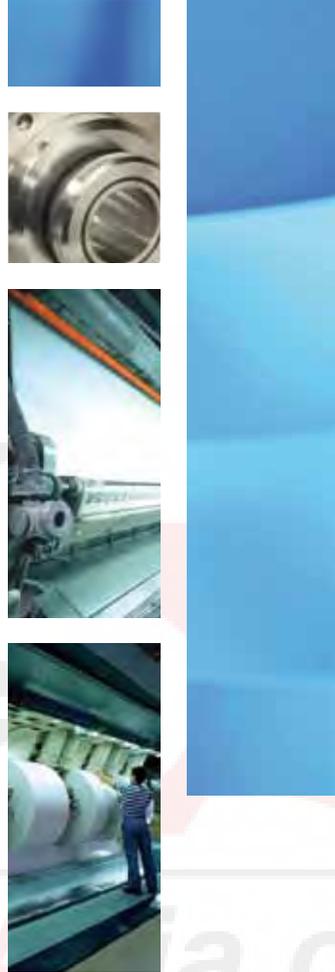


Applications Mechanical Seals

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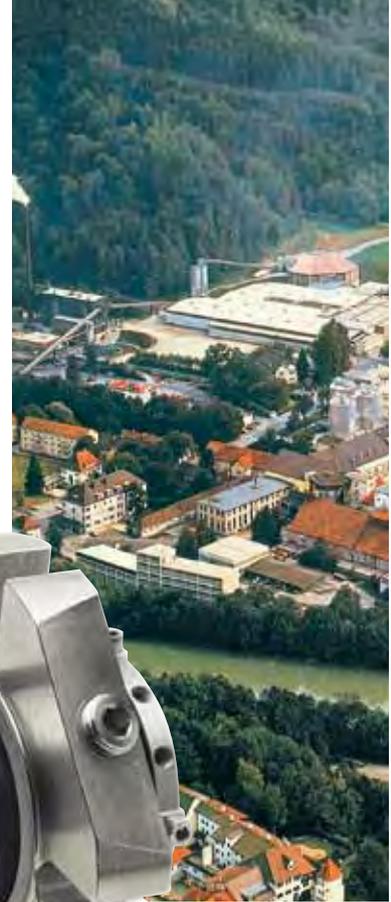


Sealing Technology in
Pulp and Paper Production.



Your partner for sealing technology in the pulp and paper industry

Worldwide demand for paper and paperboard in 2005 was about 360 million tons and is likely to grow to about 500 million tons by 2020. The pulp and paper industry therefore continues to be a definite growth sector. If anything, developments such as the “paperless office” or “new media” have actually contributed to an acceleration in the consumption of paper. With paper consumption continuing to rise, it is becoming extremely important to strike a harmony between economy and the protection of the environment. This implies a careful use of wood as a regenerative material, controlled consumption of water and energy, and particularly the recycling of waste paper as a “raw material”. Modern sealing technology makes a major contribution to optimized production processes and their further development.



The paper industry today

The processes needed to produce pulp and paper are highly energy-intensive. If only for reasons of economy companies are concerned, therefore, to minimize the specific consumption of their mostly self-generated supplies of steam and electricity through continuous rationalization and modernization. Circulating systems are used, for example, to reduce the fresh water content of the vast quantities of water required in pulp and paper production. This in turn cuts the amount of waste water that is subjected to mechanical and biological treatment, usually in the companies' own sewage treatment plants. And where the chemicals used in pulp production are concerned, the biggest part is now recovered and recycled.

Environmental protection

With its collection and recycling of old paper the paper industry is making a major contribution to easing the pressure on our environment. In hardly any other sector has the recycling of raw materials attained such significance. Chlorine-free bleaching is the state-of-the-art technology which has been used for many years now, and the production processes used for producing pulp are being perfected all the time to ensure that they are as environmentally compatible as possible.





Sealing technology more important than ever

Sealing technology has an inestimable role to play if the demands of economy and ecology are to be fulfilled as well as possible. Sealing systems used in the transportation and processing of the various media should function without maintenance but with maximum safety reserves. Yet components in the different processing stages are being exposed to more stress than ever before from the increased use of chemicals and higher stock consistencies. Mechanical seals are usually the first choice these days for use in pumps and mixers, provided they comply with an extensive catalog of requirements. They must be wear-resistant, rugged and protected against dry running, have smooth surface contours with by and large no empty spaces, and be universal in application and easy to install.

A matter of trust

A large number of major international suppliers of machinery to the paper industry trust in seals: ABS Scanpump, Andritz, Andritz-Küsters, Metso, Netzsch, Sulzer, Voith, to name just a few.

Service with a capital "S"

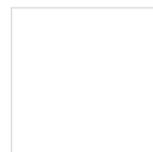
Even the perfect seal calls for expert consulting, staff training and after-sales service in the event of trouble. Ask us about the extensive range of services covered by our TotalSealCare® service.

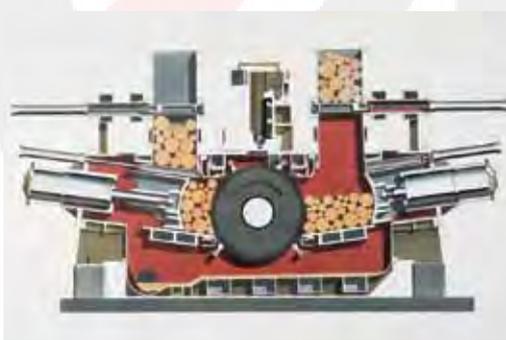
No paper without water

This simple phrase is still true today, even if specific water consumption per ton of produced paper has been substantially reduced over recent years. High-quality water is a scarce resource which varies from region to region, and for an industry with a strong commitment to cost-effectiveness and the environment such as the paper and pulp industry, the challenge is to use water as efficiently as possible. The industry is the fifth biggest industrial consumer of water in Germany and therefore has a particular duty to ensure

that it uses the water efficiently and carefully. By managing to constrict the recirculating water systems ever more, the paper and pulp industry has achieved drastic reductions in water consumption and associated waste water. The specific waste water level, for example, has now been cut to less than 10 l/kg and any further reductions now only appear possible with difficulty. However, the achievement of what are more or less completely closed water circulation systems has in turn led to other problems such as the accumulation of micro-organisms and harmful substances, for example, which are an impairment to the production processes.

LP-D for "non-flow" operation





Mechanical pulp production

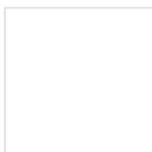
Groundwood pulp is mostly produced by mechanical means, with up to 95 % of the wood input being converted into pulp. Compared with the production of chemical pulp the yield is about twice as high, although the process does consume large amounts of energy.

For groundwood pulp production, debarked timber is processed in (pressurized) grinders (PGW, GMP). An alternative method is to fiberize chips in refiners. In this case a distinction is made between thermo-mechanical (TMP) and chemi-thermo-mechanical (CTMP) pulp. In the TMP production process the chips are pre-treated with steam.

In the CTMP process the chips are additionally impregnated with a sulphur-containing pulping solution of Na_2SO_3 . The structure of lignin becomes less tight and deformable. This results in largely unharmed individual fibers with high strength and a wood-based material which is of higher overall quality.

