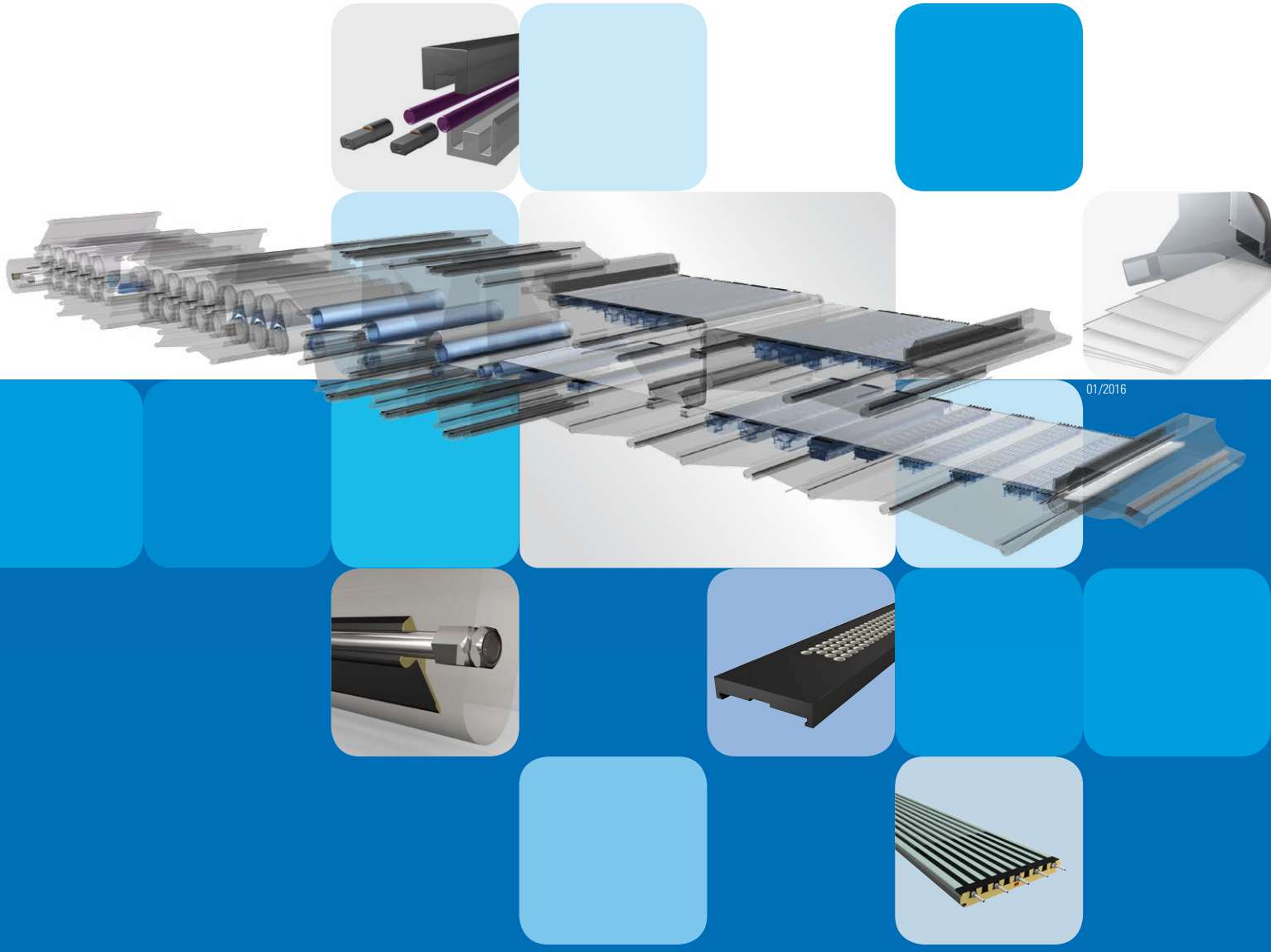
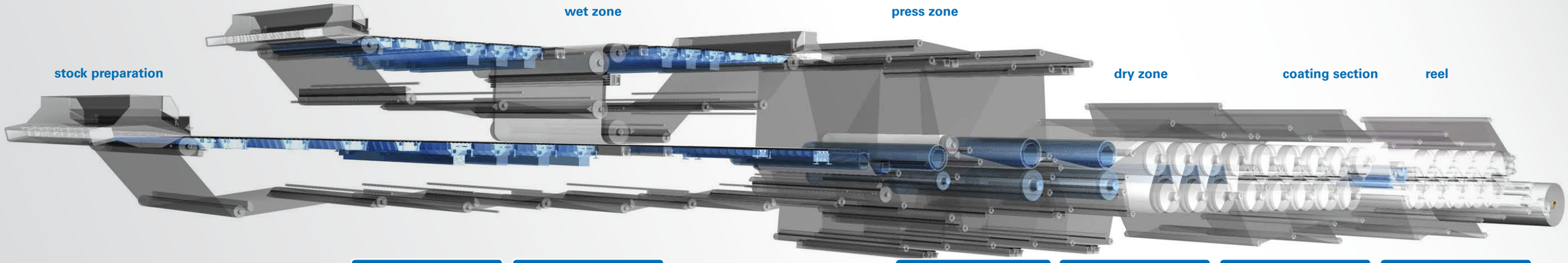
RÖCHLING

Product overview



01/2016

Wear parts
for the paper industry



Stock preparation
Cleaner cones, distribution blocks, distribution discs, turbulence tubes, head box vanes

Dewatering elements
- Available in UHMW-Polyethylene
- Available in ceramics

Suction rolls sealing strips
available in rubber-graphite & UHMW-Polyethylene, sealing systems, sealing strip holders, tubes

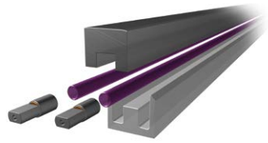
Doctor blades & sealing units
Doctor blades, sealing units in the dry zone, single and multiple lip seal

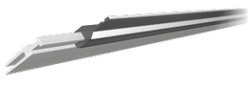
Gear wheels
as a ring or in segment design

Coating systems
Metering rod beds, metering rods, couplings & connectors in all forms

Color code at LERIPA-products:

- Light-products
- Premium products





Content

Röchling LERIPA Papertech production site at Oepping (Upper Austria)

77 sites
in 22 countries

Competence. Quality. Innovation.

RÖCHLING
Competence in Plastics

Röchling Group

Röchling Group was founded in 1822 and has been active in the field of plastic processing for more than 90 years. The internationally active Plastic Group leader, with its headquarters in Mannheim (Germany), has 77 companies in more than 22 countries around the world.

With the company's two main business areas of high performance and automotive plastics, the Röchling-Group concentrates on processing high-value semi-processed plastic products, prefabricated parts and systems for various industrial applications.

www.roechling.com

World market leader
for plastic wear parts

World market leader
for rubber graphite sealing strips

World market leader
for ceramic dewatering elements

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Tel.: +43 7289 4611-0 | Fax: +43 7289 4611-9900
robaproducts@leripa.com
www.leripa.com

Röchling LERIPA Papertech
= advanced wear solutions

Being no.1 in advanced wear solutions made from **plastic, ceramics and rubber graphite** for the paper industry, we know the exact needs of our customers – this is the basis for our worldwide quality and technological leadership.

After all, we can look back on a 300-year history. Since 1930, LERIPA has specialized in the production of wear parts for the international pulp and paper industry. With the invention of the very first synthetic dewatering element in 1961, ROBALIT 61, a breakthrough was achieved. A success story that continues today.

You will receive our products in the best possible condition accompanied with our top service.

Trust the experts!

Röchling LERIPA Papertech GmbH & Co KG
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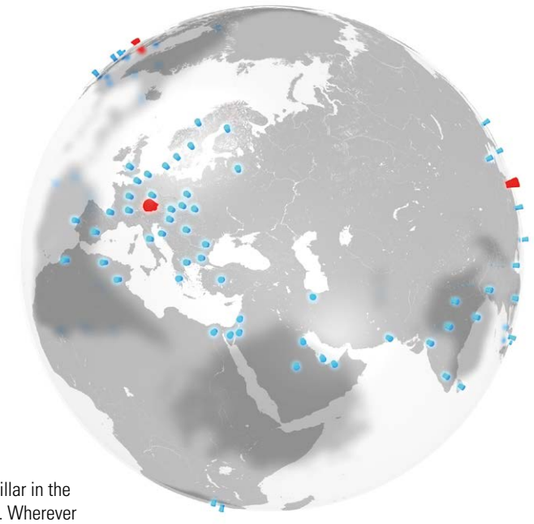
SUCCESS
is teamwork



As worldwide supplier, Röchling LERIPA Papertech has a global sales network.

Röchling LERIPA Papertech looks after their customers with a proven combination of agents, sales managers, product managers and sales representatives, as well as application and service technicians.

Their two subsidiaries and 65 sales partners are an important pillar in the worldwide team network support at Röchling LERIPA Papertech. Wherever you are, we are there to assist you.

Tested quality -
leadership through innovation
Each problem is a new challenge.
And each new product development follows our aim of providing the best possible results to the paper industry.

Basis are the ISO 9001 and SCC certifications.

Increased wear parts efficiency

Physics and technology describe efficiency as the balance between achieved performances and operating expenditure. In economics we call this the balance of benefits and costs.

Economic principle
When comparing benefits and costs, one recognizes efficient products when the tendency is clearly moving towards the benefit side. Therefore, we see efficiency improvement as a basis and as a matter of fact for all products and product developments.

IMPROVEMENT OF EFFICIENCY is a matter of fact for us

Sliding SURFACES Smooth FINISH

↓

Less FRICTION

↓

Lower DRIVING ENERGY

↓

Higher LIFETIME

↓

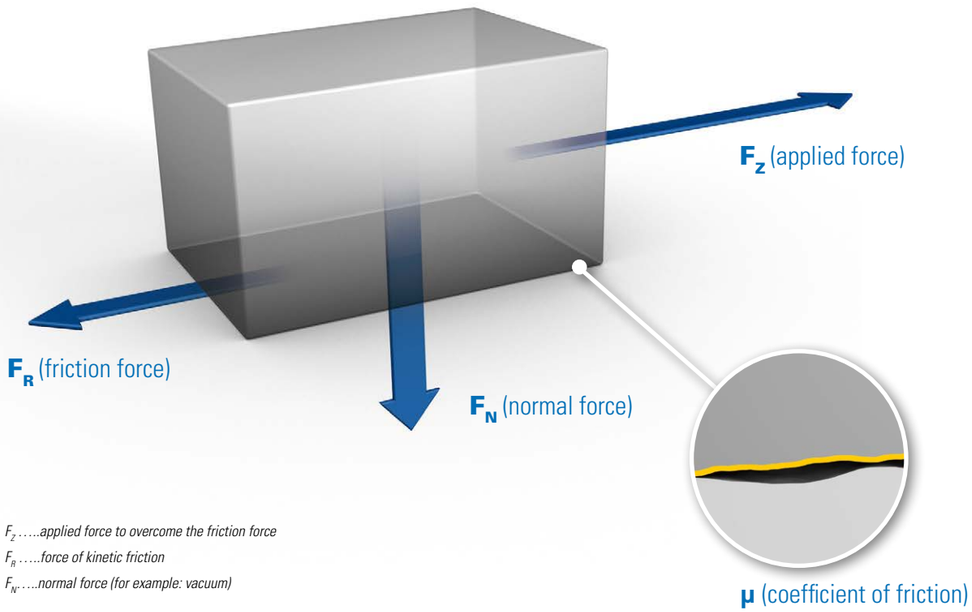
COST REDUCTION

Surface roughness and friction coefficient are the two most important factors for a paper machine

The surface roughness
describes the roughness of a technical surface which has been produced e.g. through cutting, grinding, polishing or forming processes. To determine this value, the surface of a defined length is measured; all peaks and depth differences of the rough surface are recorded. After calculating the defined integral of the roughness, the result is then divided by the length of the test section. The span of roughness values range from very rough surfaces with noticeable grooves of 25 µm, up to no longer visible tool marks of 0.1 µm, through to having a completely smooth surface of Ra = 0.01 µm.

The friction value
also known as the friction coefficient [µ], the friction value is a value of how high the friction forces are which act between the two solid bodies. This term belongs to the field of tribology.

F_R (friction force) = µ (coefficient of friction) × F_N (normal force)



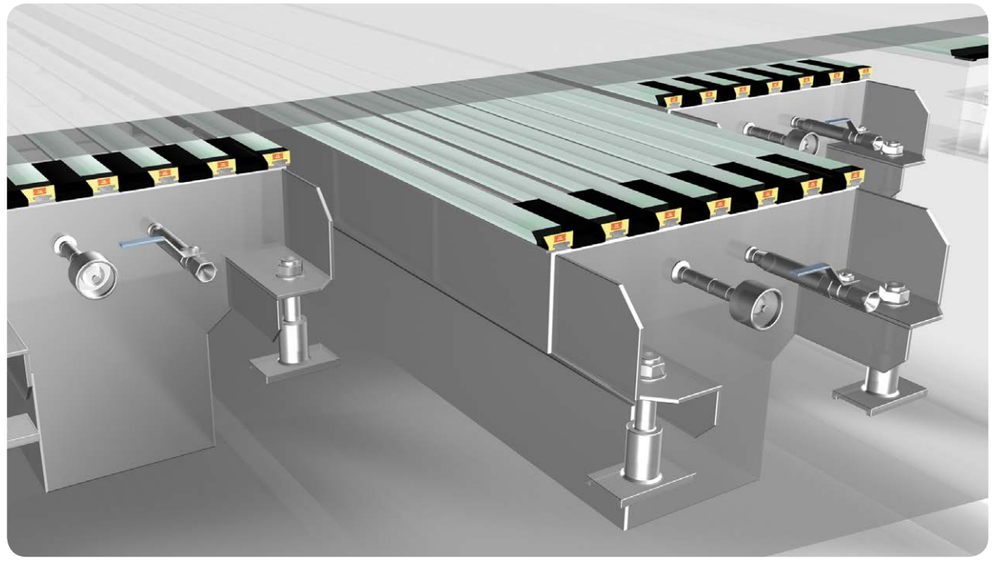
F_Z .....applied force to overcome the friction force
F_R .....force of kinetic friction
F_N.....normal force (for example: vacuum)

Improvement of efficiency at LERIPA

Tribological approaches / optimization of friction processes

It is Röchling LERIPA Papertech's intention to continually develop their products in such a way that friction and wear of the product (e.g. drainage elements) are reduced, thereby increasing the product longevity, as well as the longevity of the friction partner (e.g. sieve, felt) at the same time.

