EagleBurgmann®
Rely on excellence

Sealing competence for the pulp and paper industry

EagleBurgmann

As diverse as the requirements of the pulp and paper industry: Sealing solutions from EagleBurgmann.

Paper production, Indonesia
EagleBurgmann MA291 type cartridge seals reliably seal Sulzer pulp pumps.

Palm Paper, UK
TotalSealCare service agreement for all mechanical seals.

UPM Plattling, Germany
Metso pressure grinders sealed on both sides with EagleBurgmann type HSSH.

Kartonsan, Turkey
Burasoft type compression packings seal pumps in the de-inking plant.

Scandinavia
EagleBurgmann is the market leader for seals in the paper and pulp industry.

Copamex Paperla, Mexico
Andritz refiners sealed securely and economically with injectable Burajet compression packings.

Procter & Gamble Paper, USA

Dependable use of Yankee Flex fabric expansion joints in the air duct system.

Iggesund Holmen, Sweden

Over 250 EagleBurgmann Cartex seals in successful operation.

Palm Paper, Germany

LP-D mechanical seals in non-flow operation successfully seal Metso screens.

Sealing partner for the pulp and paper industry

EagleBurgmann is one of the world's leading system suppliers of sealing technology and has been a partner to the pulp and paper industry for decades. From the beginning, we've used our innovative approach to shape the sealing technology in this demanding industry. Our products and solutions are successfully deployed throughout the world in all primary and secondary processes.

Comprehensive industry-specific knowledge

We understand the needs of the pulp and paper industry and have a profound understanding of the various processes involved. With our application expertise and technical consultancy skills we can provide reliable and cost-effective solutions for every need: products and services as well as application and standardization concepts.

Full-service partner with a global presence

Research and development, consulting, engineering, design, production and a broad range of modular services are competencies that our customers use to their benefit. Our comprehensive network of production sites and sales and service centers means that we are always close to you, wherever you are in the world.

EagleBurgmann

Sealing technology: A key component in the operation of pulp and paper plants.

Reliably safe and very economical

No industrial production plant can be operated without seals. The number of sealing locations and media to be controlled is correspondingly large as are the number of plant components that need to be sealed: rotating equipment such as pumps, agitators and compressors, valves and flanges, not to mention pipes and ducts carrying gases and liquids.

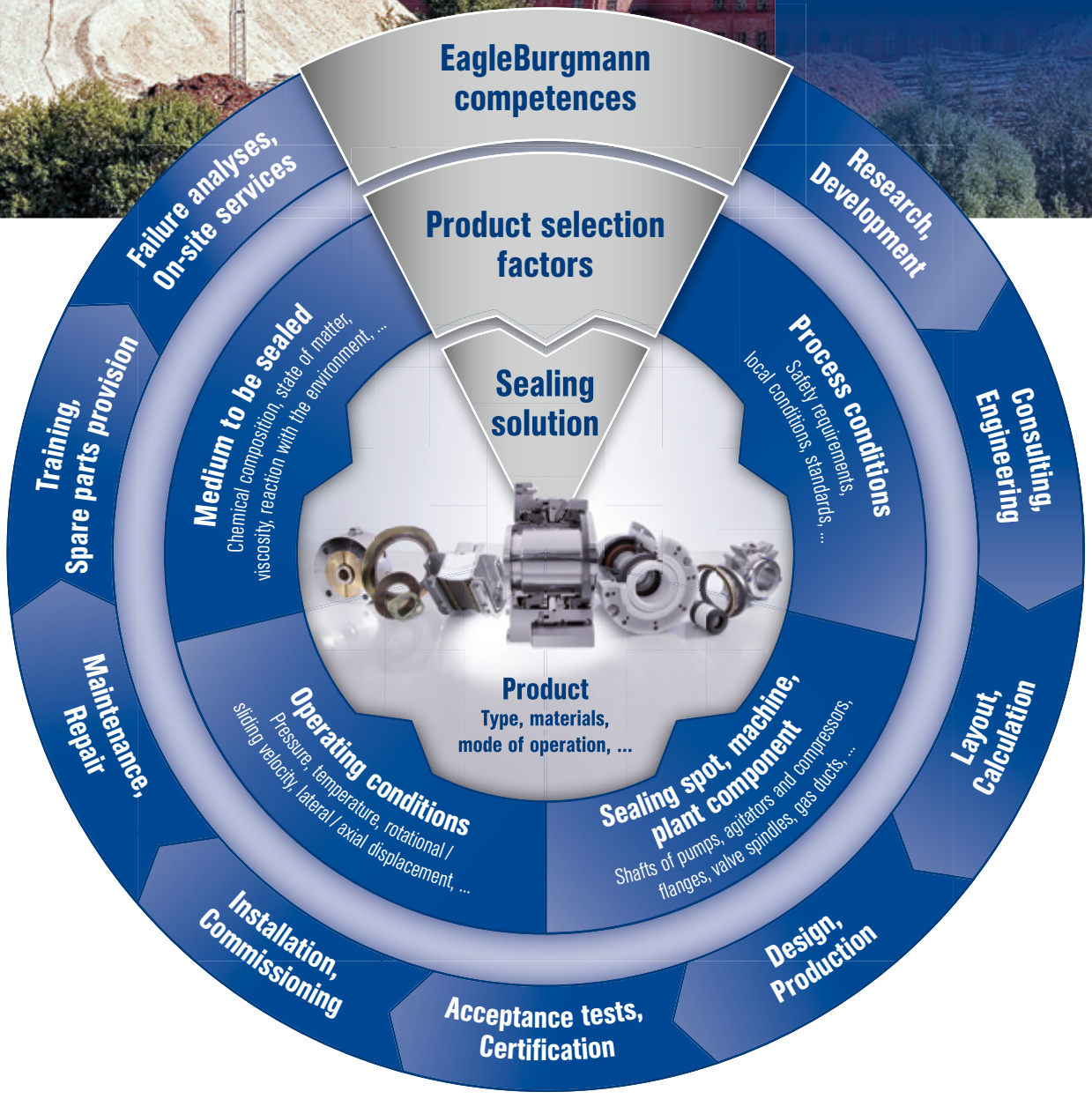
The reliability of the entire plant depends on many individual parts. The seals, as key components, play an important role. They protect systems and components from external influences and contamination as well as help prevent emissions. They thus increase process safety, availability and the economic viability of the plant.