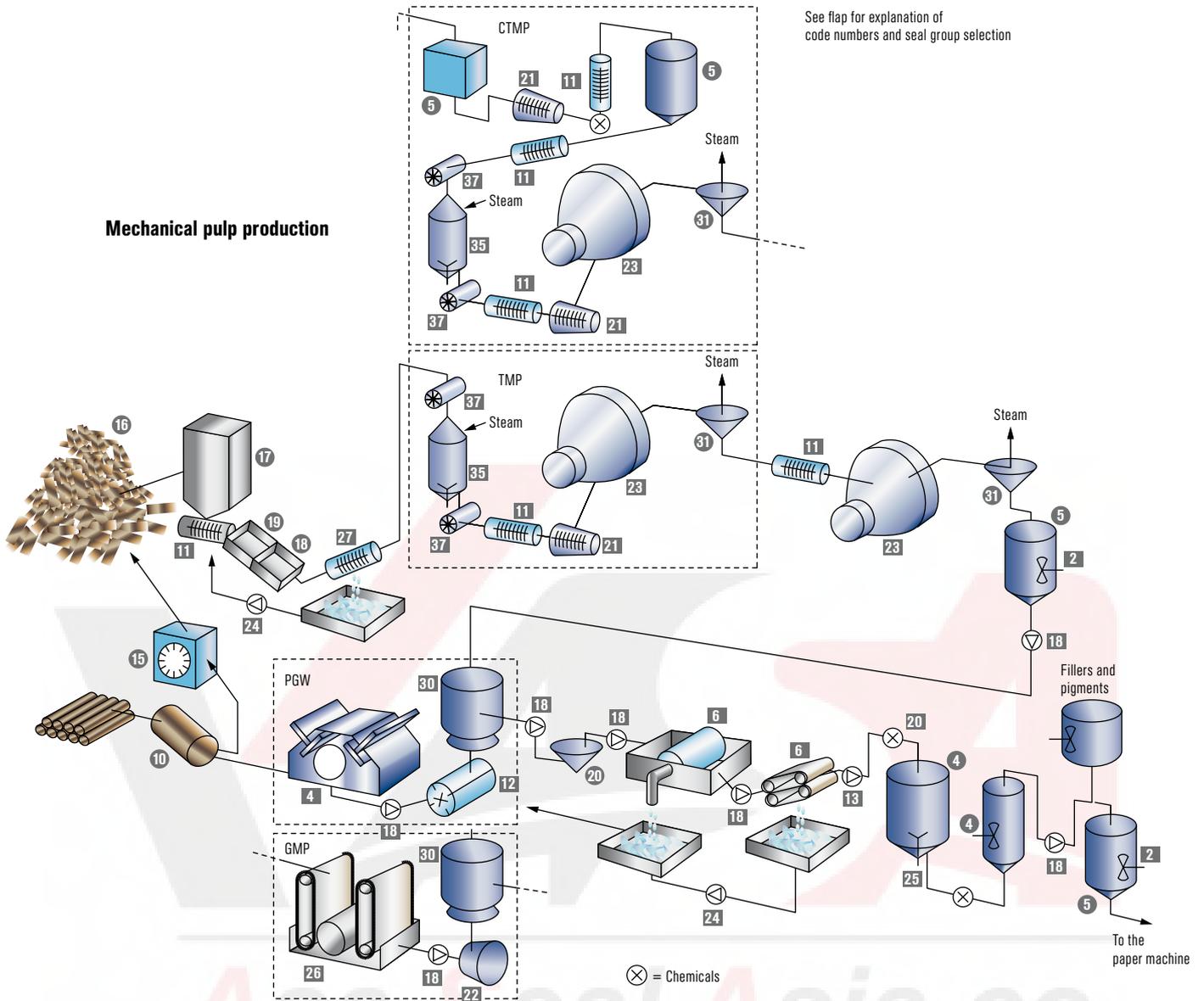


A pressure grinder (Metso) for producing groundwood pulp, as seen during installation. By raising the pressure it was possible to break up the wood structure at a higher temperature, with a higher moisture content and less stress on the product.

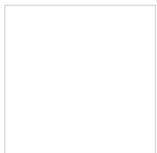


Mechanical pulp production

See flap for explanation of code numbers and seal group selection

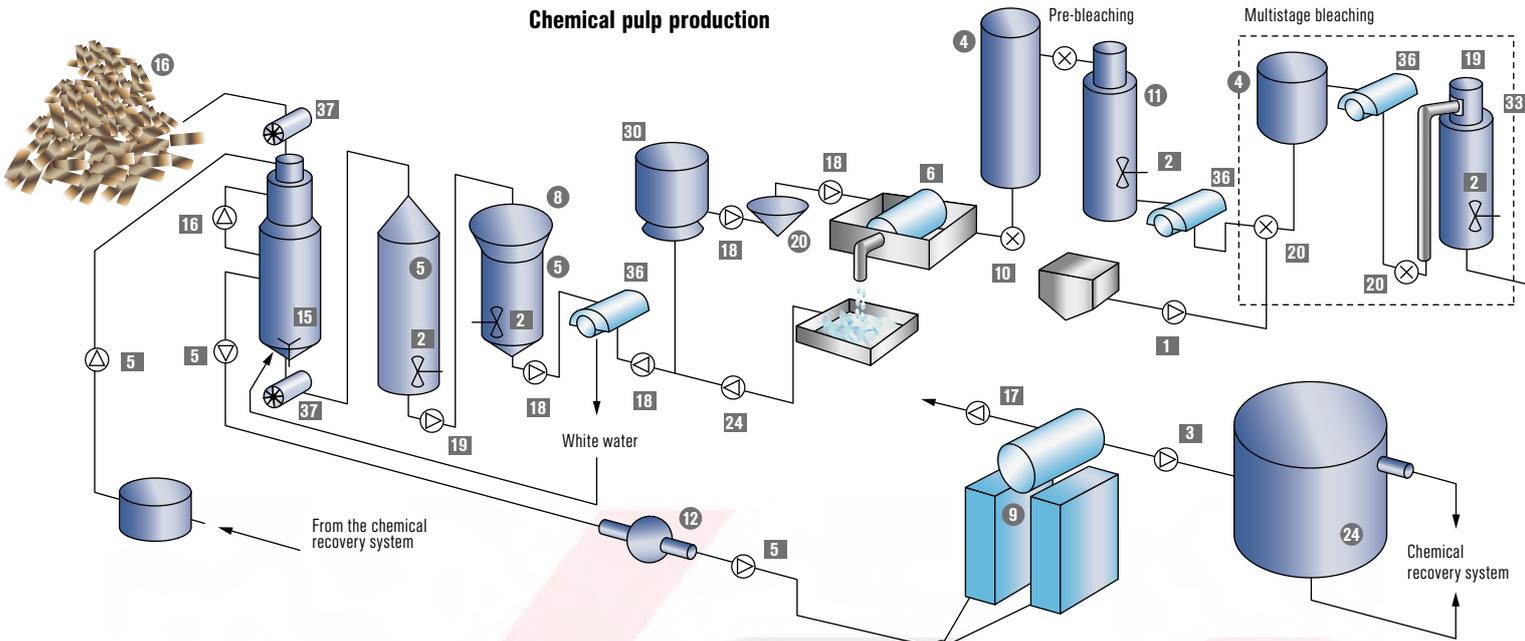


Asa Seal Asia co.