This is achieved through continuous improvement processes in the product development and through permanent quality improvement.



The correct choice is RÖCHLING LERIPA PAPERTECH

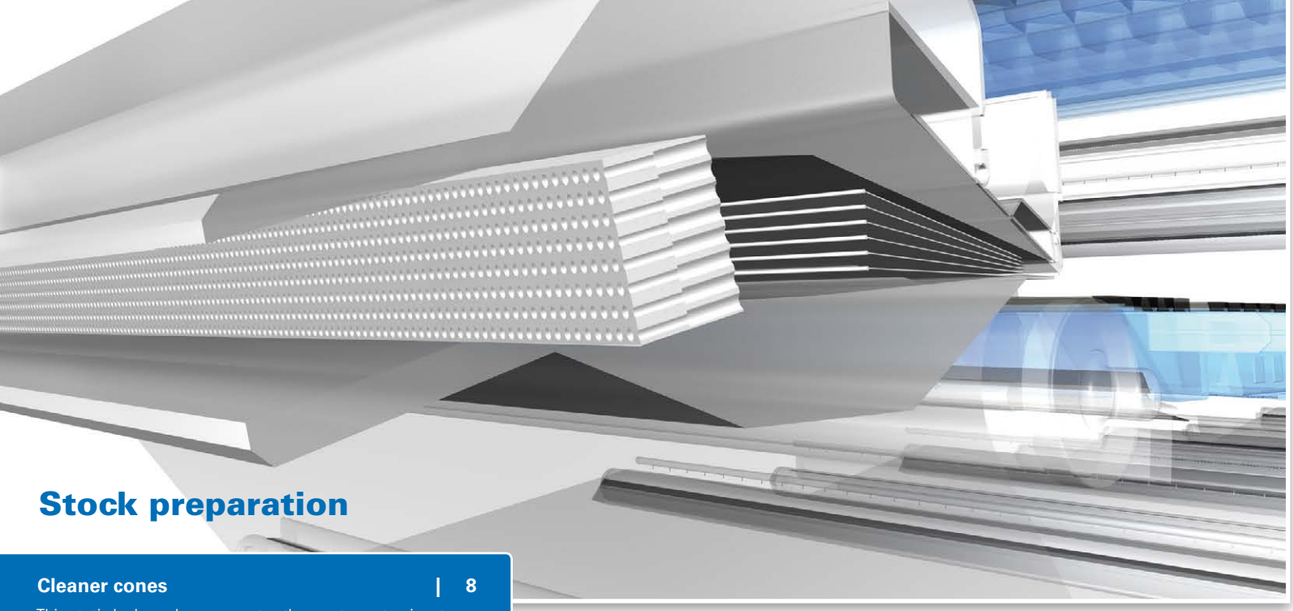
By choosing the correct wear partners and materials, a positive change to the energy balance can be achieved without changing the geometrical shape and without technical reconstruction.

**WE ARE THE SPECIALISTS FOR THESE CHOICES.
DO NOT SETTLE FOR LESS!**

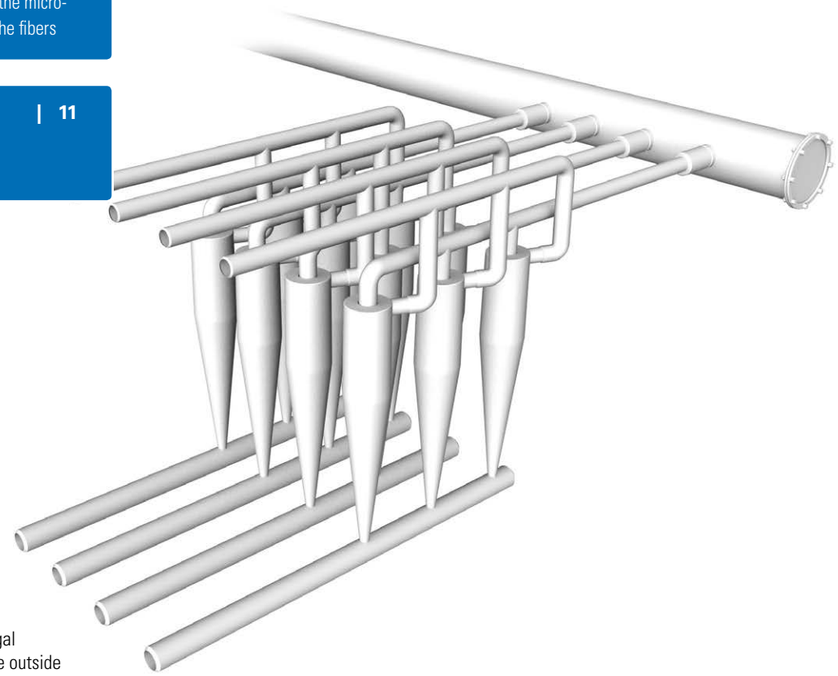
Wear parts from Leripa stand for:

- **Extension of durability**
  of at least one of the wear partners
- **Customer specific solutions**
  with technical expert advice
- **Low adaptations**
  e.g. replacement of wear parts
- **No changes to the current system**
  e.g. no reconstruction of the paper machine

The correct choice of wear parts INCREASES YOUR PROFITS!



Stock preparation



Cleaner Cones

Function:
Static hydrocyclones separate contaminations from fibers by using centrifugal force. Heavier particles will move to the outside and down whereas the lighter fraction can be separated in the middle.

The longer the process surfaces of the hydrocyclone stay intact, the longer an excellent separation will be maintained.
An optimization of this static part gives a better separation of the requested fibers, gives a better utilization of the resources and therefore a better efficiency of the raw material.

ROBACLEAN is made exclusively of highly wear-resistant plastic and offers a multiple lifetime and optimized performance, especially compared to all other injection molded plastic cleaner cones.

ROBACLEAN™-P
Cleaner cones made of ultra high molecular long term sintered polyethylene with optimized cost-performance ratio

- **Made of long term sintered ROBADUR**
  - High wear resistance among plastics
  - Reduction of service intervals (change of units)
  - Availability of all relevant cone designs
- **Boil out resistant**
- **Higher efficiency of fiber recovery (separation effect runs longer)**

Product range:
LC + HC cleaner
All standard cone designs

HIGHER LIFETIME
UP TO 5 TIMES

The unique assembling guarantees a multiple lifetime compared to conventional plastic cleaners:

	ROBACLEAN Cleaner Cone (KS 160)	**Konkurrenz** Cleaner Cone (KS 160)
Original diameter	18 mm	18 mm
Diameter after 5 weeks	**18.6 mm**	**25 mm**

Customer example: ecopaper - ROMANIA

Overview of Cleaner

	lifetime	investment	Fiber recovery	Efficiency increase	
	low → **high**	**fair** → costly	low → **high**		
ROBACLEAN-P				Premiumcleaner	
Polyamide (PA)				-	(Competitive materials)
Polyurethane (PUR)				-	(Competitive materials)

Distribution blocks / discs / tubes

Function:
The splitting of the feed stream to the head box into single “tubes” increases the contact from the suspension to the tube wall and creates higher micro turbulences. In the flow direction, the diameter of the tube opens abruptly. This impulse, or sudden pressure decrease, again creates micro turbulences and leads to deflocculation of fibers as desired.

ROBATEC is ideally suited for this important part of the paper machine. ROBATEC provides perfect and exact machined surfaces to create the requested deflocculation.

ROBATEC®-E
Ultra high molecular weight polyethylene with perfect cost-performance ratio

- **High chemical resistance (against acids and caustics)**
- **Full hydrolyze resistant**
- **No moisture expansion**

LOW COST solution

Application:
Distribution blocks, distribution discs, turbulence tubes, special parts
Delivery program blocks: max. 6,000 x 400 x 160 mm (LxWxH)
Delivery program discs: Ø 2,800 x 180 mm

ROBATEC®-A
Modified polyamide with surface optimization

- **Chemical resistance against caustics**
- **High surface quality (smoothness)**
- **Increased stiffness (tensile strength)**
- **Low thermal elongation**

CLASSIC line

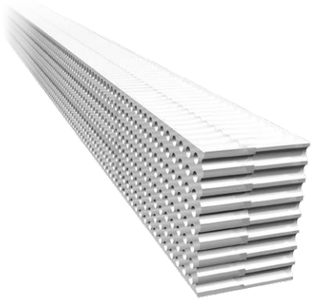
Application:
Distribution blocks, distribution discs, turbulence tubes
Delivery program blocks: max. 7,500 x 350 x 250 mm (LxWxH)
Delivery program discs: Ø 2,800 x 180 mm

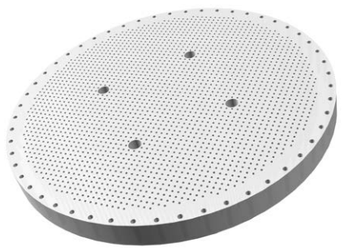
ROBATEC®-O
Polyoxymethylen with superb surface quality

- **Perfect surface quality**
- **Chemical resistant**
- **Low water absorption**
- **Low wear**
- **High tensile strength combines with high ductility**

COST/PERFORMANCE WINNER

Application:
Turbulence tubes, inserts for turbulence tubes





Overview of distributor blocks

	max. surface roughness [Ra]	lifetime low → **high**	investment **fair** → costly	Surface quality low → **high**	Efficiency increase
ROBATEC-E	0.5 - 1.0				cost - performance winner
ROBATEC-A	0.5 - 0.8				optimized function: great surface

Overview of turbulence tubes

	max. surface roughness [Ra]	lifetime low → **high**	investment **fair** → costly	Surface quality low → **high**	Efficiency increase
ROBATEC-E	0.5 - 1.0				cost - performance winner
ROBATEC-A	0.5 - 0.8				optimized function: great surface
ROBATEC-O	0.3 - 0.7				optimized function: superb surface

Head box vanes

Function:
Head box vanes are essential elements for optimizing formation and the best performance within the head box. Vanes are installed into the headbox to separate the layers or to create a turbulence. In this way, micro turbulences are created along the border surfaces between suspension and vanes surface.
Brittleness of existing PC (Lexan) or PVC vanes prompted LERIPA to invest in intensive development work in material and production processes. Today, the ROBAFLOW product range is enriched through an enormous variety of shapes, an increased resistance to breakage and therefore increased production efficiency.

At Röchling LERIPA Papertech, these parts are also manufactured in a well-proven, customer specific way.

MADE FROM ONE PIECE packed in a special, unique installation box.

ROBAFLOW®
Head box vanes made of high wear resistant polyethylene with perfect cost-performance ratio

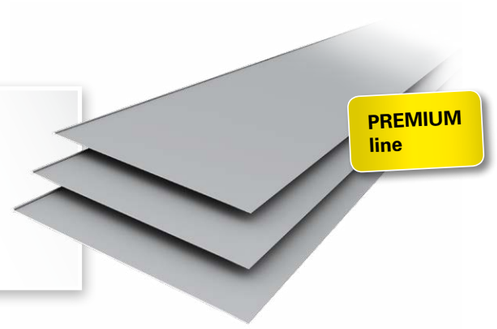
- **Absolutely break-proof**
- **High flexibility and adjustment to the head box stream**
- **Machined in one piece (no glue)**
- **Best chemical resistance**

CLASSIC line

Application:
Head boxes with rare or no boil outs

ROBAFLOW®-S
High technical and high chemical resistant polymer
with great dimensional stability

- **Superb break-proofness (production safety)**
- **High stability**
- **Absolute chemical resistance (acids and caustics)**
- **Boil out resistant**
- **Machined in one piece (no glue)**



Application:
All head boxes

ROBAFLOW®-PC
High-quality polycarbonate headbox sheet with special form locking connection
between holder and sheet. Outstanding price-performance ratio

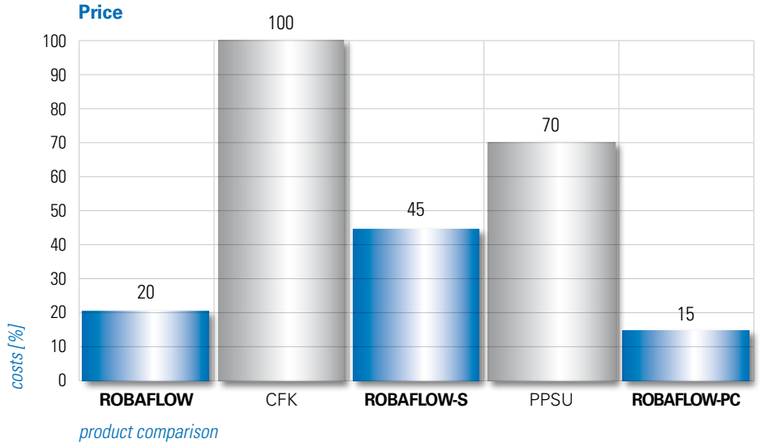
- **Excellent surface quality**
- **No stress cracking risk because of glue free connection**
- **High break resistance**
- **Low thermal expansion**

Application:
Machines with few boil outs

Overview of head box vanes

	lifetime low → **high**	investment **fair** → costly	physical rigidity low → **high**	efficiency increase
ROBAFLOW	■■□□□	■□□□□	■■□□□	classic
ROBAFLOW-S	■■■■■	■■■□□	■■■■■	premium product
ROBAFLOW-PC	■■□□□	□□□□□	■■■□□	Good value for money