Sealing technology also offers considerable potential for reducing costs – through process-orientated design and standardization, for example. The right product portfolio and knowledge of the processes and standards used allows EagleBurgmann to implement solutions that are not only technically safe and reliable but economically first-rate as well.

Sealing solutions to meet any requirement

When choosing the product, its product type, the materials used and the method by which it will be operated, several factors play a major role: the process conditions, the sealing location, the operating conditions and the medium to be sealed.

No matter what requirements our customers have, we know how these factors affect functionality and economic viability and we translate this expertise into outstanding long-term, reliable sealing solutions. EagleBurgmann has all the expertise it needs to manage and support the entire development, life and service cycle of its sealing solutions.



Experience, demand and commitment: The building blocks for optimized sealing solutions.

Reliable market partner with worldwide presence

With over 60 subsidiaries and 250 locations worldwide, we use our global focus to the benefit of our customers. Thus our production network, which has plants in Europe, Asia, North and South America, ensures that we are always in line with market requirements and that we can produce on attractive terms and are able to supply regional markets.

We also have a comprehensive network of sales and service centers which covers every important economic region. Being close to our customers also means we are precisely acquainted with their processes and individual requirements.

EagleBurgmann is part of the German Freudenberg Group and the Japanese EKK Group. We have access to all the resources we need to offer optimum support to major customers at the international level and also become their long-term, reliable partner.

Consulting and engineering with meaning

Technical expertise grows from knowledge and not just knowledge of sealing technology but also the machines, components and media to be sealed, along with the manufactured products and industrial processes and process conditions.

Knowledge management helps us keep our comprehensive knowledge up to date and make it available to the entire company. We use databases, courses and training to develop our employees and bundle our industry expertise from all around the world.

Our dedicated and committed employees use this wide and varied know-how to give our customers well-founded advice on how to choose the best product from technical and economic viewpoints and how to calculate and design according to need.

High-level research and development

We invest a great deal in research and development in order to consistently improve the performance of our products. EagleBurgmann carries out publicly sponsored research projects and works together with institutes and universities. Joint projects with customers and suppliers are a regular source of new solutions.

Two large research and development centers in Germany and Japan, combined with a worldwide network of testing facilities, allow us to respond flexibly to the requirements of our customers.
We run acceptance test rigs for pump, agitator and compressor seals, development and testing laboratories for expansion joints and special test benches for acceptance tests and certification of seals.

Wide-ranging standard portfolio and tailored solutions

Largely standardized and modular product series are an essential part of our portfolio. But we also offer individual solutions and provide the necessary development, engineering and production capacity for this purpose. Using the latest calculation and design methods, such as 3D-CAD, we adapt our products to customer-specific requirements or design new solutions. Worldwide design standards ensure that the most stringent technical requirements are met.

EagleBurgmann produces according to the most demanding internal and external standards at various locations around the world. At all of these locations, we use ultramodern equipment, optimized and standardized production processes and a great vertical production range – all building upon the reliable base of our excellent employees. Our quality management systems are ISO 9001 certified, for example.

Protection of humans, the environment and industrial plants

Safety is an elementary requirement for industrial sealing technology. It is ultimately all about protecting humans, the environment, products and resources. A lot of what EagleBurgmann does goes far beyond the legal requirements. This sense of responsibility is part of the company culture and is firmly anchored in the guiding principles of the group.

Our environmental management system is ISO 14001 certified to and our work safety management system fulfills OHSAS 18001. Regular audits and numerous training courses raise awareness in employees and management alike. This develops a culture in which everyone feels responsible for work safety, the environment and health protection within the company and on our customers' own premises.

Modular service concept ensures maximum flexibility

Products and services are both sides of the same coin. Professional installation and commissioning, practical knowledge transfer, intelligent inventory management and regular servicing and maintenance extend service life and protect investments.

The need for services varies according to the operator and the system and is as diverse as the industry itself. Failure mode analysis, tailored onsite services and engineering services related to sealing technology play an increasingly important role.

Be it for individual sealing systems, critical process elements, specific plant units, or a comprehensive service agreement for entire plants – our TotalSealCare modular service concept has the solution for every requirement. The individual service modules can be combined as needed to ensure maximum flexibility.

Comprehensive product portfolio: Sealing solutions to meet any requirement.

An overview of the EagleBurgmann product lines

Our comprehensive product portfolio covers all the needs of the pulp and paper industry. From mechanical seals for pumps and compressors, magnetic couplings, carbon floating ring seals, seal supply systems, compression packings and gaskets through single and multiple layered fabric, steel or rubber expansion joints.