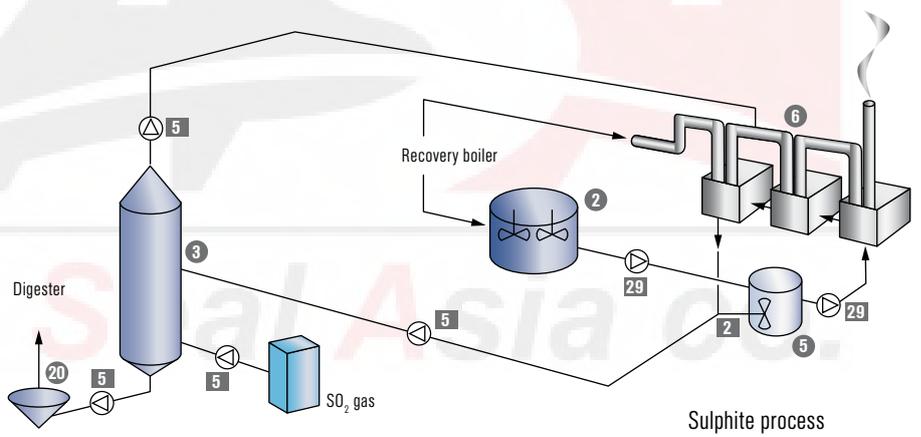


TMP refiner equipped with double seals. In the Metso refiner, for example: H-D10/2270-E1 ($p_1 = \text{max. } 10 \text{ bar}$, $t_1 = \text{max. } 180 \text{ }^\circ\text{C}$, $n = \text{max. } 2,300 \text{ min}^{-1}$). Chipped wood is steam-treated at up to $180 \text{ }^\circ\text{C}$ and then broken up into individual fibers in the pressure refiners.

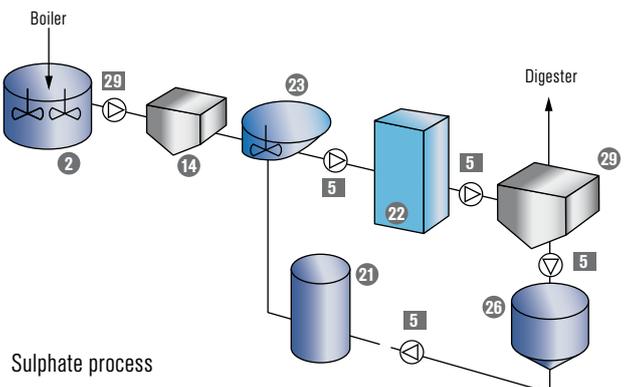
Chemical pulp production

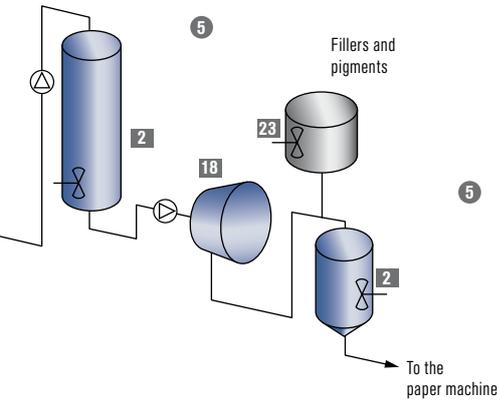


Chemical recovery



Stock pump (Sulzer Ahlstar UP) equipped with a Cartex-DN double seal and supplied by an FLC200 water supply unit, for example.





⊗ = Chemicals

See flap for explanation of code numbers and seal group selection



Pressure screens (Lamort) are sealed successfully with either type HJ977GN, MFL85N6 or HR10 mechanical seals, according to pulp consistency.



Pulp production

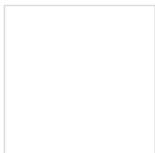
Pulp is produced from wood chips which are broken down with appropriate chemicals at elevated temperature and pressure. In contrast to mechanical pulping, this process involves the removal of the lignin. Depending on the requirements on the end product the pulp, which in chemical terms is comprised of cellulose and hemicellulose, is bleached in a number of stages. The current state-of-the-art in bleaching technology is chlorine-free bleaching with chemicals which work on an oxidative basis such as oxygen, hydrogen peroxide or ozone.

Sulphate process

In the sulphate (or kraft) process the wood chips are boiled in an alkaline sodium solution ($\text{NaOH} + \text{Na}_2\text{S}$) to remove the lignin from the wood. Although this process subjects the fibers to the least strain and produces pulp of a very high strength, the pulp is more difficult to bleach. However, since this process is suitable for breaking down every type of wood and also produces pulp of exceptionally high quality, the kraft process has become established as the most widely used process for pulp production.

Sulphite process

The sulphite process removes the lignin from the wood by means of a digesting solution consisting of sulphurous acid (H_2SO_3) and a base (e.g. Ca^{2+} , Na^+ , Mg^{2+} or NH_4^+). Compared with sulphate pulp, the sulphite variety is lighter in color but not as strong. Only certain types of wood are suitable for the sulphite process, of which spruce and beech are two; pine on the other hand, cannot be broken down using this process. In both processes the waste materials produced during the removal of the lignin and the recovery of the chemicals are used to generate energy and steam.



Waste paper treatment

The recycling of raw materials is a priority objective of every modern, ecologically oriented industrial society. In no other sector has the collection and recycling of raw materials attained such significance as in the paper industry. In 2005, 79 % of waste paper was recycled in Germany. In terms of the recycling and re-use of waste paper, therefore, Germany is ahead of every other country in the world. The collected paper is first sorted and pressed into bales. Mixed with plenty of water and a certain amount of chemical additives it is then fiberized in so-called pulpers and sorted into slightly and heavily contaminated fractions.

Ink is separated with the help of chemicals and mechanical force in the de-inking process and the subsequent flotation can be skimmed as foam from the surface. Depending on its ultimate use and required quality, the waste paper stock thus obtained can now be bleached, either on an oxidative (hydrogen peroxide) or reductive (formamidosulfonic acids or dithionite) basis.