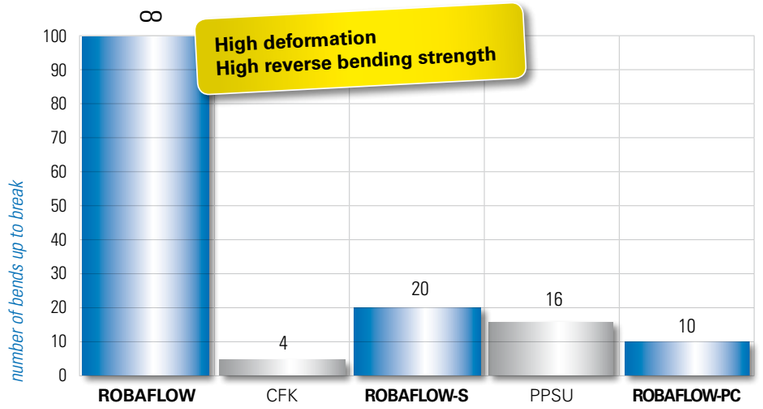
Price



product comparison

Comparison – bending flexibility

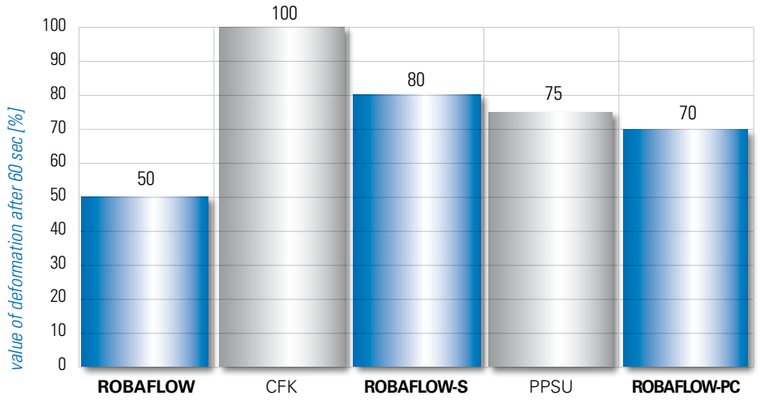
- breaking strength



product comparison

*bending tests – done at **company's own test rig***
(bending test for 90° bending)

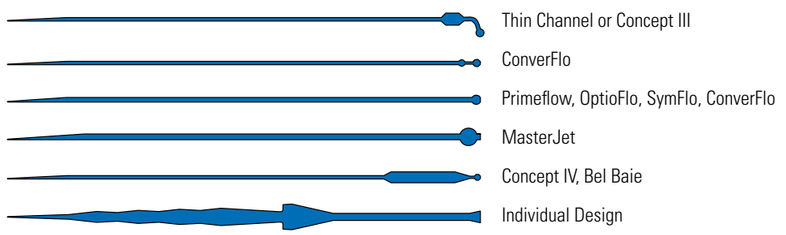
Comparison – form stability

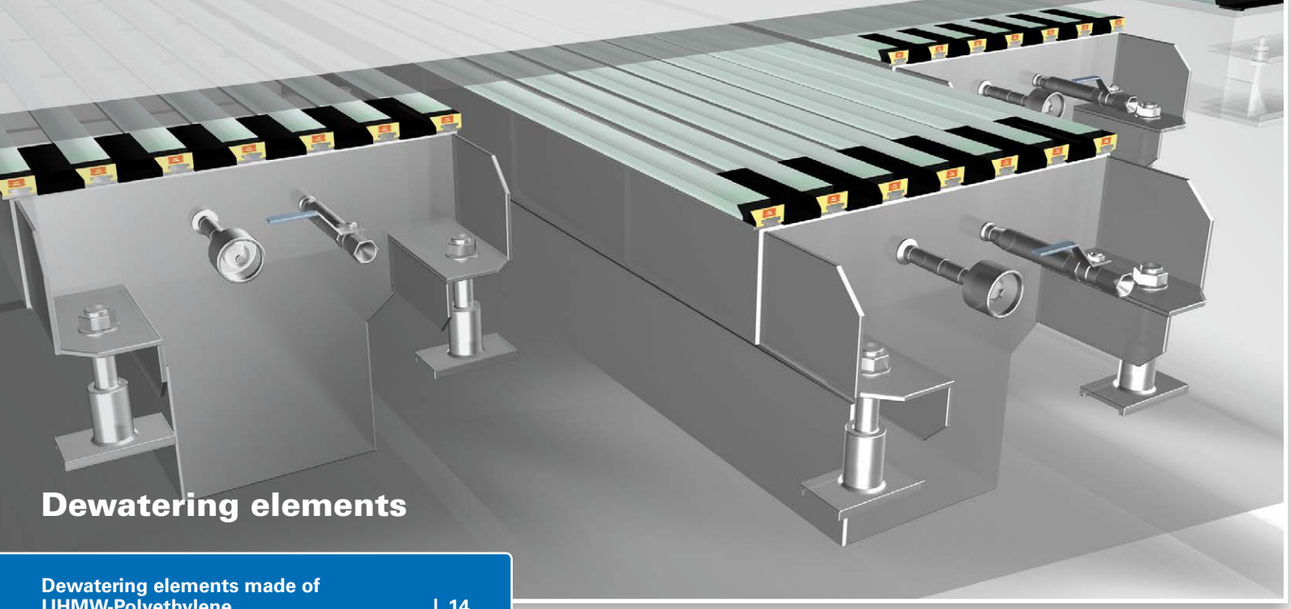


product comparison

*impact test – done at **company's own test rig***
(one sided load over 5 hours - 90° bending)

Product range of head box vanes





Dewatering elements

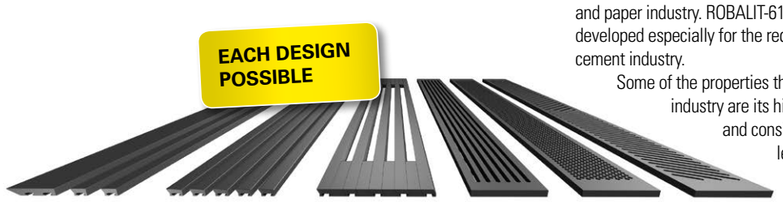
Dewatering elements made of UHMW-Polyethylene

For a machine speed up to 800 m/min (2,600 feet/min)

All plastics produced in elaborate long-term sintered process

In 1961, Röchling LERIPA Papertech became the first company in the world to install a UHMW-PE dewatering element in the paper industry. This product was given the name ROBALIT-61 to commemorate its development. ROBALIT-61 has been the basis for all of our UHMW products developed for the demanding pulp and paper industry. ROBALIT-61, ROBADUR, ROBAGLAS and ROBACER were developed especially for the requirements of the paper, board, pulp and fiber cement industry.

Some of the properties that make up its outstanding suitability for this industry are its high resistance to wear, low coefficient of friction and consistent dewatering characteristics across the entire length. All of these characteristics are achieved through using a long term sinter press process creating a stress free uniform material.

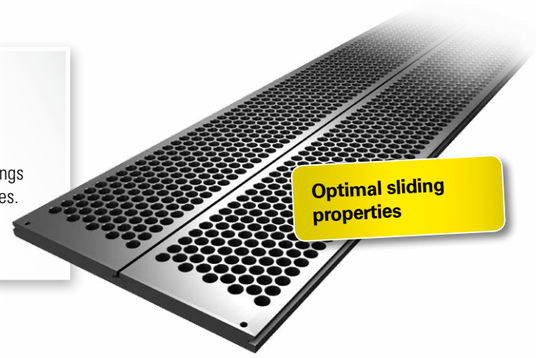


Assembly: Dewatering elements made of PE-UHMW have a high thermal elongation. They must therefore be fastened in such a way that strips and covers can extend unhindered (T-bars, angle strips, dovetail design, screws in slots).
In order to guarantee the perfect function of our covers, the substructure must be supported in distances of approx. 250 mm. The support must extend to the underside of the cover to ensure that it is held flat. The thermal expansion of plastic is significantly higher than that of steel; therefore, appropriate space during installation is necessary.

ROBALIT 61®

UHMW-Polyethylene – alloyed with lubricating agent

- **No adherence of contaminants**
- **Complete chemical resistance**
- **Low coefficient of friction**
  The world's first UHMW-PE material used as dewatering element brings a higher percentage of lubrication agent as common UHMW-PE grades. Therefore, a very smooth surface and lowest coefficient of friction is possible.



Application:
Up to 600 m/min (2,000 feet/min) machine speed

ROBADUR®

UHMW-Polyethylene – alloyed with a lubricating agent, cross linking agents and UV-stabilizers, long term sinter pressed – stands out due to its perfect cost-performance ratio

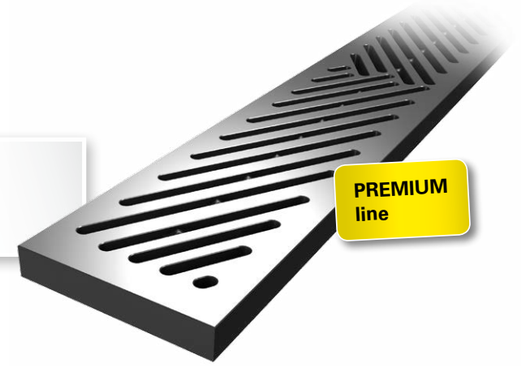
- **No adherence of contaminants**
- **Complete chemical resistance**
- **Long lifetime**
  Lubricant agents, UV-stabilizers and cross linking agents keep the special properties of this PE-1000 grade.

Application:
Up to 600 m/min (2,000 feet/min) machine speed

ROBAGLAS®

ROBADUR reinforced with micro beads of glass

- **Increased wear resistance**
  Addition of micro beads of glass provides 20 % longer lifetime.



Application:
Up to 800 m/min (2,600 feet/min) machine speed

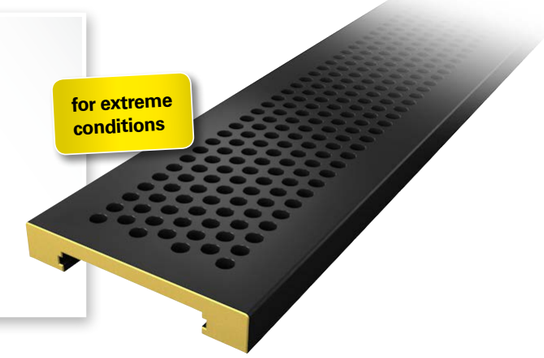
ROBACER®

Unique ceramic-plastic hybrid

ADVANTAGES of plastic
- Break resistance
- Homogeneous, closed surface
- No piano keying
- Easy to handle

ADVANTAGES of ceramics
- Very smooth surface
- High wear resistance

COMBINED IN ONE MATERIAL



Application:
800 m/min (2,600 feet/min) machine speed and more

Overview of UHMW-Polyethylene

	max. machine speed	ø coefficient of friction [µ]	lifetime low → **high**	investment **fair** → costly	surface quality low → **high**	efficiency increase
ROBADUR-MUF	up to 600 m/min	0.18				Withe UHMW-PE
ROBALIT 61	up to 600 m/min	0.16				optimal sliding properties
ROBADUR	up to 600 m/min	0.17				classic line
ROBAGLAS	up to 800 m/min	0.18				premium line
ROBACER	800 m/min +	0.12				for extreme conditions

*Tested with **Röchling LERIPA Papertech wear simulation machine***
Machine parameter: 600 m/min (2,000 feet/min), wet section with 15 % ash content, 1.5 kN/m fabric tension

Dewatering elements made of ceramics

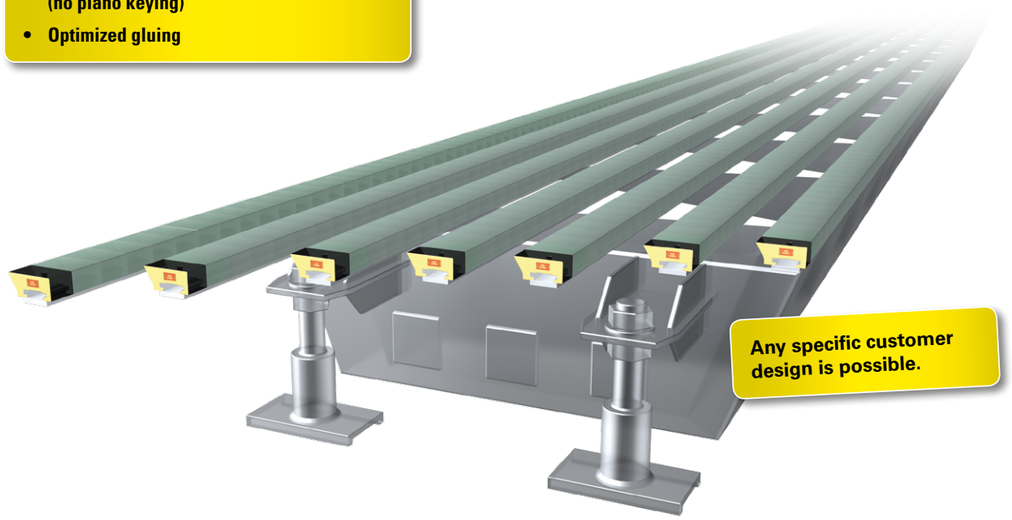
Applicable for all machine speeds

ROBACERAM dewatering elements have a multiple lifetime compared to plastic dewatering elements. Röchling LERIPA Papertech offers 7 different ceramic grades to choose from depending on the demands of the application. Important factors in determining the ceramic grade are machine speed, fiber source (virgin or recycled), filler & ash content, design of machine and vacuum.

These dewatering elements are a composite design with high grade ceramic material on top **(up to 8 mm or 0.31 inch useable wear thickness)** and a glass fiber reinforced base, combined adhesively and mechanically locked.

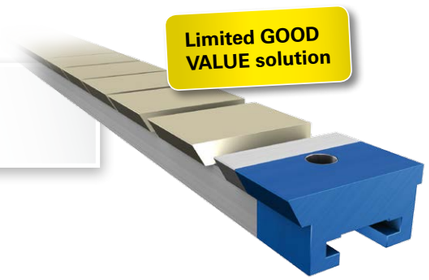
The handling of ceramics is completely different to UHMW drainage elements
- Transport of dewatering elements with ceramic side up & evenly supported
- Avoidance of bending or bowing of the blade or cover
- Avoidance of torsion of the composite
- Ceramic elements are not thrown, pulled, hammered or walked on

SAFETY FEATURES
- **Unique composite system (mechanically interlocked)**
- **Anchoring of the ceramic segments (no piano keying)**
- **Optimized gluing**



ROBACERAM®-L
Full value ALOX ceramic lightweight construction for limited application

- **Economical**
- **Limited application**



Application:
Up to max. 800 m/min machine speed
Max. 6 m width

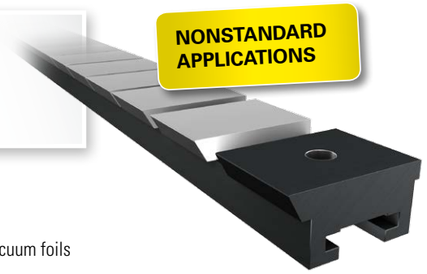
ROBACERAM® ALOX
Technically advanced ceramics
with best cost-performance ratio

- **High purity of aluminum oxide (99.7 %)**
- **Sufficient hardness**
- **Sufficient wear resistance**
- **Well known basic quality for more than 20 years**

Application:
Up to 800 m/min (2,600 feet/min) – full wet section
Up to 1,200 m/min (4,000 feet/min) – forming board to the water line

ROBACERAM® ZTA
Nonstandard ceramics for installations
with higher filler content

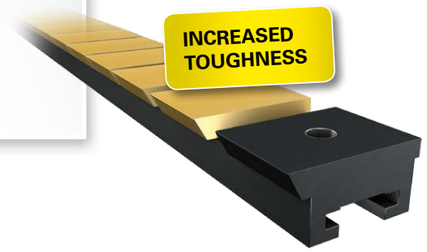
- **Thermal shock resistance of 180° C (360° F)**
- **Improved wear resistant surface**
- **Smaller grain structure**



Application:
Up to 800 m/min (2,600 feet/min) – full wet section
Up to 1,200 m/min (4,000 feet/min) – forming board to the water line
Ideally suited for suction box covers, forming elements, gravity foils and vacuum foils on machines with high ash content paper grades.

