7, no additional hardware is necessary



## SIPAPER APC DrySec

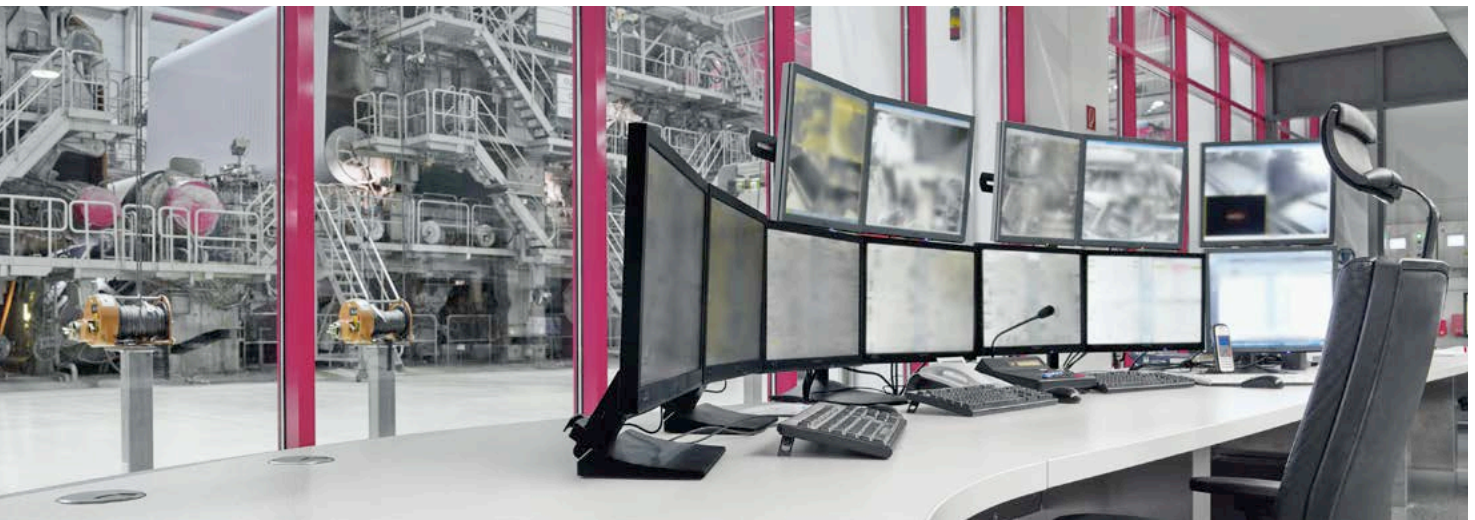
Reduce your energy consumption where it is at its highest, namely in steam generation for paper drying. SIPAPER APC DrySec reduces your steam consumption and at the same time enables you to run the dryer section in energy-saving mode. The software for this operates with calculated, optimized set points for the variables that are relevant to the drying process and compares these with the process that is running.

In practice, this means fresh steam savings of more than three percent. SIPAPER APC DrySec can of course also be connected to third-party systems and can be used as a soft sensor to compute process variables for which there is no instrumentation installed.

### Your advantages:

- Optimal use of energy
- Small investment with big benefit
- Constant optimal drying for consistent quality

The paper industry is facing major challenges: the need to manufacture high-quality products while at the same time keeping costs for raw materials, energy, and process material to a minimum. These challenges can only be met successfully if the performance of all production areas is systematically increased, for example through optimized process control with SIPAPER APC (Advanced Process Control).



#### SIPAPER APC Bleach

A dilemma for manufacturers is how to produce high-quality products with a high level of whiteness under favorable conditions, even if the quality of the raw material fluctuates. The answer is a well thought-out combination of intelligently designed control technology and optimized process management in material processing. This is precisely the area on which SIPAPER APC Bleach focuses.

The software maps the complex interrelations between processes and ensures better control of whiteness during bleaching. If different raw material qualities are used, the module uses model-predictive control (MPC)

to achieve the targeted brightness and so guarantees the required quality of the bleached fibrous material. SIPAPER APC Bleach optimizes consumption of chemicals and reduces costs.

#### Your advantages:

- Cost-optimized dosage of chemicals
- Homogenization of the fibrous material for better quality
- The targeted brightness is achieved without manual adjustment



# “Intelligent Power Distribution Gives Us the Performance We Require. Thanks to SIPAPER.”



## **SIPAPER Power – a comprehensive solution for power distribution**

SIPAPER Power performs everything – from controlling of the supply and distribution to the open- and closed-loop control of all your loads. It is a fully integrated power distribution and management system for planning and monitoring the power supply for the complete process chain of your paper factory. This also includes the power supply for black starts and emergency power operation. SIPAPER Power stands for high availability, adequate supply capacity, expandability, and scalability, based on high environmental compatibility. It goes without saying that it is also economical, saves resources, and is easy to operate.