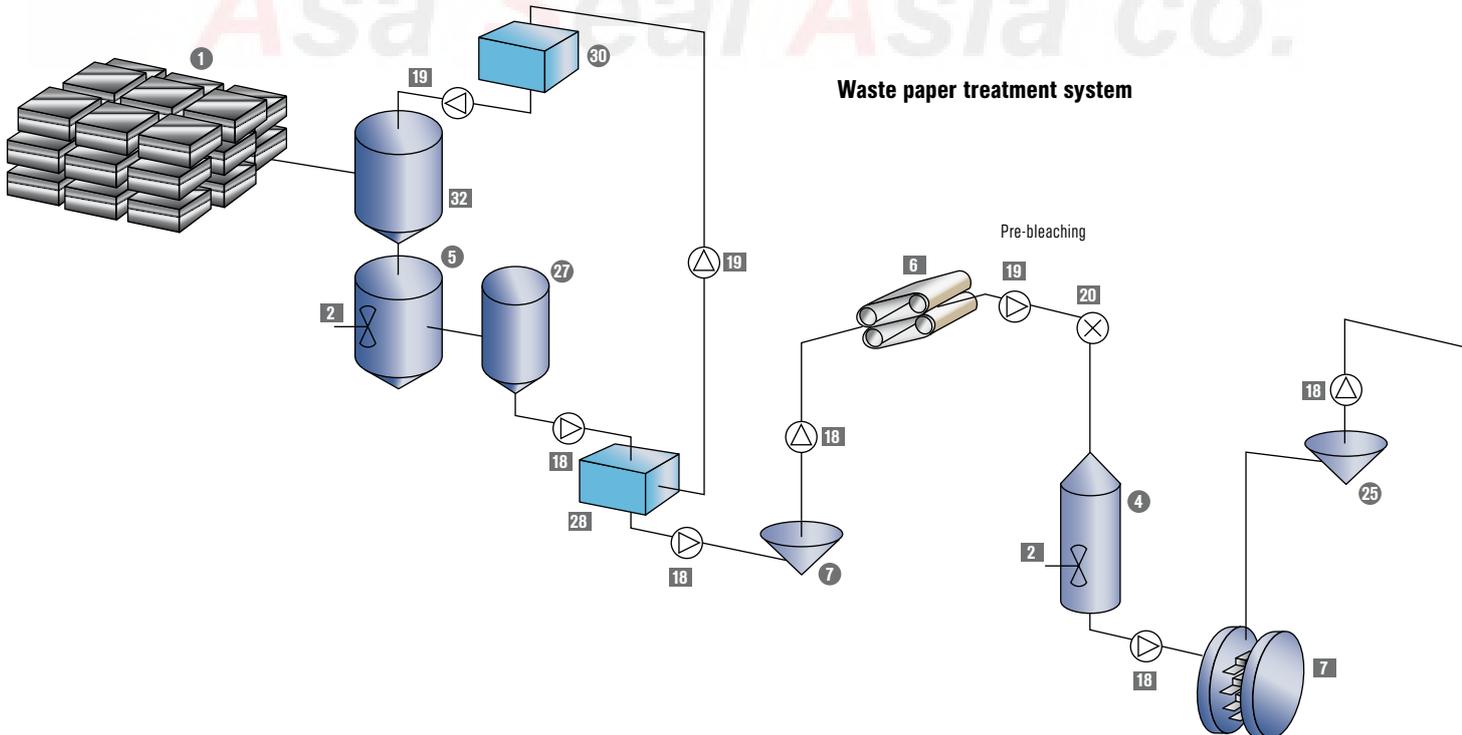


Voith slot sorting machines in a paper recycling plant used to manufacture standard and upgraded paper for newspapers.



Pulper

De-inking (flotation principle) stock pumps and screens in the de-inking plant of Stora Enso Maxau are sealed with type HR10 seals (in dead-end arrangement). Flushing with circuit water (white water) is carried out only when the medium has a high solids content. The combination of face materials is SiC/SiC ($d_1 = 46 \dots 130 \text{ mm}$; $p_1 = 1 \text{ mWC}$; $t = 60 \text{ }^\circ\text{C}$; $n = 980 \text{ min}^{-1}$; medium = pulp (0.2 ... 5 % abs. dry) with a high content of air).





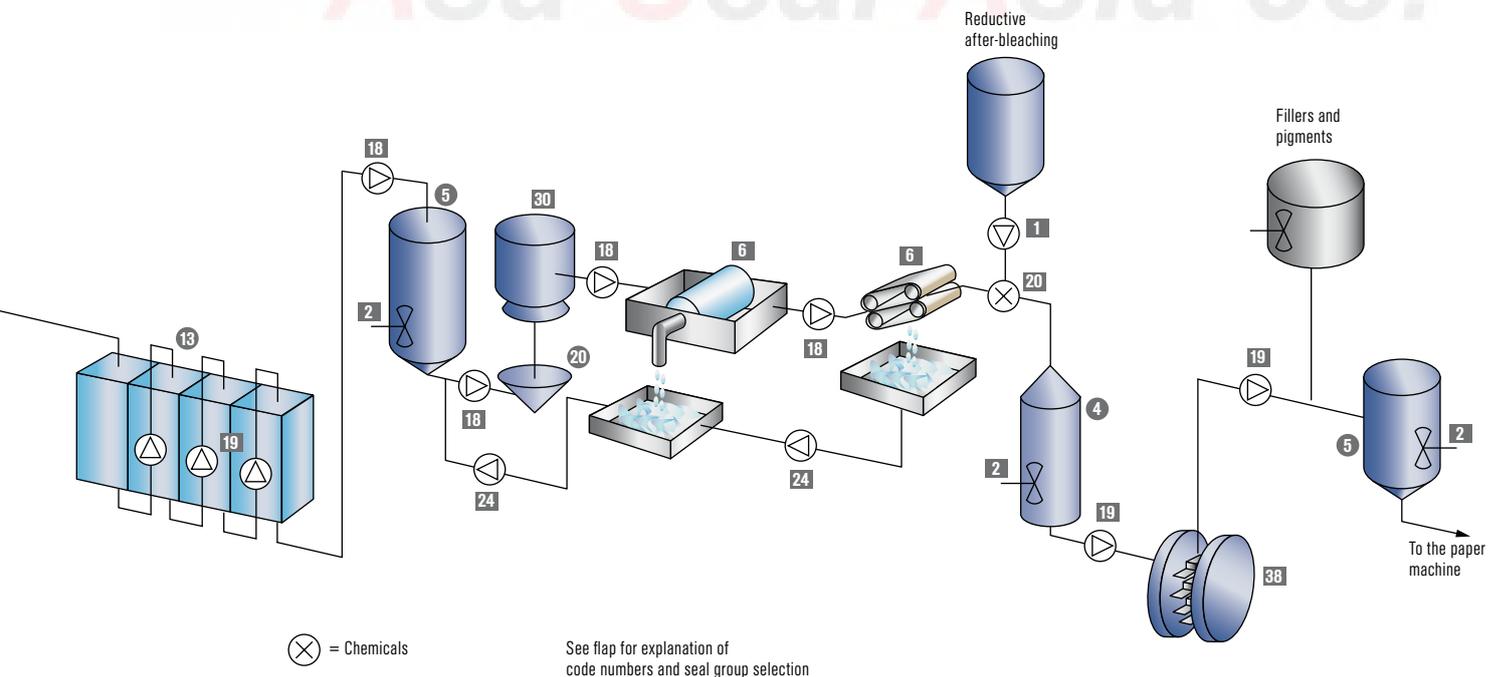
HR10



5% (right) and 15% waste paper stock.



Asa Seal Asia co.