ROBACERAM® ZIROX
Nonstandard ceramics for the press section

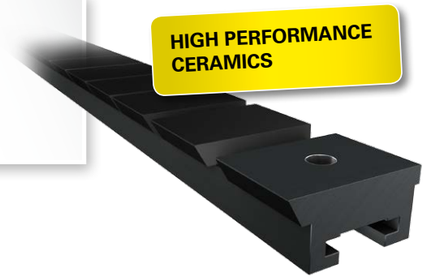
- **Thermal shock resistance of 200° C (392° F)**
- **Low hardness**
- **High fracture toughness**
- **Less porosity**



Application:
Up to 800 m/min (2,600 feet/min) – press section
Not recommended for former elements

ROBACERAM® SIN
Standard nitride ceramics
with a needle structure and high surface quality

- **Great thermal shock resistance of 600° C (1,110° F)**
- **Good wear resistance**
- **Good surface quality**
- **High fracture toughness**



Application:
Up to 800 m/min (2,600 feet/min) in GAP-former
Up to 1,500 m/min (5,000 feet/min) at fourdrinier wire machines
For all stressed positions in modern paper machines
(mainly after gravity foils)

ROBACERAM® PSIC

Liquid-phase sintered premium silicon carbide
with extremely good wear resistance

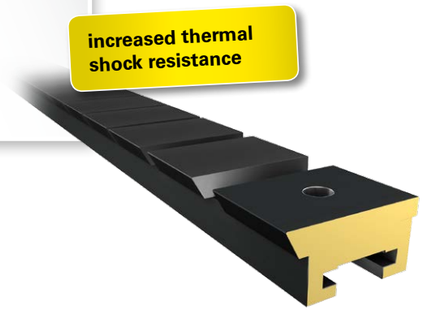
- **Extremely good wear resistance**
- **Good surface finish**
- **Liquid-phase sintered**
- **High hardness**

Application:
Up to about 3,000 m/min - for all highly stressed
and very highly stressed positions in modern paper machines,
especially for all areas with a high vacuum

ROBACERAM® SL200B

Special silicon nitride ceramics
with improved surface smoothness and improved hardness

- **Great thermal shock resistance of 600° C (1,110° F)**
- **Higher wear resistance**
- **Very smooth surface finish**
- **Enables higher fabrics lifetime**

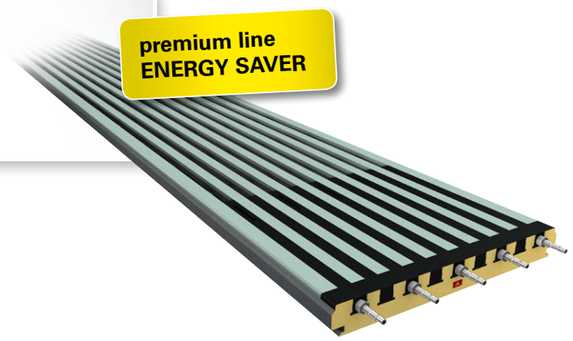


Application:
Up to 3,000 m/min (9,900 feet/min)– for all stressed
and critical positions in paper machines,
especially for positions with high vacuum and high dryness

ROBACERAM®-PX

A unique hybrid ceramics with totally closed surface and high mechanical properties
developed exclusively by Röchling LERIPA Papertech

- **Thermal shock resistance of 700° C (1,290° F)**
- **Reduction of driving energy (ENERGY SAVER)**
- **Increase of the fabrics lifetime**
- **Extremely smooth surface (zero porosity)**

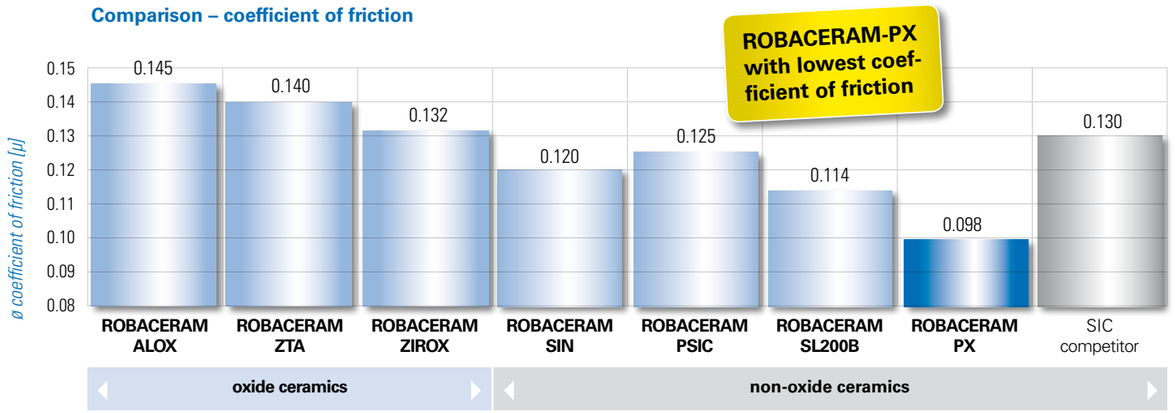


Application:
Up to 3,000 m/min (9,900 feet/min) – for all stressed
and critical positions in paper machines,
especially for units with high vacuum and high dryness

Overview of ceramics

	max. machine speed	ø coefficient of friction [µ]	lifetime low → **high**	investment **fair** → costly	Surface quality low → **high**	efficiency increase
ROBACERAM-L	Up to 800 m/min	0.145				limited good value solution
ROBACERAM Alox	Up to 1,200 m/min	0.145				classic line
ROBACERAM ZTA	Up to 1,200 m/min	0.140				nonstandard applications
ROBACERAM Zirox	Up to 800 m/min	0.132				increased toughness
ROBACERAM SIN	Up to 1,500 m/min	0.120				high performance ceramics
ROBACERAM PSIC	Up to 3,000 m/min	0.125				prizewinner
ROBACERAM SL200B	Up to 3,000 m/min	0.114				increased thermal shock resistance
ROBACERAM-PX	Up to 3,000 m/min	0.098				premium line ENERGY SAVER

Comparison – coefficient of friction



product comparison

*Tested with **Röchling LERIPA Papertech wear simulation machine.***
Machine parameter: 600 m/min (2,000 feet/min), wet section with 15 % ash content, 1.5 kN/m fabric tension

Energy saving
by using ROBACERAM-PX instead of Sic ceramics

ENERGY

Calculation study: used driving power in the wet section	→	1,000 kW
60 % caused by fabrics / ceramics contact	→	600 kW
the coefficient of friction for ROBACERAM-PX is 20 % lower as for SIC ceramics	→	Friction force = µ x normal force
20 % reduction of friction energy with PX	→	**120 kW**
Assumption (energy-costs = €0.05/kWh) For 330 working days, savings of 120 kW x 24 h x 330 days x €0.05/kWh	=	**€47,520** savings per year
Savings potential estimated for 5 years (average minimum lifetime)	=	**€237,600**

	Crystal size average [µm]	Hardness vickers [N/mm²]	Flexural strength [N/mm²]	Thermal conductivity [W/m°K]	Thermal shock resistance [°K]	Attainable surface roughness - average [µm]
ROBACERAM ALOX	6.5	16,000	379	36	150	0.3
ROBACERAM ZTA	2.2	17,600	450	15	180	0.2
ROBACERAM ZIROX	60	12,500	500	3	200	0.2
ROBACERAM SIN	needle structure	16,200	750	35	600	0.1
ROBACERAM PSIC	1	22,000	540	60	400	0.12
ROBACERAM SL-200B	needle structure	18,400	750	21	600	0.1
ROBACERAM PX	needle structure	20,100	750	17	700	0.06
SIC competition	1 - 1.15	22.000	420	100	300	0.12 - 0.2

Various

ROBACERAM X-ring
Combination of plastic base and ceramic elements specially for uniform dewatering profile. Special barbed hooks ensure perfect fixation of the ceramic.

Higher dewatering capacity
- Larger open surface - 65 % increase

Longer felt life
- Felt is no longer sucked into the gap
- No elongation of the felt (less stress than with the "Z" design)

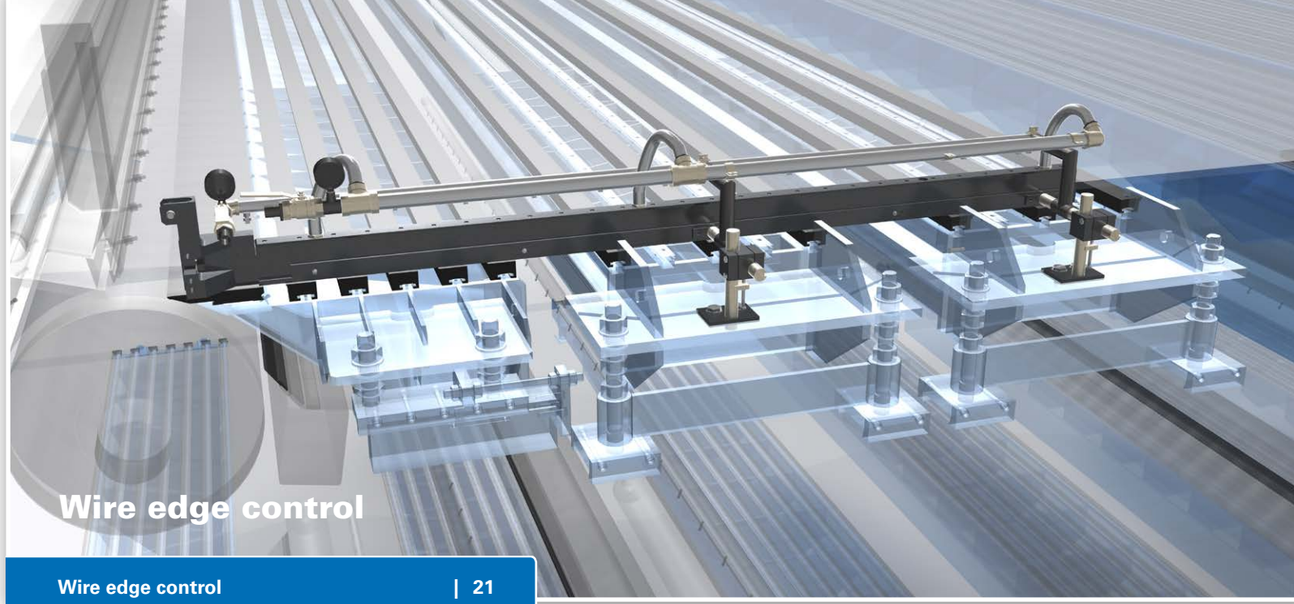
Reduction of driving energy
- Less vacuum required
- Less air consumption
- Less friction owing to the good support

Application:
Flat suction box covers in the wire section as well as felt suction box covers in the press section

Ceramic button plates of ALOX ceramics
Wear minimization at web guide controls

- **Longer shelf life**
- **Simple assembly**
- **Short delivery time**

Product range:
2 different standard sizes:
- 120 x 30 x 5 mm
- 127 x 30 x 5 mm
Other sizes and materials upon request



Wire edge control | **21**
Wire edge limiters are individually customized to the conditions of your paper machine; only in this way can optimum functionality be guaranteed.

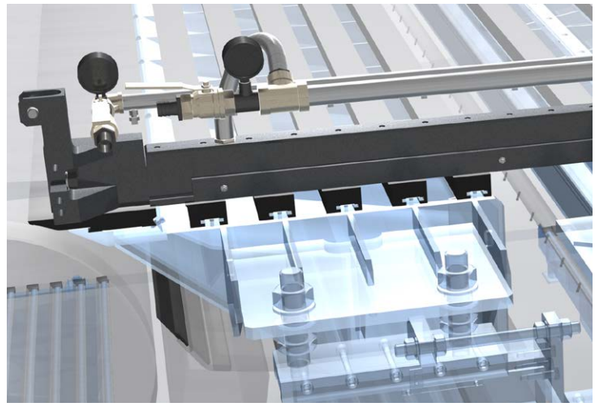
ROBALIT 61® wire edge control
Edge control system for headboxes from all manufacturers, as well as all current paper and pulp types

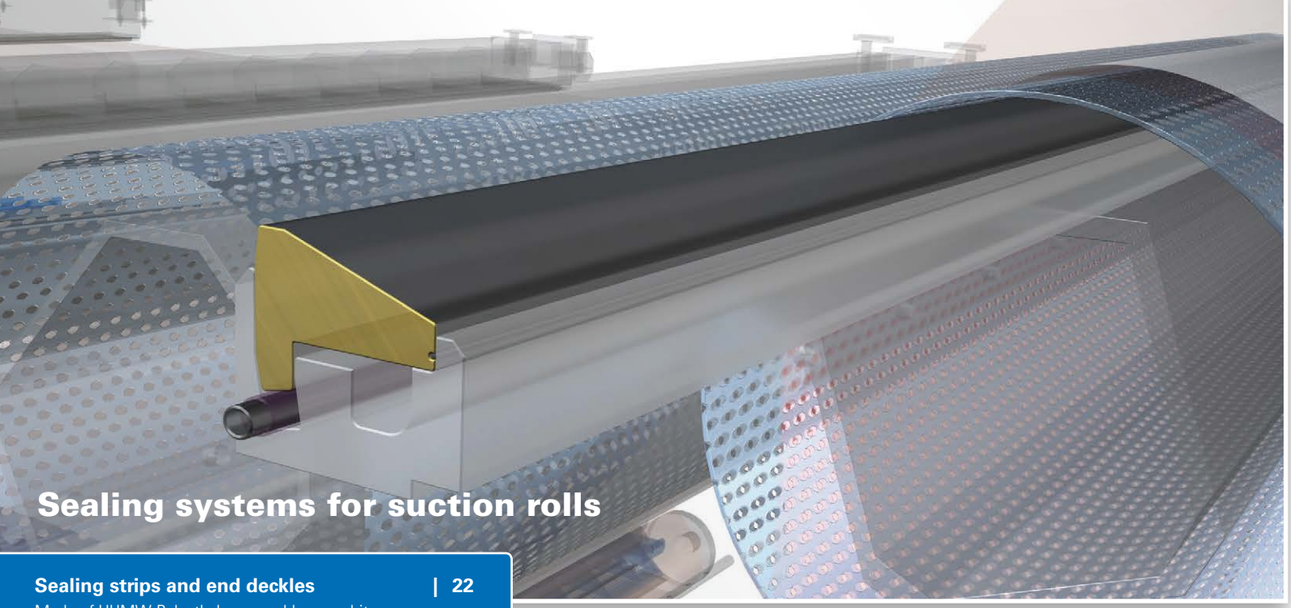
- **Improved direction profile**
- **Minimize the edge trim**
- **No fiber loss**
- **No wire contact**
- **Individually adapted to your headbox**

FUNCTIONALITY
Sealing function is ensured by water seal - no wire contact necessary.