Over the course of our long partnership with the pulp and paper industry, we have developed a range of standard, high-grade solutions which meet many of the industry's diverse needs. We also design and manufacture special and one-off customer-specific solutions to suit individual applications.

This may mean a volume-produced seal or an engineered one-off solution. EagleBurgmann products are rugged, reliable and easy to assemble and they offer a very attractive cost-benefit ratio.

On the following pages we set out our product portfolio. This is followed by a number of sample applications from real life, categorized by the fields of: mechanical and chemical pulp production, waste paper treatment, paper production and finishing.

Mechanical seals for pumps

The entire range of liquid and gas-lubricated seals. Available as standard seals or special versions, as single or multiple seals and for all categories and configurations in accordance with API 682.

Successfully utilized in the pulp and paper industry:

- Component seals: e.g. HJ, M7
- Cartridge seals: e.g. Cartex
- Elastomer bellows seals: e.g. MG1, MG9
- Special seals: e.g. H-D, HR
- Split seals: e.g. HGH, Splitex
- Metal bellows seals: e.g. MFL, L9, L9UC, L9D, HA211, MD291, EK777, MA291

Mechanical seals for agitators

For sealing shafts in mixers, kneaders, reactors, filters, dryers and special machines in normal and sterile processes. Robust, practice-oriented, economical. For steel and glass lined vessels.

Successfully utilized in the pulp and paper industry:

e.g. HGH, Splitex

Mechanical seals for compressors

The entire range of seals for process gas compressors. Robust, non-wearing and contact-free operation. Available as single and double seals, tandem seals and tandem seals with intermediate labyrinth versions.

Successfully utilized in the pulp and paper industry:

e.g. DGS, PDGS

Magnetic couplings

For areas of application with very high requirements. Hermetically sealed, leak-free and maintenance-free pumping and mixing. Media are reliably kept in the closed system circuit.

Successfully utilized in the pulp and paper industry:

e.g. MAK66

Carbon floating ring seals

Carbon floating ring seals are supplied as maintenance free compact labyrinth cartridge seals with low leakage. The floating self-adjusting sealing rings provide radial sealing on the shaft with a very small gap. The seal requires no additional lubrication, and it is designed for dry running. Besides pure gas, carbon floating ring seals are also suitable for Atex applications, toxic media, media containing solids, flue gas, dust, powder, vapor, liquid mist, oil mist and penetrating oil.

Successfully utilized in the pulp and paper industry:

e.g. Espey WKA 300,
Espey WKA 600,
Espey WD200 / 500,
Espey WDB 200,
Espey WDKS-Eco

Seal supply systems

Depending on the design, application and mode of operation, mechanical seals and magnetic couplings need supply units for flushing, cooling, pressurization and leakage compensation. EagleBurgmann supplies the entire range from a single source.

Successfully utilized in the pulp and paper industry:

- External flushing systems: e.g. Bestflow, FLC200
- Automatic refill units: e.g. SPN
- Buffer pressure systems: e.g. SPA

Compression packings

The economical and reliable method of sealing pump shafts and valve spindles. A broad product range, innovative materials, material combinations and special impregnating agents and lubricants allow us to provide solutions for even the most demanding requirements.

Successfully utilized in the pulp and paper industry:

- Compression packings for pumps: e.g. Buraflex-HT, Buraflon, Supraflon,
- Compression packings for valves, e.g., Isartherm, Isartherm-Flex, Rotatherm, Burajet

Gaskets

Ready to install seals or sheet materials. State-of-the-art materials, material combinations and production methods allow us to supply a multitude of versions, variations and shapes.

Successfully utilized in the pulp and paper industry:

- Graphite seals: e.g. Statotherm, Rotatherm
- PTFE gaskets: e.g. Burasil
- Metal gaskets: e.g. Spiraltherm

Expansion joints

For ducts and pipe systems carrying gas or liquids – to reliably compensate for pressure and temperature fluctuations, vibrations and misaligned joints.

Successfully utilized in the pulp and paper industry:

- Fabric expansion joints: e.g. Fluaflex, FlexGen, Fluastal, KE-Flex
- Metal expansion joints: e.g. AN, AX, EX, HA, TB, UN and CX Codeflex types
- Rubber expansion joints: e.g. T-Max, Type D, DT, DFS and DTU, Safety hoods and Rubber hose expansion joints.

Special products

Special applications require innovative and specific solutions. As well as special seals and sealing elements for marine technology and the aerospace industry, we also provide high-quality metal bellows and diaphragm couplings.

Successfully utilized in the pulp and paper industry:

DRO Sealing systems for rotary kilns

In the form of single and double seals used in drying, calcining, incineration and pyrolysis operations with extras adapted to specific requirements.

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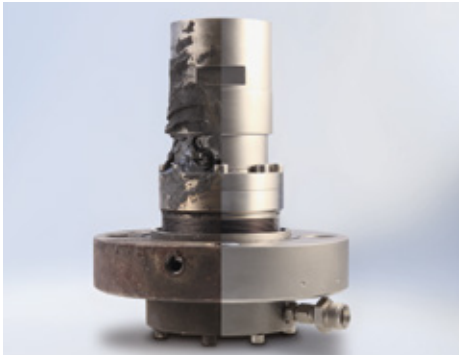
Service made to measure: TotalSealCare.

We have the idea - you have the choice

The idea behind TotalSealCare is really quite simple. Everything that is needed to deliver world-class service is packaged into seven modules, including complete repair and maintenance of all installed seals, inventory management, engineering, training and electronic documentation.