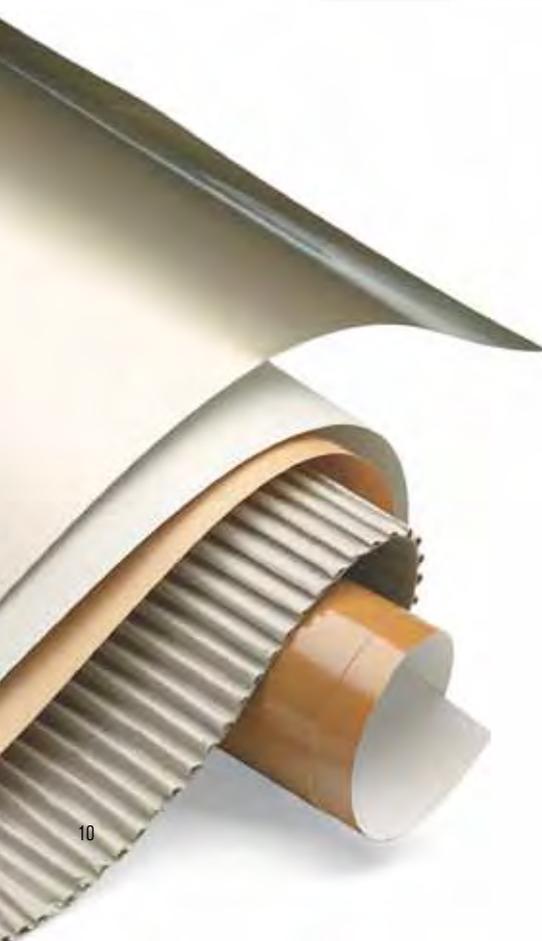
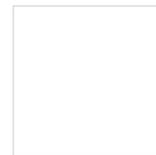


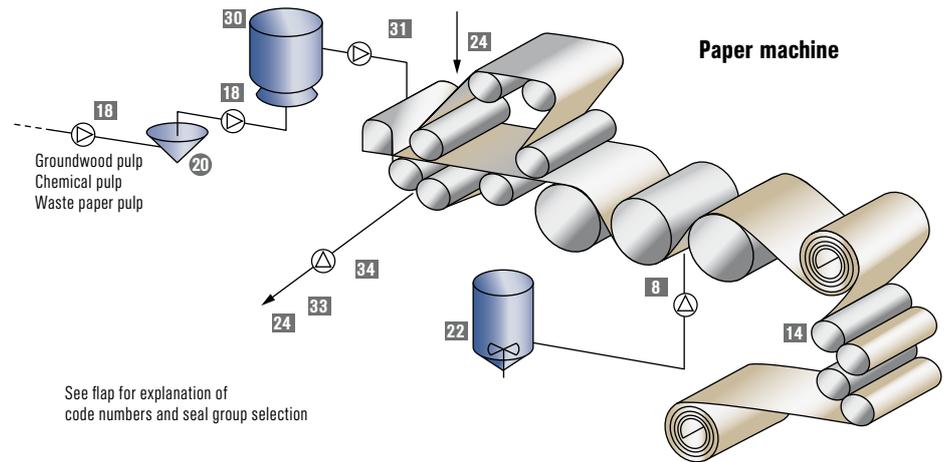


Paper production

All the raw material components (groundwood pulp, chemical pulp, waste paper pulp, fillers and other additives) are fed to the stock preparation plant where the stock is mixed. The circulating water from the paper machines is used to dilute the stock according to the requirements of the chosen paper (consistencies from around 0.1 to 1.3 %), and before the stock is fed into the head box it is cleaned again. The standard equipment used for mechanical paper production is the endless wire paper machine, which contrasts with the board machine on which different types of boards can be made. The stock is transferred from the head box to the wire section where the water is removed from the endless web of paper. Most of the water which has to be removed is removed in the wire section and the web of paper is then transferred to the press section. More water is removed under the application of pressure and vacuum.

Following the press section the web of paper, which is still damp, is forwarded to the drying section where all remaining moisture is removed by rotating drying cylinders heated by steam on the inside. This is followed by the calender section, comprised of 5 to 8 rolls, where the paper, which is still rough at this stage, is smoothed out.

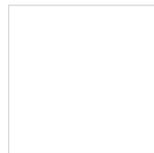




See flap for explanation of code numbers and seal group selection

Paper finishing

Depending on the quality of paper required the paper machine may be followed by further units for upgrading the web of paper. One method used for improving the surface quality and printability of the paper is coating. In this operation a coating paste comprised of pigments and binding agents is applied to the surface of the raw paper. In terms of the coating process itself a distinction is made between doctor blade coating, coating with film presses and new coating processes such as curtain coating and spray coating. Coating is used above all for graphics papers. However, even after it has been through the smoothing rolls in the machine the paper still has not achieved the quality required for high-grade writing paper and printing paper. This is only achieved by calendering, in which the paper is compacted and the surface upgraded even further. Here the webs of paper run through 4 to 10 pairs of rolls in the calender which are either heated or cooled depending on requirements.





RGP 68 DD (Metso) at SCA



Refiner grinding disc



S2000 Refiner from Andritz

Applications for mechanical seals

Fiberizing processes

Refiners

Single disc refiners have a fixed and a rotating disc whereas double disc refiners have two counter-rotating discs. The fiberized material leaves the refiner together with the process water and is either forwarded directly to the sorting section or is ground further in a second refiner stage, normally under atmospheric pressure, until it has reached the required degree of grinding.

Operating conditions:

Temperature ... 200 °C
 Pressure ... 16 bar
 Sliding velocity ... 40 m/s
 Axial displacement of the shaft
 0.2 ... 100 mm.
 Medium: Wood fiber, lignin,
 water(steam)

Seal solution: H-D double seal with a stationary spring arrangement protected from the product, and rotating seat. Flushing on the product side prevents the medium from entering the sealing compartment (as used, for example, in Andritz, Pallmann and Metso refiners; where water flushing is on the product side these seals last for about 5 to 8 .(operating years on average

Pressure grinding machines

When it comes to grinding processes, pressure grinding is now the most widely used method because it produces a higher quality of pulp. The fibers are loosened by grains of corundum embedded in the surface of the grinding stone. The fibers isolated from the tissue structure in this way are sprayed with jets of water to remove them from surface of the stone, to land in a grinding trough below the stone.

Operating conditions:

Temperature ... 150 °C
 Pressure ... 6 bar
 Speed ... 350 min⁻¹
 Shaft diameter ... 450 mm
 Shaft displacement: Axial ... ± 4 mm;
 radial ... ± 1 mm
 Medium: Groundwood pulp,
 water(steam)

Seal solution: HSSHRS8-D4 double seal of cartridge design; rotating seat, stationary spring arrangement protected from the medium, seal faces with hydrodynamic grooves for better lubrication of the sliding faces, clean water as the buffer medium. Seals in pressure grinding machines (from Metso, for example) have to be as reliable as possible. This is because every repair necessitates dismantling the entire rotating unit of the pressure-grinding machine (shaft, grinding stone, bearings and seal), resulting in at least three days of lost production, including shutting down and starting up the grinder. With the service life of the grinding stone generally being about four years, the seal is .increasingly expected to last just as long



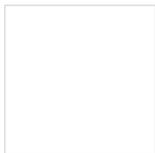
Metso refiner for groundwood pulp production



Pulp transportation

Centrifugal pumps (stock pumps)

The design of pump to be used will vary according to the consistency of the pulp (thin, medium or thick pulp). The vast majority are pumps for thin pulp with a pulp consistency of up to a maximum of 8 % abs. dry. There are also special forms of thin pulp pumps such as, for example, fan pumps and digester pumps. So-called MC pumps (MC = medium consistency) are used for conveying pulp in the medium consistency range of between 8 to 18 % abs. dry. These are used mainly in the bleaching stage, but are also widely used for the processing of waste paper as well. Centrifugal pumps are not suitable for thick pulp.