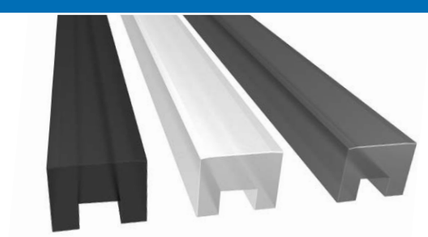
DESIGN
The system is completely removed before the wire change (incl. uprights). This only takes 5 minutes. Adjustment in cross-machine direction possible thanks to flexible holders.

Optional:
Hinged design: The entire system can be swiveled below the wire level with just a few manual steps. No tools required.





Sealing systems for suction rolls



Function: Sealing strips are responsible for the function of the suction roll. A failure of the strip causes a failure of the needed vacuum and the suction roll and the whole machine has to be stopped – unplanned and cost intensive stops of a machine. Using the wrong material will negatively impact the function of a suction roll. Examples include: higher driving load, premature shell wear, accelerated seal strip wear, loss or reduction of vacuum levels, heat transfer from the seal strips to the shell & cover. Therefore, it is very important to install a proven sealing package (loading tubes, acceptable sealing material and the right holder system in FRP) to eliminate possible problems in suction rolls, to eliminate unplanned machine stops.

Sealing strips and end deckles made of UHMW-Polyethylene

Up to 600 m/min (2,000 feet/min) machine speed

In 1961, UHMW-PE sealing strips (ROBALIT 61) were introduced; since then, we have continuously developed them for use in the paper industry.

Now there are 4 different material qualities developed specifically for different customer requirements.

These plastics are characterized mainly by the special **long-term sintered process,** a **very high molecular weight** and **additional additives** adjusted to the paper machine.

These advantages give UHMW-Polyethylene sealing strips an extraordinary long lifetime and a very low coefficient of friction.

Details about these materials on page 15.

Overview of UHMW Polyethylene

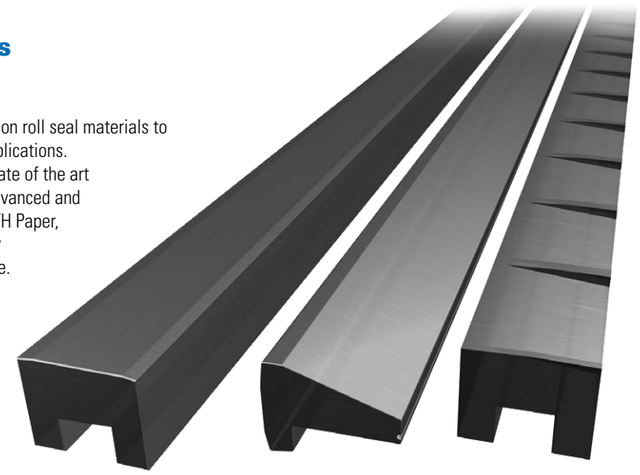
	max. machine speed	ø coefficient of friction [µ]	lifetime low → **high**	investment **fair** → costly	Surface quality low → **high**	efficiency increase
ROBADUR	up to 600 m/min	0.13	●●●○○	○○○○○	●●●●○	cost - performance winner
ROBADUR-MUF	up to 600 m/min	0.14	●○○○○	○○○○○	●●●●○	optimized task: white color
ROBALIT 61	up to 600 m/min	0.12	●●○○○	●○○○○	●●●○○	optimized task: surface

*Tested with **Röchling LERIPA Papertech's own test rig** - counterpart stainless steel*

Sealing strips and end deckles made of rubber graphite

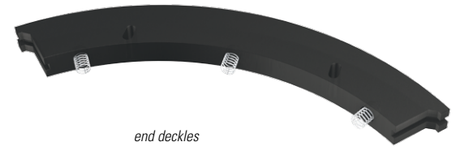
In 1994, Röchling LERIPA Papertech added additional suction roll seal materials to be ahead of the increasing demands in the suction roll applications. The development of our suction roll test machine in our state of the art research & development laboratory has led to the most advanced and best performing sealing strip material, ROBASEAL A. VOITH Paper, the world's largest paper machine producer, has used only ROBASEAL sealing strips in all suction rolls since that time.

The specially formulated mixture of ROBASEAL is the basis for all other rubber graphite sealing strips of LERIPA. ROBASEAL ensures excellent dry running and emergency properties as well as longest lifetime in all suction rolls and for each speed.



sealing strips

Used materials:
- **ROBASEAL-L**
- **ROBASEAL-A**
- **ROBASEAL-S**



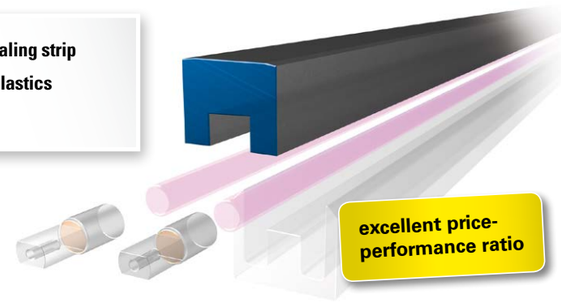
end deckles

ROBASEAL®-L

Thermoplastic bonded graphite sealing strips for a machine speed of 800 m/min (2,600 feet/min)

ROBASEAL-L (light) is a rubber graphite material in a thermoplastic base. The high amount of graphite inside allows for emergency situations like dry running without breaking down like a UHMW sealing strip would. Surface melting is prevented by this rubber graphite composite. This unique compound is the ideal link between a plastic and a rubber graphite sealing strip and runs up to 800 m/min (2,600 feet/min) like a high grade rubber graphite sealing material.

- **Amazing emergency properties for a thermoplastic sealing strip**
- **Energy saving - reduced friction compared to thermoplastics**
- **Break-proof and flexible sealing strips**

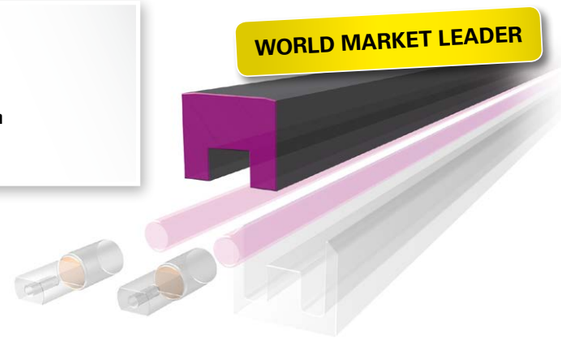


Application:
All machines up to a speed of 800 m/min (2,600 f/min) end deckles and special shapes in the same quality available

ROBASEAL®-A

Sealing strip material with unique emergency properties for increasing the lifetime of the suction roll

- **Increase of lifetime**
  - Less wear
  - High temperature resistance
- **Low coefficient of friction = low energy consumption**
- **No cracking from dry running**



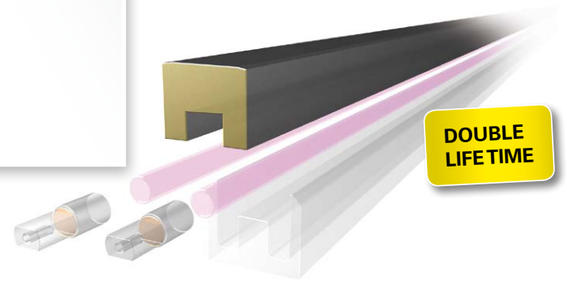
Application:
For all sealing strips & end deckles at all machine speeds

ROBASEAL®-S

Premium quality to double the lifetime

ROBASEAL-S is the premium product for high stress sealing strips and end deckles in suction rolls. Combined with high temperature resistant silicon oil. It allows a significant reduction of lubrication water and maintains the same functionality & lifetime of the suction roll as before.

- **Reduction of lubrication water volume**
- **Low energy consumption**
- **Increase of lifetime**
  - Less friction
  - Less wear
- **For saving of energy or lubrication water and lengthening service cycles**



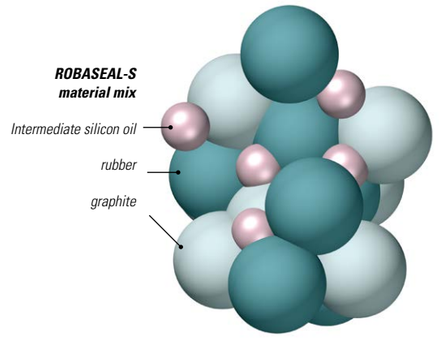
Application:
- High stress sealing strips and end deckles in suction rolls
- For saving of energy or lubrication water and lengthening service cycles

ADVANTAGES IN DETAIL:

Double lifetime
By keeping the same working parameters (lubrication water, contact pressure, vacuum) the lifetime of ROBASEAL-S can achieve 100 % more than ROBASEAL-A.

Reduction of lubrication water
A suction roll needs 10 cubic meters (2375 gallons) of water per meter of length every 24 hours to keep the sealing strips lubricated. The unique silicon oil inside ROBASEAL-S allows a reduction of the lubrication water by 30 %, yet performance and lifetime of the suction roll is the same as before.

30 % less lubrication water means 30 % less water needs cleaning, reduced chance of re-wetting while keeping the same lifetime and saving production costs!



WATER

Savings potential
by reduction of lubrication water for a 5 meter (16.4 feet) wide machine

2.5 l lubrication water/nozzle per minute
x 3 spraying nozzles/m x 5 meter
x 5 suction rolls = 187.5 l lubrication water/min → **saving by 30 % reduction 56.25 l/min**

56.25 l x 60 min x 24 h x 330 days → **savings of 26,730 m³ per year**

Cost estimation for lubrication-water:
€0.40/m³ drainage water
€0.40/m³ x 26,730 m³

€10,692
savings per year

ENERGY

Savings potential
by reducing the friction

example: 10 ampere energy reduction of the drive per suction roll
10 amps x 400 volts x 1.73 (3 phase support)
x 0.85 (efficiency) = 5.88 kilowatts → **5.88 kW** energy reduction per roll

5.88 kW x 24 h x 330 days
x €0.05 / kWh =
€2,328.48 / year savings → **€2,328.48** savings per roll / year

example: 5 suction rolls / machine
= €2,328,48 x 5 =
€11,642.40 / machine and year

€11,642.40
per machine and year

DESIGN OPTIONS

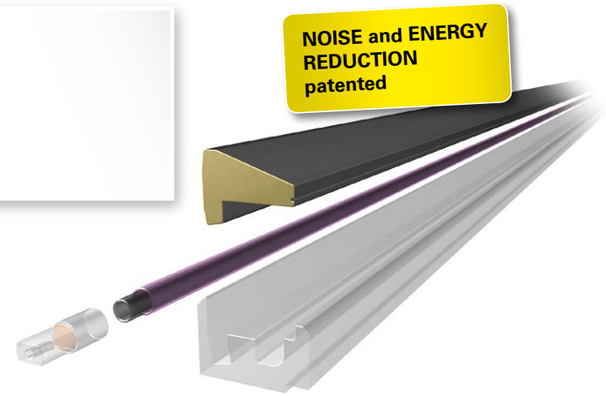
ROBASEAL®-A/-S/-L SeaLencer

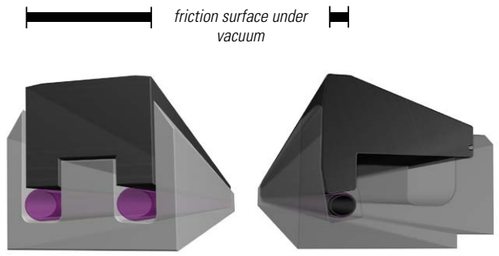
Energy saver
A partnership of VOITH Paper and Röchling LERIPA Papertech
The effective solution, to reduce friction energy and to reduce the noise level (roll whistling) of a suction roll at the same time.

The patented solution from VOITH Paper and Röchling LERIPA Papertech allows a drastic reduction of the suction roll noise through gentler suction roll ventilation. The reduced fiction surface reduces the friction between sealing strips and roll shell. In this way, the sealing strip lifetime is increased and the required drive power is reduced.

- **Reduced energy consumption**
  (90 % reduction of friction area)
- **Half of sound pressure**
- **Less wear**
- **Shortest initial run-in time**

Application:
- Each paper machine





left: conventional sealing strip
because of wide friction area
- *high material wear*
- *high energy demand*
- *shorter duration*
- *high vacuum pull*

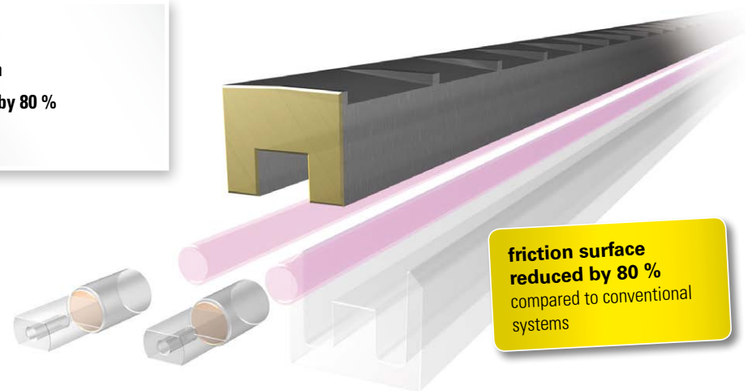
right: SeaLencer
because of reduced friction area
- *less friction*
- *shorter run-in time*
- *less energy demand*

ROBASEAL®-A/-S/-L Energy Saver Light

This design reduces the sound pressure slightly but the reduction of the surface-contact to the shell side is much greater. This system fits to the existing holder design, needs no rework but provides the benefit of less driving energy through less friction-area in the position of the wide sealing strip.