You enjoy the benefits of lower costs, increased system availability and improved reliability. What sets this concept apart is the freedom to choose only those services you need.

You can put together your individual combination of TotalSealCare modules, tailored to your specific service needs and preferences. We offer you customized packages which give you unparalleled flexibility and transparency.



Our seven service modules

Optimized services are major contributors to making sure that plants function smoothly – and that doesn't just begin with maintenance. With TotalSealCare, our modular service concept, we are able to cover all individual service requirements very flexibly. The individual modules can be combined as required.

1 Consulting & Engineering

After establishing and analyzing all of the installed seals in a system, we develop standardization concepts based on the as-is status. The results we strive for are to reduce the number of seal types, sizes and materials used and to improve the plant performance of the system. We advise you on codes of practice and statutory regulations and indicate what actions need to be taken.

2 Maintenance

In the plant or in the service center, qualified fitters and technicians look after all the aspects of seal maintenance – installation, start-up, servicing, conversion, overhaul and repair. We record and document functionally relevant data (failure reasons and related costs). This means it is possible to evaluate seal operating times and maintenance costs on a continuous basis, thereby defining measures for extending service intervals.

3 On-site Service

Our on-site service includes the components of an overhaul service, conversions and service container. We deploy a service unit directly to your premises: equipped with the basic range of seals or a stock of seals discussed with you in advance and staffed by qualified personnel. On-site, we assure production of the necessary gaskets, ensure that the documentation is complete and advise our customers on the selection and installation of seals. Our range of services also includes complete conversions (e.g. acc. to TA-Luft).

4 Inventory Management

Based on your individual requirements and the applicable quality regulations, we develop a concept for inventory management of complete seals and spare parts. Furthermore, we optimize stocking on site or in the EagleBurgmann service center. In this way, you reduce your administration overhead and concentrate on your key operations.

5 Seminars & Training

We offer an extensive range of continuing education programs in sealing technology. Developed for service and maintenance personnel and skilled staff and engineers from various branches of industry including refining, chemicals, power generation, foodstuffs, paper and pharmaceuticals. Our program includes group seminars, individual training and seminars specifically tailored to your requirements. At our premises or at a location of your choice.

6 Technical Analysis & Support

A team of seal specialists is responsible for rectifying process malfunctions or "bad actors". The latest methods such as thermography or data logging are used for diagnosing critical items for the operation of the plant and for defining measures to resolve them. In our research and development centers, we perform realistic tests on test rigs or in original pumps. The objective is to extend the MTBF and to increase system reliability by individual and constructive solutions.

7 Service Agreements

We offer our customers specific agreements that are combined from the six service modules. Whether for individual seal systems, critical process elements, specific plant units or an extensive seal service for complete plants, the modular structure of our service makes it possible to satisfy individual requirements. With our well established monitoring instrument, SEPRO, we can also record all seal-related data for documentation and evaluation purposes.

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Successful throughout the world: EagleBurgmann sealing technology in mechanical pulp production.

Groundwood pulp is produced by mostly mechanical means in which a yield of up to 95 % of the utilized wood is converted to fibrous material. Compared with chemical pulp production, the yield from mechanical pulp production is nearly twice as high. However, the process of mechanical pulp production is very energy-consuming.

In principle, groundwood pulp production is differentiated between fiberization of debarked timbers in pressure grinders and fiberization of chips in refiners. Fiberization in refiners is further differentiated between thermomechanical (TMP) and chemithermomechanical (CTMP) produced wood pulp.

Smooth operation of the refiner or pressure grinder is a decisive criterion for the reliable operation of the entire plant. Very high sliding velocities are generated due to the combination of large shaft diameter and high rotational speeds and the addition of steam and chemicals means the mechanical seal operates in a demanding environment.

Experience with individually adapted solutions as well as the selection of high-quality face materials is the requirement for long operating periods of the installed seals.

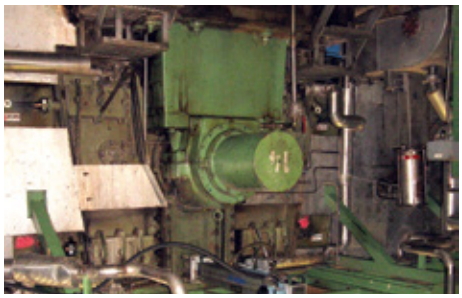
Numerous machines are used in the processes of mechanical pulp production. Pressure grinders, refiners, agitators, pumps, screw conveyors and sorters place the most diverse of demands on sealing technology.

EagleBurgmann fulfills the special requirements of mechanical pulp production without restrictions and supplies this sector with fail-safe and reliable mechanical seals of the H-D, HR, LP, Cartex, MG12 and HGH series, or with economical and highly-wear resistant compression packings, such as Buramex and Buraflon.

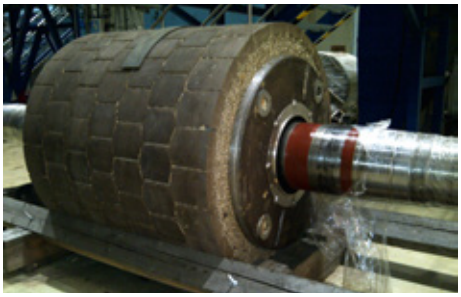
*for mechanical pulp production with refiners

EagleBurgmann **Burajet SF6335** and **Burajet 8032SCW** type compression packings are installed in Andritz refiners as shaft seals at the Mexican paper factory Copamex Papelara de Chihuahua. Operating conditions: p = max. 16 bar (232 PSI), t = 200 °C (392 °F).