Operating conditions:
 Temperature 20 ... 170 °C
 Pressure ... 25 bar
 Sliding velocity ... 30 m/s
 Resistance to chemicals pH 0 ... 14

Medium: Water with pulp; abrasive contamination and solids; poor lubrication characteristics, to some extent harmful to the environment.

Seal solution:

- MG12, MFL85N, HJ977GN component seals
- e.g. MG12S14/ d1■
 G1 rubber bellows single seal with a rugged spring with unrestricted allround flushing, and no dynamic O-ring. The special feature here is the enlarged gap between the shaft and the inner diameter of the seat.
- Cartex-SNO, LP-S single cartridge seals, e.g. LP-S-S32-E10/60-00, a semi-cartridge seal adapted to the machine featuring a stationary super sinus spring arrangement protected from the product, rotating seat with double elastic support, shrink-fitted sliding faces, smooth external contours on all seal parts in contact with the product.



Sulzer Ahlstar UP equipped with a Cartex-DN (double seal).

- Cartex- DN, LP-D double cartridge seals, e.g. Cartex-DN/60-E31 double cartridge seal with a pressurized buffer water supply, stationary and encapsulated springs, rotating seat, self-closing in case of pressure reversal (double balancing), can also be used as a single seal with quench, quick and easy to install. The Cartex is one of the most successful cartridge seals available, and that applies to pulp and paper production as well. Just some of the companies who use it are Stora Enso, Norrsundet/Sweden, Iggesund Paper, Iggesund/Sweden, Smurfit Kappa, Piteå/Sweden, Zellstoff Pöls, Austria



Mixing processes

In the pulp and paper industry, mixers are used either for blending different media, homogenizing ready-prepared mixtures or preventing existing mixtures from segregating again. Given the diversity of tasks that mixers are required to fulfill they also vary considerably in terms of design, e.g. pumps (largely horizontal centrifugal pumps) or agitators with top, bottom or side drives.

Operating conditions:
 Temperature ... 180 °C
 Pressure ... 18 bar
 Speed ... 1,500 min⁻¹
 Shaft diameter ... 240 mm
 Medium: Pulp suspension with a consistency of 0.1 % to 8 % abs. dry, chemicals

Seal solutions:
 HGH, MG, HJ, LP-D, MR-D and even Cartex®, e.g. HGH210/10-E6 half-split mechanical seal for a chest agitator at Sappi Lanaken/Belgium. Installation is from the outside, horizontal (or vertical). It is important that there is sufficient axial latitude to enable the seal housing and seat housings to be pulled back far

enough to allow access to the sliding parts. The only parts that are split are the actual wearing parts, such as the seal face, the seat and the O-rings. They can therefore be replaced easily without the need for complete dismantling. Operation is with flushing into the product (which prevents concentrations of the product building up on the sliding faces) and a quench on the atmospheric side. If a stand-still seal is fitted it is also possible to carry out inspection work on the seal without interrupting operations, even with a full container.



HGH

Sorting

The job of the sorting machine is to remove foreign material such as sand and undesirable form elements such as splinters. The sorting operation is carried out at a high level of dilution (pulp consistency of no more than 2 % abs. dry) to ensure that the foreign material can move with relative freedom. Vertical sorters operating under pressure are normally used these days. The advantages of these kinds of plants are that they offer high throughputs, are insensitive to load variations and have closed systems of pipework which means they lose less steam and heat.

Operating conditions:
 Temperature ... max. 80 °C
 Pressure ... max. 12 bar
 Speed ... 2,500 min⁻¹
 Shaft diameter ... 175 mm
 Medium: Pulp suspension with a maximum pulp consistency of 4 %
 Axial displacement of the shaft ± 1mm
 Installation position: vertical

Seal solution:
 HR, LP-D, HRS-D
 e.g. HR10S2/100-G11E1 single cartridge seal for a Voith sorter with rotating seat and stationary, group spring arrangement protected from the medium.
 LP-D-ST-D15/130-DE double seal for a Metso Tampella sorter in non-flow operation without buffer fluid system, with substantially reduced water consumption in use at the Palm paper factory in Wörth.



Paper finishing

Eccentric screw pumps

Eccentric screw pumps are used mainly for the finishing of the raw paper, e.g. for the preparation of coating paste. The media used here are generally characterized by a high solid content, high viscosity and tendency to stick, which means they have poor lubrication properties.

Operating conditions:

Temperature approx. 40 °C

Pressure 1... 4 bar

Speed ... 400 min⁻¹

Medium: Coating pastes with latex

Seal solutions:

MG1S50/65-G6 single seal with elastomer bellows, seal face with knife edge.

Cartex-DN/55-E2 Double cartridge-style seal, pressurized buffer medium (as used, for example, by BASF in Ludwigshafen: Pulp & Paper Test Center, dispersing plant).

Calender rolls

Heat is generated by the high pressing forces and friction involved, which has a strong influence on the results of the calendaring process. For heavy glazing, therefore, the steel rolls have to be cooled, whereas light glazing requires them to be heated.

Operating conditions:

Temperature ... max. 200 ... 300 °C

Pressure ... max. 5 bar

Speed ... 600 min⁻¹

Shaft diameter ... 460 mm

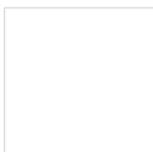
Medium: Thermal oil

Special features: Expansion of the long rolls under heat

Seal solution: MFLW81 metal bellows seal for high temperature applications (as in Küsters calender rolls, for example).



Calenders (Kleinewefers; Küsters): MFL W80S1/475 seals are used successfully to seal off the oil used for heating the rolls and for lubricating the bearings. (p₁ = ... 6 bar; t = 20 ... ; 200 °C
n = ... 462 min⁻¹; axial displacement ± 7 mm).





BestFlow: Temperature-controlled valve for 'non-flow' operation

Greater cost effectiveness thanks to reduced water consumption

As little water as possible, as much water as required

The costs of water and sealing water management have become increasingly important issues in the paper and pulp industry over recent years. Growth in environmental awareness, stricter environmental regulations, water recirculation systems which are largely self-contained, the increasing cost and effort associated with supplying and treating the water and higher operating costs in general have all led to a change in approach and are the main reasons for this development. An approach which protects resources is not only good for the environment - saving water and energy also makes it possible to achieve substantial and above all measurable reductions in costs. Furthermore, investigations have also shown that actual consumption levels are often above recommended

levels because this is believed to be necessary for safety reasons. Many producers of pulp and paper are therefore keen to run seal systems with methods of operation which, while meeting requirements for necessary operational safety, use only minimum amounts of water or, where possible, even dispense altogether with the use of sealing systems involving flushing or buffer water.