## **Automation from specialists**

Transparency is the key to success, and that applies to your electrical power supply distribution system as well. That’s why SIPAPER Power uses an ingenious power control technology, to give you an overview of all processes of your electrical installations at all times. The system monitors the switching processes of the entire factory with smart SIMOCODE and SIPROTEC control and switch devices.

It can, for instance, detect load requirements and distribution quickly, and can reliably avoid unacceptably high load peaks. You are not linked to the central control room for this thereby, since the completely integrated SIPAPER communications network allows smooth data exchange across all supply levels. This gives you access to all relevant information at all times, exactly where you need it, including at the field level.



In the paper industry, the electrical power supply requirements are especially complex, for example in order to reliably and economically distribute electricity in the 100-MWh range to the consumer units during peak loads. SIPAPER Power allows you to safely and reliably configure and plan your factory system while providing you with leeway for further developments.



#### **Cost-optimized planning**

The starting characteristics of large units, the short-circuit characteristics of individual components, and the calculation of short-circuit currents and power – we take all these parameters into account in the design of the network. The optimal design of your switchgear and protection devices is then based on realistic network simulations. You benefit at every planning stage from our advanced, high-performance technologies and flexibly deployable components, which we can configure with reduced engineering input.

#### **Your advantages:**

- High availability and supply capacity that matches demand
- Central open- and closed-loop control of the entire power supply
- Transparency through monitoring and control of energy flows
- Smart components and easy operation
- Simple integration in the automation system
- Scalability and viability in the future
- Low energy losses

# “Our Production Runs Smoothly and without Incident. Thanks to SIPAPER.”



## SIPAPER Services – helping you to achieve success

An industrial plant is only as good as the service that maintains it. With SIPAPER Services we therefore offer you services tailored exactly to the special features of your plant and that fit your products and processes. You benefit in particular from the comprehensive offering in the Siemens Industry Services portfolio when it comes to online support, technical support, repair and spare parts service, or field service. We can also offer you wider-reaching support, for example in the form of training courses, technical consulting and engineering support, energy and environmental services, plant maintenance and condition monitoring, or modernization and optimization services, any and all of which can be combined in individualized service contracts.

## Service von A bis Z

SIPAPER Services give you a crucial edge over your competitors, because your plants operate at maximum efficiency and productivity, and because, as an experienced service partner, we not only look at the specific plant but also its role in the overall structure, its energy requirements, and any environmental regulations that may be applicable.

SIPAPER Services are thus geared as much to the overall process chain of the pulp and paper industry as they are to the complete lifecycle of your paper and pulp production plants. You benefit from the comprehensive technical knowledge and product know-how as well as the industry expertise of our service specialists at every stage – from planning and development, to operation, and on to modernization. And you enjoy the advantages of higher productivity, flexibility, and efficiency with low overall costs.



Creating optimum quality at minimum cost is a question of the latest equipment and state-of-the-art technologies. This is also possible without costly new investment, by combining maintenance and economic optimization – with SIPAPER Services. This means you benefit twice from SIPAPER: through cost savings and through the long-term preservation of your plant and machinery.



**Your advantages:**

- Comprehensive services from a single source, available 24/7 on request
- International network of expert service specialists
- Expert advice for reinvestment decisions
- Thorough analysis and optimization of maintenance processes
- Service agreements with individual performance guarantees
- Cost savings (optimized spare parts provisioning, reduced capital lockup)
- Specialized services for all phases of the plant lifecycle

**Plant-wide transparency**

Control Performance Analytics from Siemens generates a new layer of transparency from process data to support more efficient optimization processes. Control Performance Analytics are fully automated and provide consistent, end-to-end reliable analysis results that are available via a secure Web portal. This allows effective collaboration of all persons involved – from the plant manager to the process owner. Long-term availability of data makes it possible to measure optimization results.

- Automatic state detection and KPI calculation for different control states
- Hierarchical plant overview, from management view to single control details
- Regular automated data analysis, which supports long-term process optimization – also with help from generated optimization suggestions
- Identification of maintenance-relevant valves for preventive maintenance
- Additional evaluation of conspicuous control loops by specialists