A horizontally arranged machine shaft is sealed by an Espey **E-WDKS205** type carbon floating ring seal at Norske Skog Saugbrugs in Norway. Operating conditions: t = 40 °C ... 50 °C (104 °F ... 122 °F), n = 11 ... 15 min^{-1}.



EagleBurgmann **M42S2/470-00** type mechanical seals operate successfully in several pressure grinders in the pulp mill at Stora Enso Publication Paper in the Maxau/Germany plant.



UPM Plattling/Germany uses Metso pressure grinders to fiberize wood. EagleBurgmann **HSSHR8-D4/470-E1** type mechanical seals are used to seal off both sides of the high-consistency groundwood pulp at the grindstone shaft. Operating conditions: p = 3 bar (44 PSI), t = 150 °C (302 °F), n = 350 min^{-1}.

HA211 type mechanical seals operate in the fiberization process of the mechanical pulp production at Nippon Paper in Japan to provide secure sealing of white water. Operating conditions: p = 1 bar (15 PSI), t = 30 °C (86 °F), n = 1,450 min^{-1}.

Robust and economical: Sealing concepts for chemical pulp production.

In chemical pulp production, wood chips are chemically pulped under the effects of pressure and temperature. In contrast to the mechanical pulping of groundwood, this process removes the lignin. Depending on the requirements towards the end product, the pulp is bleached in a number of stages. Instead of chlorine, current state-of-the-art bleaching uses oxidative-based chemicals such as oxygen, hydrogen peroxide, or ozone.

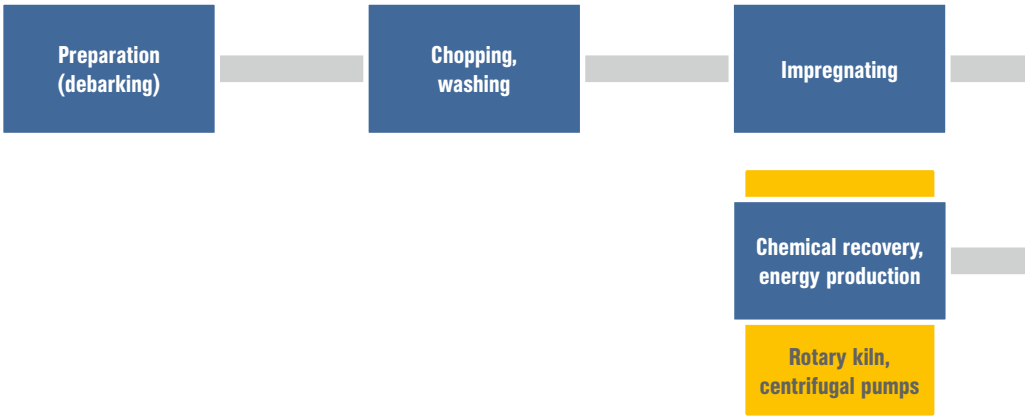
Two processes are used here: the sulphate and the sulphite processes. Due to the good quality properties of the cellulose, the sulphate process has become the popularly established method of pulp production in the world. In this procedure, the wood chips are digested in an alkaline sodium salt solution to remove the lignin from the wood. This process is very gentle to the fibers and produces pulp with a very high strength.

The waste materials produced during the removal and recovery of chemicals are used in both processes to generate energy and steam.

High plant availability paired with economical operation are important requirements of the operators. This also includes efficient Seal Water Management and seal systems and concepts that are designed according to application.

From mechanical seals for economical and reliable non-flow operation to the use of new instruments for seal supply while monitoring the mechanical seals at the same time – EagleBurgmann has practical solutions: Various control units are used to regulate and optimize the supply of water to suit the application.

Pumps, agitators, chest agitators, pulp digesters, washers and sorters are sealed with mechanical seals of the LP, M7, Cartex, MG and HJ series.



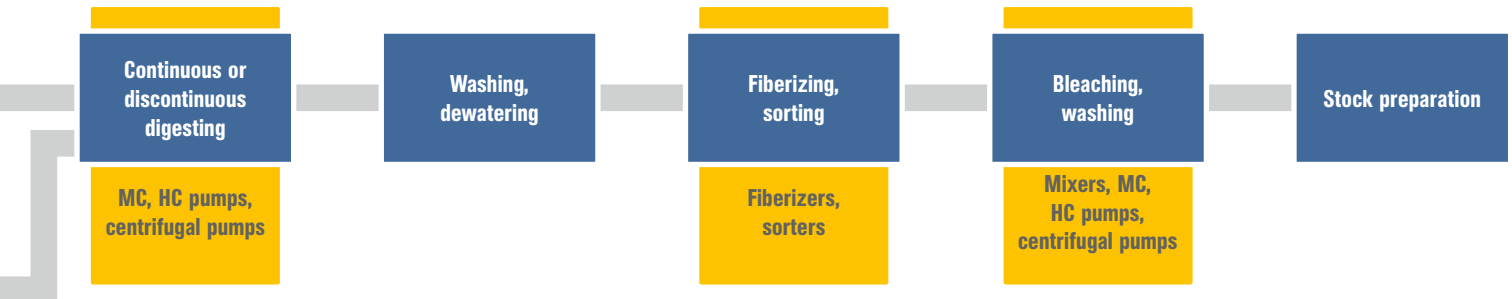
Chest agitators at Sappi in Lanaken/Belgium were retrofitted to EagleBurgmann **HGH** type semi-split mechanical seals. Since then, product leakage has been drastically reduced and plant availability has noticeably increased. Operating conditions: p = 0.5 bar (7.25 PSI), t = 20 °C ... 40 °C (68 °F ... 104 °F), n = 300 min^{-1}.