- **Less energy consumption**
- **Sound pressure reduction**
- **Friction surface reduced by 80 %**
- **No rebuild necessary**

Application:
- Each paper machine

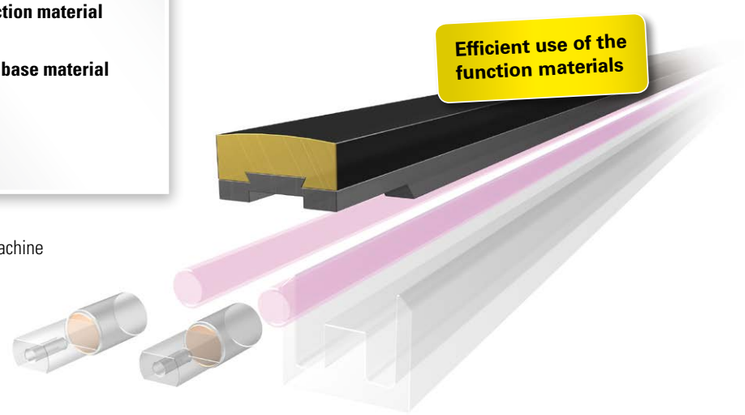


ROBASEAL®-A/-S Hybrid

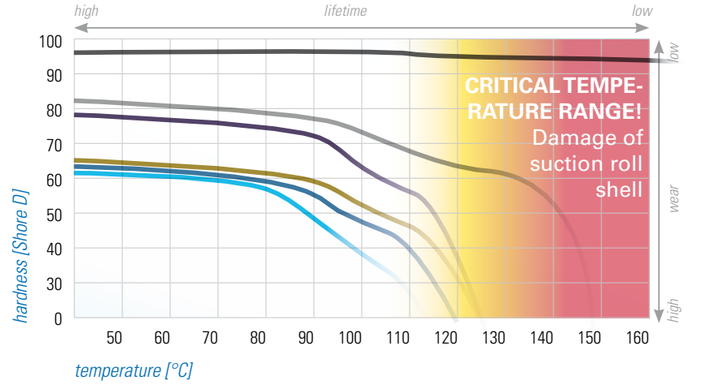
The cost-benefit ratio of a sealing strip depends on wear, which is on average max. 20 %. Therefore, 80 % of the sealing strip is not reusable and creates additional costs for waste disposal.
We produce an innovative hybrid ROBASEAL sealing strip which consists of base material (= ROBADUR UHMW-PE) and function material (ROBASEAL rubber graphite). In future, only the function material made of rubber graphite has to be replaced. The base material made of ROBADUR can be reused several times.

- **Interchangeability of function material = cost effective**
- **Temperature decoupling (base material and function material)**
- **Gentle on the tubing**
- **Easy to use**

Application:
- In the suction roll of any paper machine



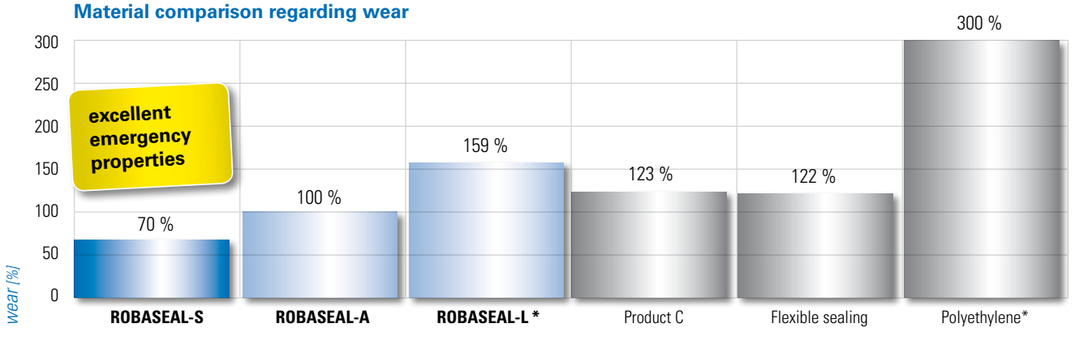
Emergency properties for dry running



*Test on the **suction roll simulation machine** dry running, speed 2,000 m/min (6,600 feet/min), loading pressure 2,5 bar, 48 hours.*

**Speed of 800 m/min (2,600 feet/min), loading pressure 0,5 bar, 48 hours.*

Material comparison regarding wear



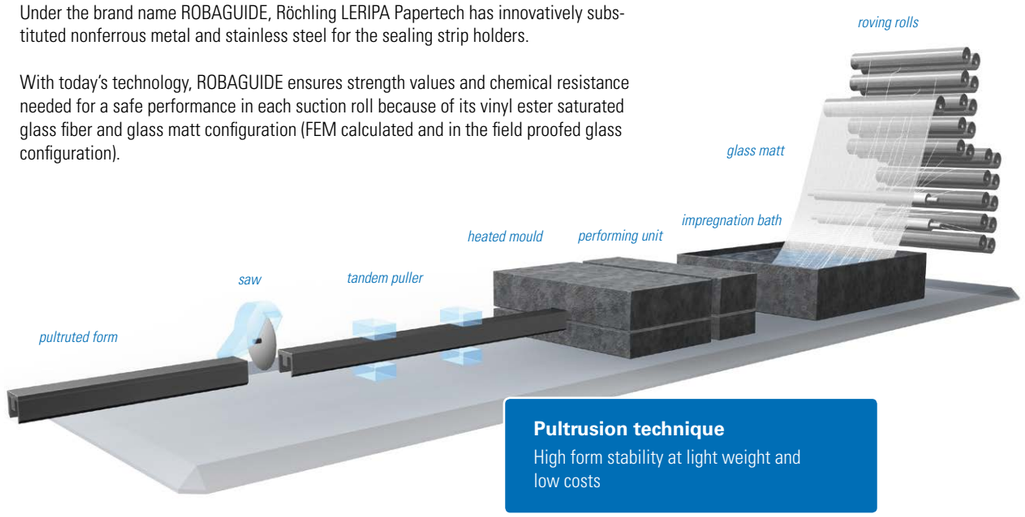
*Test on the **suction roll simulation machine** dry running, speed 2,000 m/min (6,600 feet/min), loading pressure 2.5 bar, 48 hours.*

**Speed of 800 m/min (2,600 feet/min), loading pressure 0.5 bar, 48 hours.*

FRP sealing strip holder

Under the brand name ROBAGUIDE, Röchling LERIPA Papertech has innovatively substituted nonferrous metal and stainless steel for the sealing strip holders.

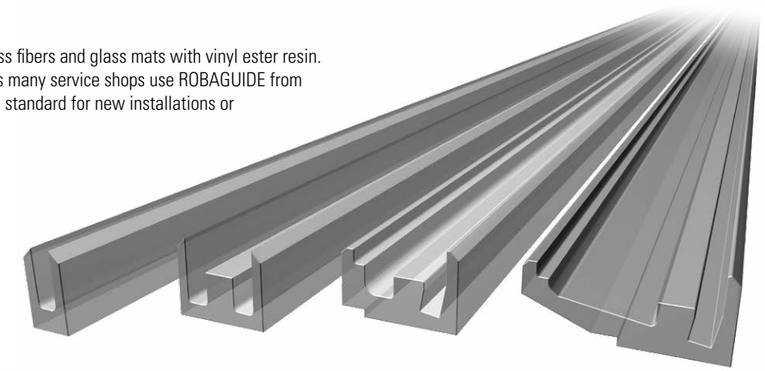
With today's technology, ROBAGUIDE ensures strength values and chemical resistance needed for a safe performance in each suction roll because of its vinyl ester saturated glass fiber and glass matt configuration (FEM calculated and in the field proofed glass configuration).



Pultrusion technique
High form stability at light weight and low costs

ROBAGUIDE™

Sealing strip holders made of glass fibers and glass mats with vinyl ester resin. Large machine builders as well as many service shops use ROBAGUIDE from Röchling LERIPA Papertech as the standard for new installations or as replacements for rebuilds.



- **Safety feature in case of bearing problems**
- **Resistant against chemicals, no hydrolyzing**
- **Light weight**
- **Available for all suction rolls**

Application:
For use with all ROBASEAL sealing strips

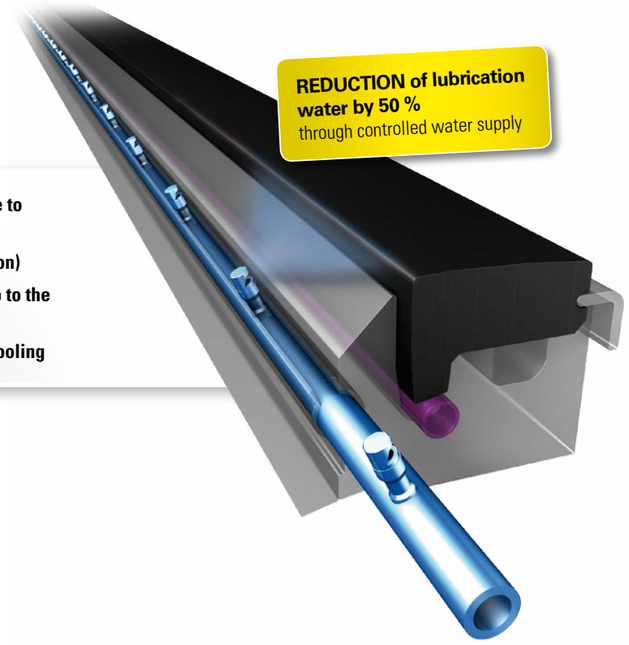
REBUILDS

Röchling LERIPA Papertech provides various standard pultruded shapes as well as custom holders for the rebuild of existing suction rolls. Existing holders often need time to be replaced because of chemical or physical damage. Rebuilding with ROBAGUIDE allows an older roll to have the latest technology in seal holders.

- **No corrosion**
- **Light weight**
- **Rebuild to single lift systems of the sealing**

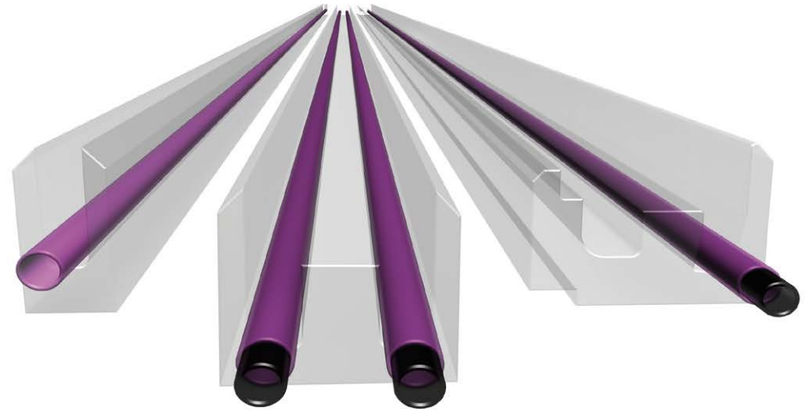
Lubrication systems

Sealing strip holder with integrated lubrication supply



- **Increased lifetime of the sealing due to less wear**
- **Less lubrication water (cost reduction)**
- **Reduced sucking of the sealing strip to the suction roll holes**
- **Equalized hardness due to perfect cooling**

Application:
For all suction rolls in the wet press position



Loading tubes

ROBATUBE is supplied in combination with ROBASEAL-A/-S/-L and ROBAGUIDE as a full package for a complete sealing unit.
The highly resilient tube offers high lift at a low pressure. ROBATUBE-ES provides unmatched chemical and thermal resistance.

ROBATUBE™

- **Great lift at low pressure**
- **Good chemical resistance**

Application:
All press section suction rolls in the paper machine
Maximum thermal resistance is 70° C

Stroke characteristics of ROBATUBE

pressure [bar]	Stroke characteristics in mm at 20° C					Stroke characteristics in mm at 50° C				
	Tube diameter [mm]					Tube diameter [mm]				
	16	19	22	26	29	16	19	22	26	29
0.5	1.53	0.94	1.94	1.23	2.90	1.60	1.46	2.31	2.48	4.81
1	2.58	1.72	2.94	2.46	4.34	3.29	3.24	4.07	5.22	7.81
1.5	3.32	2.77	3.74	3.56	6.08	5.05	4.81	5.64	7.89	11.11
2	4.18	3.54	4.66	5.10	7.28	6.88	6.64	7.64	10.59	14.57
2.5	5.07	4.36	5.46	6.22	8.71	9.16	8.27	9.95	12.58	18.62

Attention! *The stroke characteristics were determined in the holder with the net weight of the sealing strips.*

ROBATUBE tubes are available in the following dimensions:

ROBATUBE		
ø [mm]	s [mm]	material
9.5	1.6	PVC
16	1.3	EPDM
16	1.5	PVC
19	2.0	PVC
22	2.0	PVC
26	2.0	PVC
29	2.5	PVC

ROBATUBE™-ES

- **High chemical resistance**
- **High temperature resistant**
- **High safety level**

Application:
2-component tube for high thermal and chemical resistance

Stroke characteristics ROBATUBE ES

pressure [bar]	Stroke characteristics in mm at 20° C					Stroke characteristics in mm at 50° C				
	Tube diameter [mm]					Tube diameter [mm]				
	16	19	22	26	29	16	19	22	26	29
0.5	-	0.40	1.20	1.40	1.60	-	1.00	1.40	1.60	1.80
1	-	0.90	1.80	2.70	2.70	-	2.30	2.30	3.10	4.90
1.5	-	1.70	2.80	4.40	5.00	-	3.40	4.30	6.00	8.00

Attention! *The stroke characteristics were determined in the holder with the net weight of the sealing strips.*

ROBATUBE-ES tubes are available in the following dimensions:

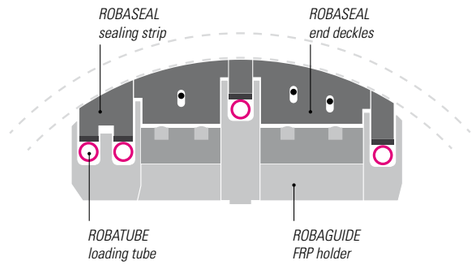
ROBATUBE-ES		
ø [mm]	s [mm]	material
-	-	-
-	-	-
-	-	-
19	2.7	TPEV
22	2.7	TPEV
26	2.7	TPEV
29	2.9	TPEV

Sealing package from one source

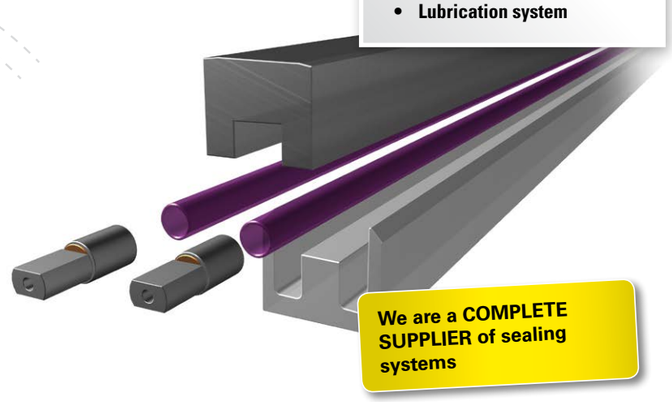
Röchling LERIPA Papertech is the **only complete supplier** of all components and materials appropriate for **the sealing system of a suction roll.**

Sealing strips and high-quality loading tubes and holders guarantee an efficient vacuum zone sealing within the suction roll. By supplying the entire system, the order handling and storage is made easier for our customers, as well as the ability to guarantee a faultless functioning sealing system.