FLC200: Control unit for the individual setting and monitoring of pressure and flow rate at the seal





Major potential for savings

Mechanical seals, single seals with or without flushing and/or a quench, and double seals with pressurized water supply all operate in different ways and these differences have a major influence on the amount of water they use. For example, the use of a supply unit along with the operation of a double seal can, subject to specific operating conditions, achieve savings in buffer water consumption of up to 97 % compared to operation with an open flow.

Low outlay, big effect: A range of different control units can be used to control and reduce the water supply, depending on each specific application. offers a range of systems designed to help save water without any impairment to the safe and reliable operation of the mechanical seals.

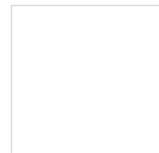
Seal Asia co.



Thermosiphon System: A supply unit with a closed circuit for double seals in which the only water consumption is the leakage on the seal, which has to be replaced



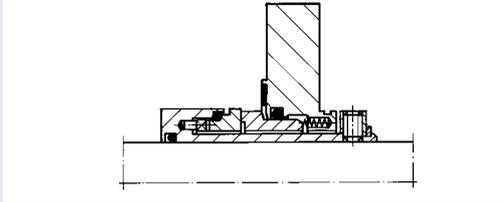
FLC100 Flow Controller: A control unit for a constant, pre-defined and pressure-independent flow



Selecting mechanical seals for individual applications

Group S

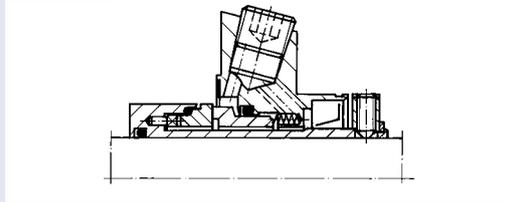
Cartex-SNO



Single cartridge seal. Designed for retrofitting pumps by the end-user. Stationary spring arrangement protected from the product. Complete with flush connection as standard.

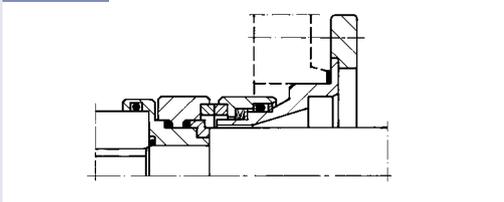
Group Q

Cartex-QN



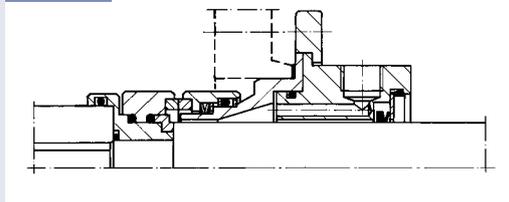
Cartridge seal with quench.

LP-S



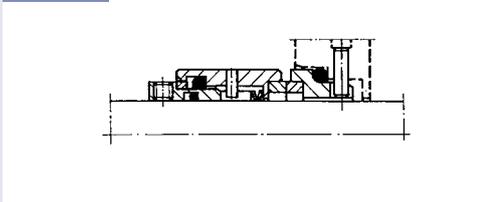
Single seal of modular design for easy upgrading into a Q and/or D version. Service-proven design as original equipment for stepped shafts. Rotating seat, encapsulated spring.

LP-Q



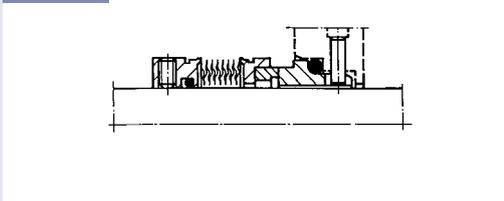
Same design and characteristics as the LP-S but with quench cylinder, lip seal and threaded port on the atmosphere side.

HJ977GN10



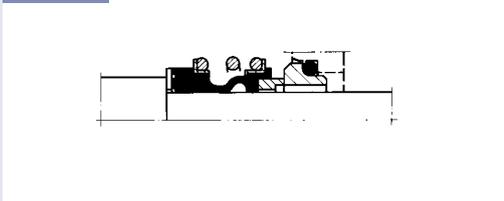
Single seal. Rotating, encapsulated springs. Fitting dimensions to EN 12756. Reversal pressure design.

MFL85N6



Single seal with metal bellows. No dynamic O-ring. Open space in the seal area, all-around flushable. Fitting dimensions to EN 12756.

MG12S14

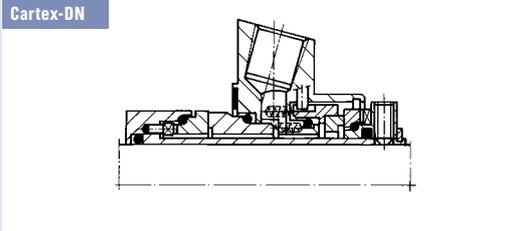


Rubber bellows single seal. Robust spring with unrestricted all-around flushing. Enlarged gap to the shaft on the atmosphere side. Seat fitting dimensions to EN 12756.



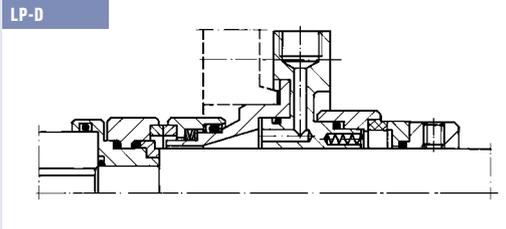
Group D

Cartex-DN



Double cartridge-type seal. Self-closing in the event of pressure reversal (double balanced). Can be operated as a single seal with quench.

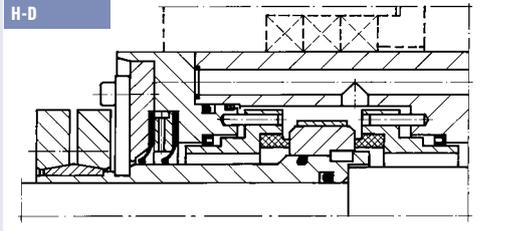
LP-D



Double seal of the same design as the LP-S on the product side but with a flange on the atmosphere side with a second, internally pressurized mechanical seal.

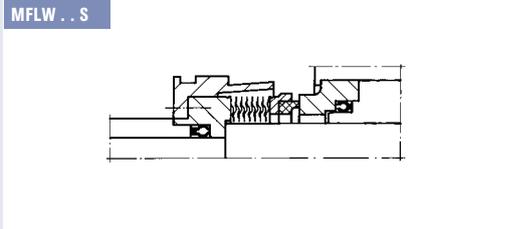
Group X

H-D



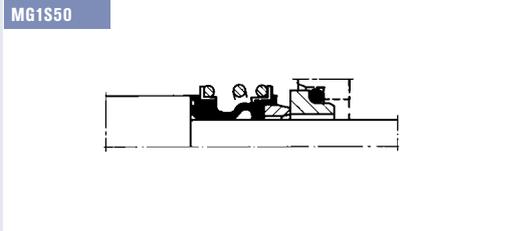
Example of a special double seal with stationary springs and rotating seat used in refiners successfully now for more than 15 years.

MFLW . . S



Example of a special single metal bellows seal used in calender rolls.

MG1S50



Rubber bellows seal with knife edge face successfully used in eccentric screw pumps for latex-containing coating paste.