At the UPM Pietarsaari pulp mill in Finland, a Sulzer APP 23 pump is sealed with an EagleBurgmann **Mtex-TN**. This cartridge version of the metal bellows seal is particularly suitable for highly viscous media at low temperatures. Operating conditions: p = 1 bar (15 PSI), t = 120 °C (248 °F), n = 1,500 min^{-1}. Medium: Tall oil.

A **Pulpex-S/135-00** is installed in a sorter at the Sappi paper mill in Lanaken/Belgium. The mechanical seal runs in a continuous process in pulp preparation. Operating conditions: p = 3.5 bar (51 PSI), t = 80 °C (176 °F), n = 800 min^{-1}. Medium: pulp.

A successful seal type for the entire plant: Over 250 standardized EagleBurgmann **Cartex** cartridge seals are installed in pulp pumps and in the pumps of the chemical sector at the Swedish Iggesund Holmen paper and pulp mill. Operating conditions: p = 12 ... 25 bar (174 ... 363 PSI), t = -40 °C ... +220 °C (-40 °F ... +428 °F), n = 1,660 min^{-1}.

For the reliable sealing of black liquor, **L9UC** type mechanical seals are used at Nagayo Paper in Japan. Operating conditions: p = 3 bar (44 PSI), t = 85 °C (185 °F), n = 1,750 min^{-1}.



Proven and sophisticated: Shaft seals in waste paper treatment.

Waste paper treatment is of great significance in the paper industry. The collected and sorted waste paper is fiberized in pulpers using large amounts of water with the addition of chemicals and is sorted into slightly and heavily contaminated fractions.

In the de-inking process, the printing ink is removed by means of chemicals and mechanical forces and is skimmed as foam from the surface in the subsequent flotation.

The risk of dry running for the mechanical seal is especially great for the machines used in the flotation process. The seals in the coarse screening are subjected to intense stress due to the contaminations inclined to plaiting. Know-how and experience in the selection of seals and materials are requirements in order to ensure optimal and trouble-free operation.

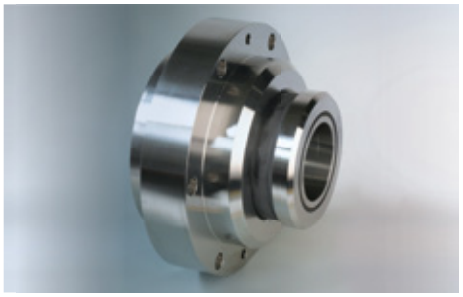
The shafts of bleaching agent pumps, MC pumps, dispersers, slurry pumps, sorters, pulpers and fiberizers are successfully equipped with EagleBurgmann single and double seals of the LP, M7N, M74, HR and Cartex-DN series. Thermoflon and Buramex type compression packings reliably seal bleaching agent pumps and separators in the waste paper treatment process.

In Kartonsan, Turkey, numerous pumps for pulp treatment and in the de-inking system have been successfully equipped with EagleBurgmann **Burasoft 6225-L** type compression packings.

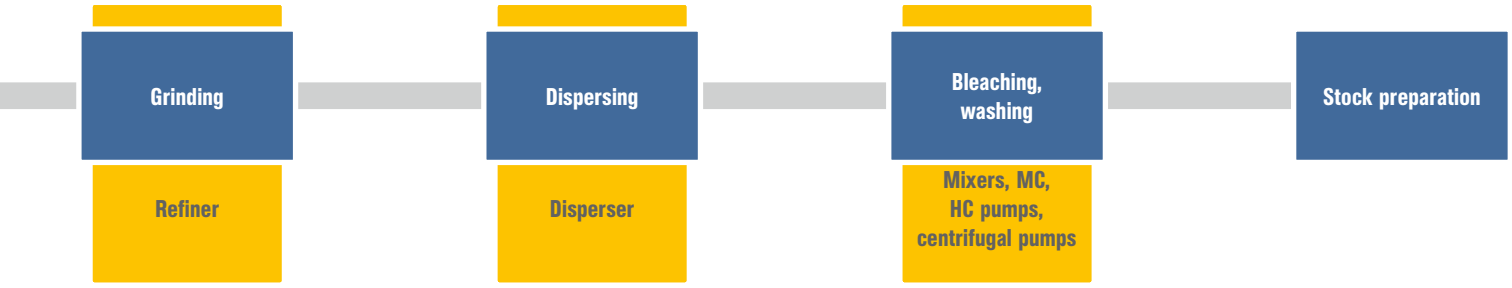
At UPM Kymmene Shotton in England, nine Voith pressure screens in waste paper treatment are being used successfully with EagleBurgmann **HR-D** type double cartridge seals. Medium to be sealed: Pulp fibers 1.5 ... 4 % abs. dry and water, p = 8 bar (116 PSI), t = max. 40 °C (104 °F).

In the waste paper treatment at Palm in Wörth, Germany, four TL200/TL300 type Metso Screens with **LP-D-ST-D15/130-DE** were retrofitted to non-flow operation and have been running in continuous operation (24 hrs./day) since 2004. Medium: Pulp 3 % abs. dry and water, t = 50 °C (122 °F), p3 = 4 bar (58 PSI), n = 800 min^{-1}.