From one part to a complete package is available in the highest quality materials and delivered quickly.



SEALING STRIP SYSTEM
- **Sealing strip**
- **Loading tube**
- **FRP holder**
- **Lubrication system**

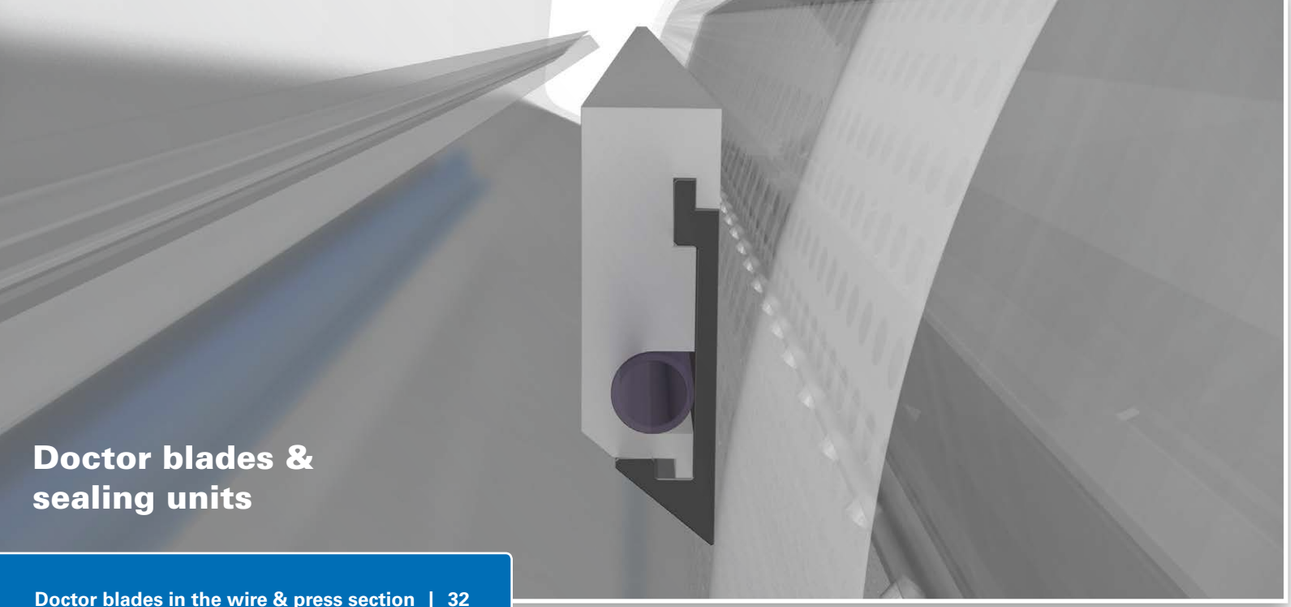


Overview of rubber-graphite

	max. machine speed	ø coefficient of friction [µ]	lifetime low → **high**	investment **fair** → costly	Surface quality low → **high**	efficiency increase
ROBASEAL-L²	up to 800 m/min	0.165				excellent price-performance ratio
ROBASEAL-A¹	all	0.125				world market leader
ROBASEAL-S¹	all	0.11				duplicate lifetime
SeaLencer*¹	all	0.125				noise and energy reduction
Energy Saver Light*¹	all	0.16				friction surface reduction
Hybrid*¹	all	0.16				efficient solution

*Tested with **Röchling LERIPA Papertech own suction roll simulation machine***
12,000 m/min (4,000 feet/min) with 2.5 bar pressure
2800 m/min (2,600 feet/min) with 0.5 bar pressure.

** SeaLencer and Energy Saver Light can be offered in the following qualities ROBASEAL-A, ROBASEAL-S and ROBASEAL-L. The values in the chart belong to ROBASEAL-A.*

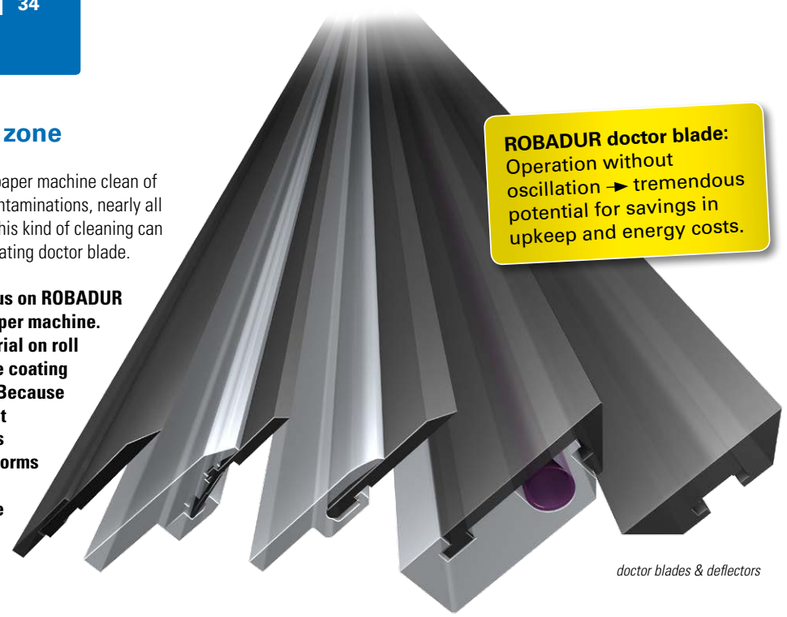


Doctor blades & sealing units

Doctor blades in the wet zone

Function: To keep the rotating rolls in the paper machine clean of deposits, of paper-stickies and sediment contaminations, nearly all rolls have doctoring systems for cleaning. This kind of cleaning can be done with or without the use of an oscillating doctor blade.

Röchling LERIPA Papertech has its focus on ROBADUR doctor blades in the wet zone of the paper machine. ROBADUR is an extremely gentle material on roll covers, coatings and adjusts best to the coating surface without the use of oscillation. Because of its extreme straightness & consistent material from the long term sinter press method of manufacture, ROBADUR performs best with a reduced loading pressure. The softer the doctor blade, the less the wear of the roll-coating surface.

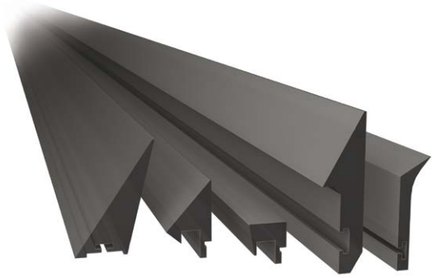


doctor blades & deflectors

ROBADUR®, ROBAGLAS®, ROBALIT 61®, ROBADUR®-MUF

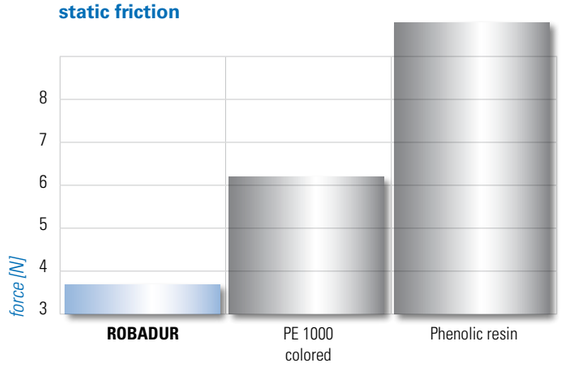
- **No oscillation**
- **Optimized doctoring of the rolls**
- **Up to 50 % less friction energy** (compared to standard blades)
- **Best cost - performance**

Application:
- In the wet zone of the paper machine (breast roll, suction couch roll, pick up roll, all wire guide rolls)
- Press zone (all felt guide rolls up to 1,000 m/min / 3,300 feet/min)



deflectors

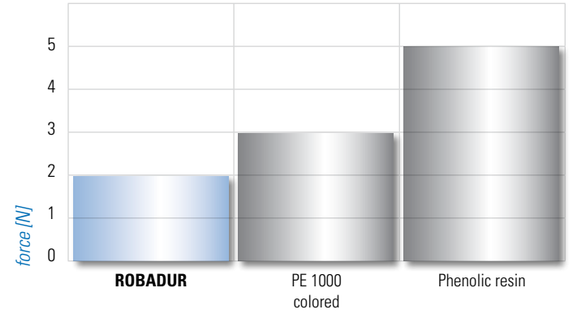
Strength to overcome static friction



product comparison

*Tested with **Röchling LERIPA Papertech's own test-rig** – counterpart PU coating.*

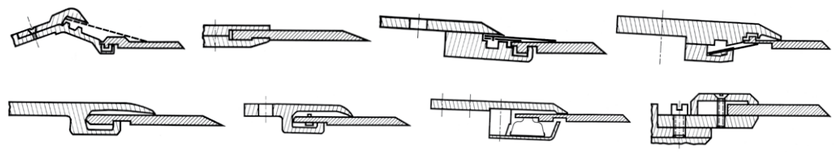
Strength to overcome dynamic friction



product comparison

*Tested with **Röchling LERIPA Papertech's own test-rig** – counterpart PU coating.*

Various design possibilities suitable for all standard retail holding systems



Customer case studies:

SAPPI FINE PAPER Europe
"… because of non oscillation of this doctor blades, we had a formidable reduction of maintenance costs (permanent repairs and oil-losses at the movers) …"

UPM-Kymmene Austria GmbH
"… the ROBADUR doctor blades function to our full satisfaction. The running time is between 1 - 1.5 years. On both positions the oscillators have been dismantled …"

W. Hamburger GmbH
"… by using your ROBADUR doctor blades, the oscillation was no longer needed …"

Hamburger Rieger GmbH & CoKG
"… the change in your doctor blades gave us the opportunity to shut down 34 oscillating motors on 4 layers. This was an amazing ease for our maintenance group and finally a perfect cost saving program …"

Overview of doctor blades

	max. machine speed	ø coefficient of friction [µ]	lifetime low → **high**	investment **fair** → costly	surface quality low → **high**	efficiency increase
ROBADUR	all	0.13	■■■□□	■□□□□	■■■■□	cost - performance winner
ROBAGLAS	all	0.18	■■■■□	■■□□□	■■■□□	optimized task: wear resistance
ROBALIT 61	all	0.12	■■□□□	■■□□□	■■■■■	optimized task: soft doctoring
ROBADUR-MUF	all	0.14	■□□□□	■□□□□	■■■■■	custom product white – no UV stabilized

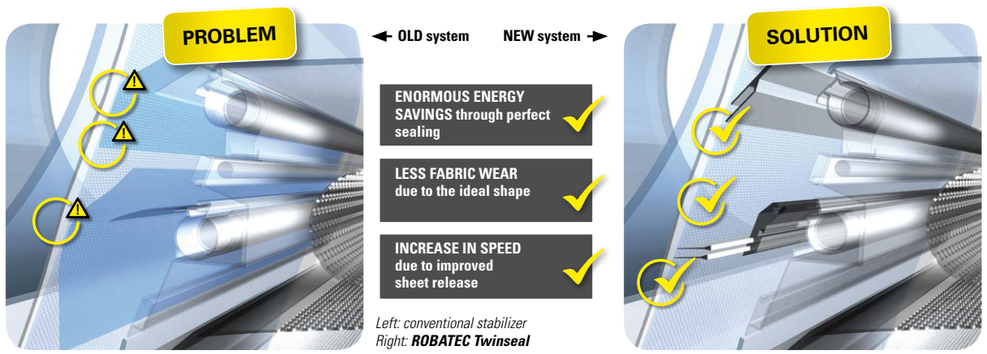
*Tested with **Röchling LERIPA Papertech's own wear simulation machine** against stainless steel.*

Stabilizers / Sealing units in the dry section

Function: through increased vacuum, a stable fold-free length production becomes a matter of fact. The improved sealing allows reduction of draw which can also significantly reduce the frequency of sheet brake. Therefore, the possibility of a speed increase is given.

The given design of the ROBATEC-Twinseal and the specifically formulated material properties for this application guarantee a perfect sealing of the release zone with an absolutely gentle fabric contact.

ROBATEC sealing strips for web stabilizers cases are essential for improving the efficiency of the drying section.

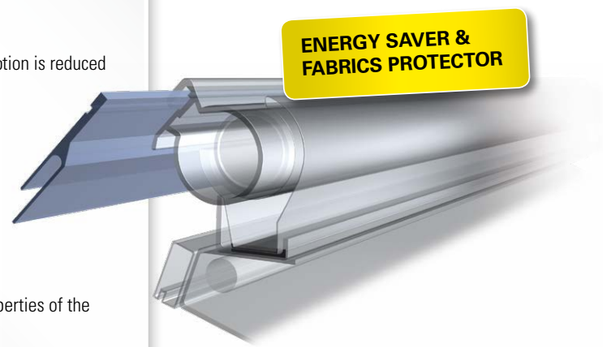


Left: conventional stabilizer
Right: ***ROBATEC Twinseal***

ROBATEC® Twinseal

Based on the better sealing at the releasing zone, the suction power can increase up to 40 % at the same vacuum level.
Implementation can take place with a simple & cost-saving installation at the mill site.