Seal groups and recommendations

Code No.	Machine	Process							Seal group
		Sulphate	Sulphite	PGW	SGW	CTMP	TMP	De-inking	
1	Bleach pump	●	●	●	●	●	●	●	D
2	Chest agitator	●	●	●	●	●	●	●	S
3	Strong liquor pump	●	●	-	-	-	-	-	Q/D
4	Pressure grinder	-	-	●	-	-	-	-	X
5	Weak liquor pump	●	●	-	-	-	-	-	Q/D
6	Thickener	●	●	●	●	●	●	●	Q
7	Deflaker	○	○	○	○	○	○	●	S
8	Eccentric pump	●	●	●	●	●	●	●	S/D
9	Flotation pump	-	-	-	-	-	-	●	S
10	Fluffer	○	○	○	○	○	○	○	X
11	Conveyor screw	●	●	○	○	●	●	○	Q
12	Shredder	○	○	●	●	○	○	-	D
13	HC pump	●	●	●	●	●	●	●	X
14	Calender rolls	○	○	○	○	○	○	○	X
15	Digesting agitator	●	●	-	-	-	-	-	D
16	Digester pump	●	●	-	-	-	-	-	D/Q
17	Condensate pump	●	●	-	-	●	●	-	S
18	LC pump	●	●	●	●	●	●	●	S
19	MC pump	●	●	●	●	●	●	●	D
20	Mixer	○	○	○	○	○	○	○	S/D/X
21	Plugscrew feeder	-	-	-	-	●	●	-	Q
22	Disperser	●	●	●	●	●	●	●	D
23	Refiner	○	○	○	○	●	●	○	X
24	White water pump	●	●	●	●	●	●	●	S
25	Scraper	○	○	○	○	○	○	○	Q
26	Grinder	-	-	-	●	-	-	-	X
27	Screw press	○	○	○	○	○	○	○	Q, D
28	Separator	○	○	○	○	○	○	●	S
29	Slurry pump	●	●	●	●	●	●	●	D
30	Sorter	●	●	●	●	●	●	●	X/D/S
31	Fan pump	●	●	●	●	●	●	●	S
32	Pulper	-	-	-	-	-	-	●	D
33	Stock pump	●	●	●	●	●	●	●	S/Q
34	Vacuum pump	○	○	○	○	○	○	○	S/Q/D
35	Pre-heater	○	○	-	-	●	●	-	S
36	Washer	○	○	○	○	○	○	○	S
37	Rotary valve	○	○	-	-	●	●	-	-
38	Fibrizer	○	○	○	○	○	○	●	D
39	Coating paste pump	○	○	○	○	○	○	○	X

- Machine/unit used in the process
- Machine possible in the process
- Machine not used in the process

- S** = Single seal
- Q** = Single seal with quench
- D** = Double seal
- X** = Special design

Seal groups and types

From within the groups it is possible to select the seal suitable for the specific requirements of the machines needing to be sealed. The seal types and their special features are listed on the following page (p. 19). As a rule, all the mechanical seals described are able to comply, in terms of pressure, temperature and velocity, with the conditions of application found in pulp and paper production

S Single seals

- LP-S
- HJ977GN(10)
- MFL85N(6)
- MG1S50
- MG12S14
- Cartex-SNO

Q Single seals with quench $p_1 > p_3$

- LP-Q
- Cartex-QN

D Double seals $p_1 > p_3$

- LP-D
- M7N/M7N back-to-back
- M74-D
- Cartex-DN

X Special designs

- H-D (example)
- MFLW.S (example)
- HR...
- LP..
- HGH...

Designation of other machines and plant components

The components marked in the diagrams with a number in a circle are included for better understanding of the various processes.

- 1 Waste paper
- 2 Dilution tank
- 3 Make-up tower
- 4 Bleaching tower
- 5 Chest
- 6 Flue gas cleaner
- 7 Cleaner
- 8 Diffuser
- 9 Evaporator
- 10 Barking drum
- 11 Extraction tower
- 12 Filter
- 13 Flotation machine
- 14 Green liquor clarifier
- 15 Chipper
- 16 Chip pile
- 17 Chip bin
- 18 Chip sorter
- 19 Chip washer
- 20 Hydrocyclone
- 21 Lime kiln
- 22 Causticizer
- 23 Slaker
- 24 Recovery boiler
- 25 Centricleaner
- 26 Lime sludge washer
- 27 Sorter drum
- 28 Washing tower
- 29 White liquor clarifier
- 30 Vibration screen
- 31 Cyclone

Standard materials

Combinations of face materials:

Preferably silicon carbide (S-SiC/S-SiC). For double seals also SiC/carbon graphite on the product/atmosphere side. Where there is a risk of running dry: SiC (carbon graphite).

Secondary seals, O-rings:

FKM (e.g. Viton®), EPDM, FFKM (e.g. Kalrez®), PTFE

Spring and construction materials:

1.4571 (AISI 316 Ti); 1.4462, 2.4610 (e.g. Hastelloy® C-4), Inconel® 718

Certification

ISO 9001:2000

EN 9100

ISO 14001

OHSAS 18001

ATEX 94/9/EG

QHD
Qualified Hygienic
Design VDMA

DIN/EN 729-2
HPO certified

KTA 1401
Certified for
Nuclear
Power Plants

ISO TS 16949

Specialist company
in accordance with
the German Water
Resources Act
(Section 19)

Germanischer Lloyd
Approvals

ICC
test center

Umweltpakt
Bayern
(Bavarian
Environment
Agreement)

All current
certificates:

QM



(Plant I Wollratshausen (D))



(Niigata (J))



(Plant II Eurasburg (D))



(Plant Judenburg (A))



An alliance with a great deal to offer our customers and partners

Under the joint name of Industries, and Eagle Industry, Japan's leading manufacturer of mechanical seals, together form the foundation stone for a global alliance – an alliance with a dedication to quality and service and a pronounced customer orientation.

The basis of this arrangement is an intensive and trusting cooperation that notably strengthens the global competitiveness of both partners and makes them one of the top suppliers of sealing technology in the world market. A world-wide presence, market-orientated products and high-quality services must also be mentioned as key factors of success. All this, together with the know-how and dedication of our employees, means that we have considerable potential to offer our customers.



We are there when you need us

Customers want proximity, speed and solutions to their problems. Thanks to our world-wide presence, flexibility and specialist know-how we can face these challenges with quiet confidence. All over the world we offer our in-depth package of services – from the simple stuffing box packing to the complex high-tech seal, plus the backing of our „Total Seal Care“ modular support offering, which allows each customer to put together exactly the right package for his individual needs. Numerous service contracts and international agreements attest to the trust which top-name companies place in our expertise and confirm the quality of our services.



Helping to make our customers even more successful

Our customers expect their plants to run without a hitch. To this end we draw up innovative and user-friendly seal solutions which make sound economic sense and also contribute to compliance with the highest requirements in terms of safety and the protection of the environment. Our mission is to enhance our customers' efficiency and productivity and be recognized world-wide as a reliable and expert partner for high quality and leading-edge technology. A key role in achieving these goals and helping to make our customers even more successful is played by our employees and their technical expertise, creativity, motivation and efficiency.