The Palm Paper Ltd. paper mill produces newsprint for national and international newspapers. Production is based solely on waste paper pulp.
A **TotalSealCare service agreement** having a duration of several years includes servicing of all installed mechanical seals for pulp pumps, mixers and various pressure screens. Additional contractually agreed services are on-site presence during start-ups, troubleshooting and providing seal-related schooling and training courses for plant personnel.



At Stora Enso Maxau, Germany, Voith slot sorters in a waste paper treatment plant for the production of standard and upgraded newsprint paper are sealed with EagleBurgmann **HR10** type seals (“dead-end”). Flushing with circuit water (return water) is used only when the medium has a too high solids content. Face material combination SiC/SiC, shaft diameter d1 = 46 ... 130 mm (1.81” ... 5.12”), p1 = 1 bar (15 PSI), t = 60 °C (140 °F), n = 980 min^{-1}, medium: Paper pulp (0.2 ... 5 % abs. dry).



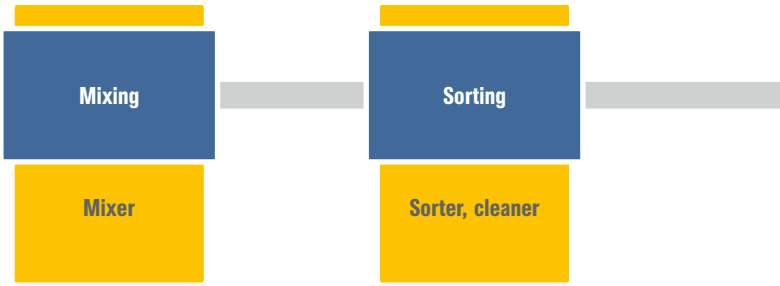
Competent and process-oriented: EagleBurgmann sealing technology for paper production and finishing.

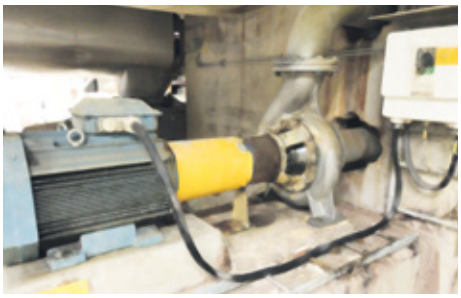
All raw material components (groundwood pulp, chemical pulp, waste paper pulp, fillers and additives) are fed to the stock preparation plant. The circulating water from the paper machine is used to strongly dilute the stock according to the requirements of the chosen paper to be produced (stock density approx. 0.1 % ... 1.3 %) and it is cleaned again before being fed to the headbox.

Following the transfer to the headbox on the wire section of the paper machine, the water is removed from the paper web where it is then transferred to the press section. More water is removed by means of pressure and vacuum. This still moist paper web is now moved to the drying section where the residual moisture is reduced by rotating drying cylinders heated by steam on the inside. The still rough surface of the paper is then smoothed in the following calender section.

Depending on the required quality, further units for upgrading the paper web directly follow the paper machine: coating is a process where a paste of pigments and binders is applied to the surface of the raw paper. Calendering then compacts the paper web and further upgrades the surface (e.g. for high-quality writing and printing paper). The paper webs run through four to ten pairs of rolls in the calenders which are either heated or cooled, depending on the application.

Since modern paper machines reach productions speeds of 2,000 m/min (6,600 ft/min), the trouble-free operation of all involved units is of vital importance. Specifically the reliable sealing of the headbox pump, which frequently runs 24 hrs./7 days a week in continuous operation, poses a great challenge to the utilized seal technology.

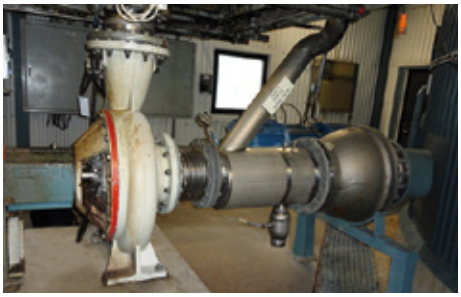




MG1S14 type elastomer bellows seals are supplied as standard cartridge and also fit in ABS Scanpump pumps and Sulzer APP pumps. Alone more than 40 seals are being applied successfully at the Stora Enso Kvarnsveden/Sweden paper mill. Operating conditions: p = 8 ... max. 10 bar (116 ... 145 PSI max.), t = 60 °C (140 °F), n = 1,490 min^{-1}.

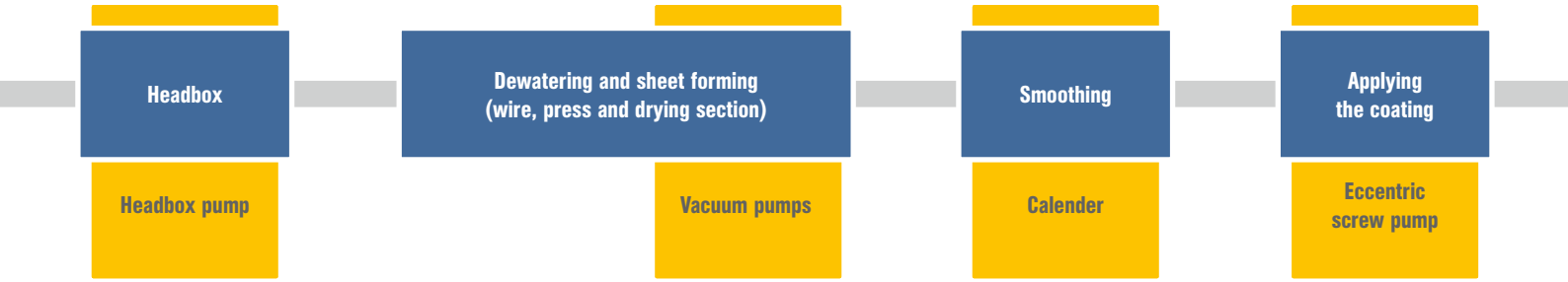
After retrofitting at Stora Enso in Sweden, two fully split EagleBurgmann **Splitex** type mechanical seals operate successfully in a mixer with bottom entry and a chest agitator with side entry. Here, pulp having a solids content of over 11 % is sealed. Operating conditions: p = 10.3 bar (149 PSI), t = 180 °C (356 °F), n = 15 min^{-1}.

An EagleBurgmann **MA291/60** type single cartridge seal is installed in a Sulzer APP pump at an Indonesian paper mill. The medium to be sealed is pulp with a solids content of 5.5 %. Operating conditions: p = 4 bar (58 PSI), t = 60 °C (140 °F), n = 1,430 min^{-1}.

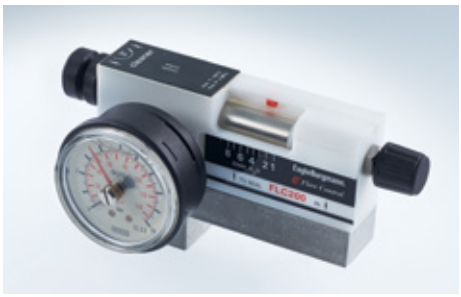


In the pulp production at Stora Enso Skutskär in Sweden, a Sulzer APP Ahlstar pulp pump transports the pulp with black liquor to the washing and bleaching processes. The pump is equipped with an EagleBurgmann **Cartex-DN** with a connected **BestFlow** pressure regulating valve for the optimum supply of buffer water to the seal. Operating conditions: p = max. 4.5 bar (65.3 PSI), t = 66 °C (151 °F), n = 956 min^{-1}.

An EagleBurgmann **MA291** type mechanical seal operates at the Hakuetsu Paper in Nayo, Japan and seals the white water of the paper machine. Operating conditions: p = 2 bar (29 PSI), t = 100 °C (212 °F), n = 1,470 min^{-1}.



At the UPM Pietarsaari paper mill in Finland, a feed pump for pressure screens is sealed by an EagleBurgmann **LP-Q-SA2-DZXX70/160**. Installed since 1988, overhauled in 2000, it operates reliably up to today. Operating conditions: p = 2 ... 3 bar (29 ... 44 PSI), t = 60 °C ... 70 °C (140 °F ... 158 °F), n = 750 min^{-1}.

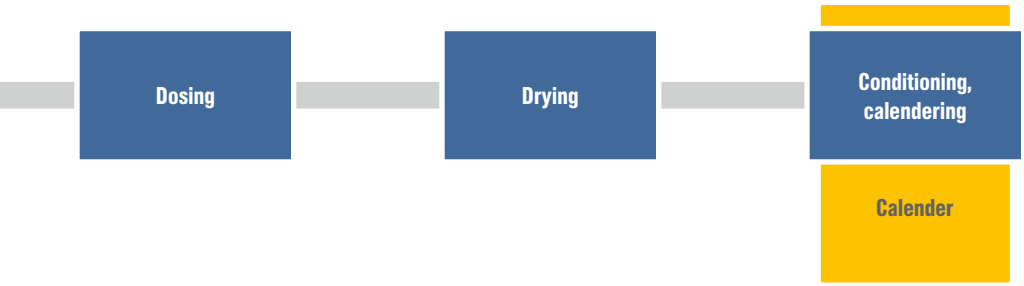


The EagleBurgmann **FLC200** flow control unit is used for all dual seals of the Stora Enso Skutskär paper mill in Sweden in order to adjust the volume of supplied water as needed. Safe operation of the seals is thus ensured. Operating conditions: p = 25 bar (363 PSI), t = 85 °C (185 °F).

A **Yankee Flex 350** type fabric expansion joint with an outer layer of Alusil is installed in an air duct system at the paper mill of Procter & Gamble Paper in Oxnard, USA. The expansion joint is reliably tight and flexible. Operating conditions: t = 343 °C (649 °F), rate of flow = 15 m/s (49 ft/s).

At Stora Enso Kvarnsveden, Sweden, several pumps of the paper machines are sealed with EagleBurgmann **MA251**. Medium: pulp with a solids content up to 1.5 %. Operating conditions: p = 2 bar (29 PSI), t = 30 °C ... 40 °C (86 °F ... 104 °F), n = 1,490 min^{-1}.

At Iggesund Paperboard, Workington, UK, eccentric screw pumps with MG1S50 type cartridge seals are operating reliably in the coating plant.
Medium: Coating color, p3 = 4 bar (58 PSI), t3 = 40 °C (104 °F), n = 850 min^{-1}.



Furthermore, the media pumped through the eccentric screw pumps in paper upgrading has bad lubricating properties which puts an additional strain on the utilized mechanical seals.

The machines to be sealed in paper production and finishing are, for example, LC pumps, sorters, vacuum pumps, eccentric screw pumps, calender rollers and dispersers. EagleBurgmann LP, Cartex-DN, MG1S50 and Cartex-SNO type mechanical seals, Burasoft 6225/L and Buraflon 5846 type compression packings and Yankee Flex 350 type fabric expansion joints are in successful operation here.

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