- **Enormous energy savings**
  ... through the perfect sealing of the release zone, energy consumption is reduced up to 40 % at the same vacuum level.
- **Lowest investment costs**
  - simple & low-cost replacement on site
  ...due to compatibility with existing systems
- **Optimal sheet guidance – increased speed**
  ...is possible due to the improved sheet release and increased vacuum level.
- **Increasing fabric life time due to contactless sealing**
  ... due to the ideal shape and specifically matched up material properties of the ROBATEC Twinseal.
- **Maintenance friendly and easy handling**



Application:
Stabilizer boxes / stabilizers in the dry zone

ENERGIE

Energy savings potential
by using ROBATEC Twinseal as sealing unit

Using the conventional system (45 kN nominal van-capacity)
200 Pa under pressure running on 80 % capacity
= energy consumption of 36.9 kW

Using ROBATEC Twinseal (same 45 kN nominal capacity)
300 Pa under pressure at 55 % capacity → **12.2 kW** saving at higher vacuum
= energy consumption of 24.7 kW

Energy saving for each blower → **96,624 kWh** saving for each blower / year
12.2 kW x 24 hours x 330 days

96,624 x €0.05 / kWh → **€4,831.20** per blower / per year

Case study from Sappi Gratkorn / PM 11

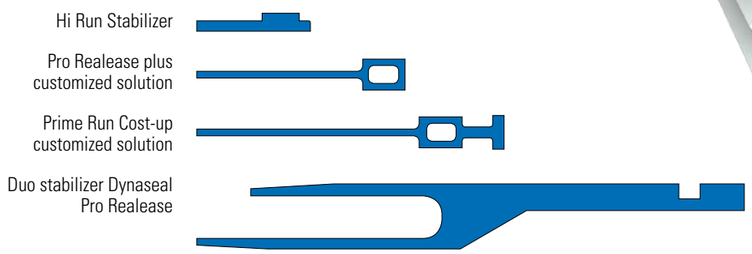
ROBATEC® Multiseal

Multiple lip-seal is a simple exchange of the original Teflon-lips to ROBATEC Twinseal material providing immediate energy savings. The optimizing of the physical properties is enough to create an energy reduction and an optimization of the stabilizers.

- **Improved paper web release through selective vacuum**
- **Energy saving through unchanging sealing position**
- **Increase of fabric's lifetime**
- **Simple exchange of the seal-lips**
- **No rebuild necessary**

Application:
Stabilizer boxes / stabilizers in the dry zone

Product range



Overview of sealing units

	max. machine speed	energy saving (low → high)	sealing (low → high)	wire wear (low → high)	
TwinSeal | MultiSeal	all				
teflon strip	all				(competitor material)
felt seal	all				(competitor material)
FRP-fabric	all				(competitor material)

Gear wheels

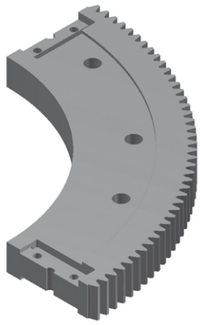
Highly loaded gears as a ring or in segments for drive wheels mainly in the drying section.

- **Excellent mechanical durability**
- **Excellent thermal resistance**
  - Maximum operating temperature ~110° C
  - Material is additionally heat stabilized
- **No brittleness**
  - Due to conditioning of the material, the toughness is increased
- **Special additives reduce tooth breakage**
- **Extremely wear resistant**

Supply range
Rings: Max. diameter of 2.5 m | Max. thickness of 250 mm
Installation on the machine is possible

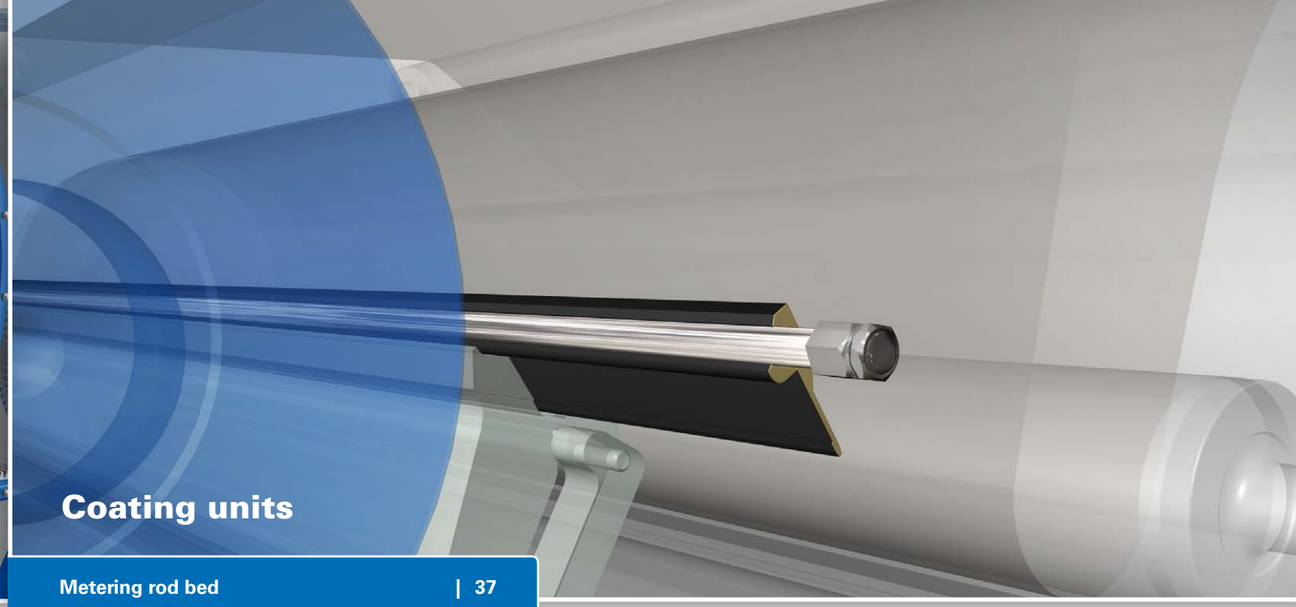
Segments: no dimensional limit
- Special connection technique between segments guarantees a gap-free connection
- Pre assembly on steel core at Leripa
- Adaptation on the cast-steel core necessary

Materials
Rings: ROBATEC-A
Segments: ROBATEC-A (max. 120° C)
& ROBADUR (max. 80° C)



Product comparison

	temperature	construction
ROBADUR	80° C	Segment, pinion
ROBATEC	~110° C	Segment, pinion, ring



Coating units

Roll coater

Function: For paper production or for increase of paper quality, rod beds and rods are used. A rotating metal rod (mostly chromium coated, grinded and polished) which is mounted in an UHMW-PE, meters an application medium to a specified quantity. This can happen in a direct (medium is directly transferred to the paper or board) or indirect process (medium is transferred to the coater roll and pressed to the paper in the NIP).
As an application medium, starch (a water glue mixture to increase the mechanical properties of the paper), or coating color/pigments (to increase the surface quality) is used.
The rods are either smooth, grooved, or in rare cases wire wound.
The diameter, the loading power and the profile design determine the coating thickness.

The unique material of ROBACOAT was customized to meet the highest demands for coating and sizing units including additives to provide reduced friction.

Röchling LERIPA Papertech produces ROBACOAT from the base powder to the final product. We incorporate our vast knowledge of the sinter pressing process, CNC-milling and final quality control to ensure the high demands of a system where rod & bed operate in perfect harmony.

Coating beds

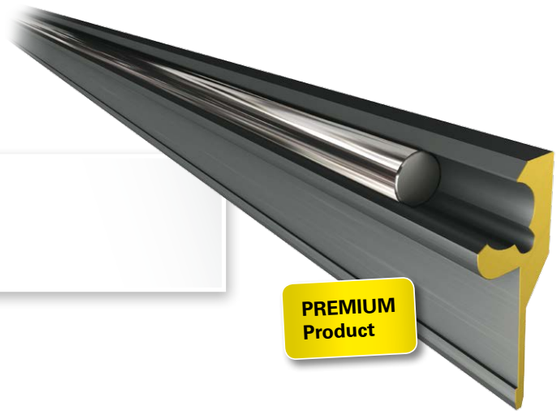
ROBACOAT®-B
Coating beds with a perfect cost-performance

- **Increase of lifetime (rod & bed)**
- **Reduced driving energy**
- **Perfect fit between rod & bed**
- **Quick and smooth installation of the rod into the bed**

Application:
Rods for coating and sizing units

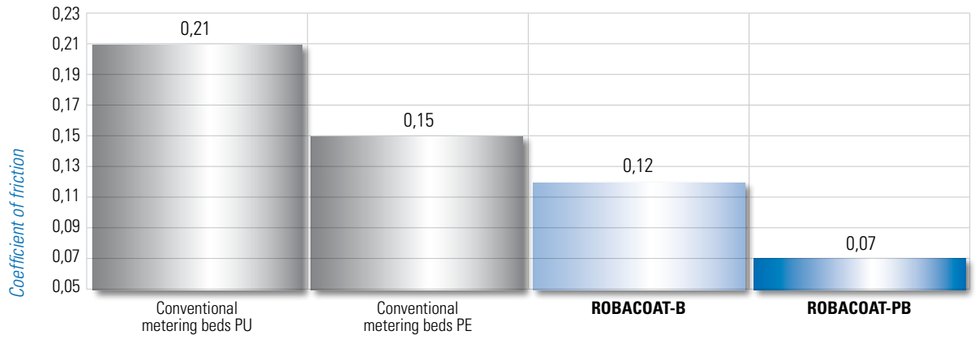
ROBACOAT®-PB
Premium material with further reduction
of friction compared to the classic line of ROBACOAT-B

- **Up to 50 % less energy-demand**
- **Up to 50 % less wear**
- **Increase of system runability**



Application:
Wear reduction on abrasive coating medium

Material comparison: friction



product comparison

*Tested with **Röchling LERIPA Papertech's own wear simulation machine** against stainless steel.*

RUNABILITY

Savings potential (case study)
by using ROBACOAT-PB as metering bed

Machine parameter: 1,800 m/min, 65 g/m², width = 8.4 m	**paper production of 0.983 t per min**
Time for bed ex-change ~ 0,983 to/min x 15 min x 400 €/to =	down time expenses due to bed-exchange €5,900
Duration time standard metering bed **~ 21 days:** €5,900 x 330 days / 21 days =	down time expenses due to bed-exchange €92,714 / year
Duration time of ROBACOAT-PB **~ 46 days:** €5,900 x (330/46) =	down time expenses due to bed-exchange €42,326 / year
€92,714 minus €42,326 =	**€50,388** per coating bed / year

Customer example: Spain, PM 10

Design options

ROBACOAT®-PBA
Adjustable metering system for premium quality
with wear compensation

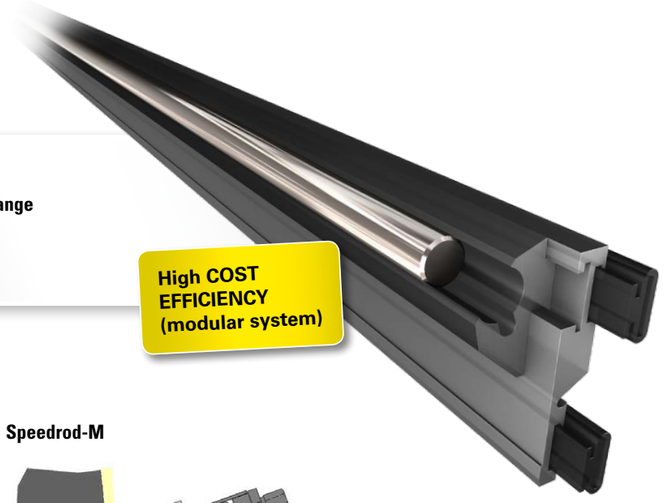
- **Elimination of lubrication water leakage**
- **Wear compensation**
- **Increased lifetime**
- **Avoid of stripe problems**

Application:
Size press and coating units at high abrasive components to increase the lifetime

Not available in Finland!

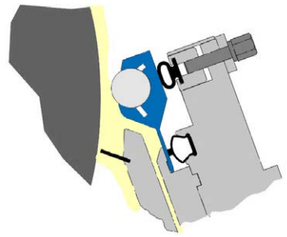
Speedrod-M
Modular design for ultimate reduction
of down time of coating units - developed
together with VOITH Paper

- **Increased runability**
- **Great cost savings in case of an exchange of clamping tubes**
- **Reduced wear parts**

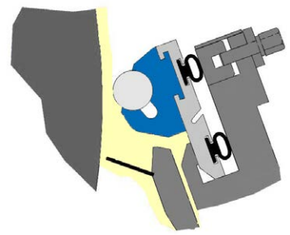


Application:
Not only at VOITH coating units

Standard



Speedrod-M



RUNABILITY

Savings potential
due to reduction of down time
by using Speedrod-M

Parameter paper machine: 1,200 m/min, 90g/m², width of 5.5 m	**paper production 0.594 t/min**
Time for tube exchange on the machine ~ 30 min: 0.594 t/min x 30 min x €400/t =	down time expenses per tube exchange €7.128
Time for exchange with Speedrod ~ 5 min 0.594 t/min x 5 min x €400/t =	down time expenses per tube exchange €1.188
Time saving per tube exchange of 25 min 0.594 t/min x 25 min x €400/t =	**€5,940** per tube exchange

Overview of metering rod med

	max. machine speed	ø coefficient of friction [µ]	lifetime low → **high**	investment **fair** → costly	surface quality low → **high**	efficiency increase
ROBACOAT-B	all	0.12				CLASSIC line
ROBACOAT-PB	all	0.07				premium product
ROBACOAT-PBA	all	0.12				adjustable premium product
SPEEDROD-M	all	0.12/0.07				high cost efficiency

*Tested with **Röchling LERIPA Papertech's own wear simulation machine** against stainless steel.*

Coating rods

Röchling LERIPA Papertech also offers, for coating units with metering rod systems, a full package with beds, metering rods and all different kind of drive parts and drive couplings. GH Beschichtungstechnik is our exclusive partner for the production of metering rods. The core competence of both companies flows together and creates a perfect package on high quality level.

Standard diameters

9.75 10.00 12.00 12.70 13.65 15.00 18.00 20.00 24.00 25.00 30.00

solid shaft

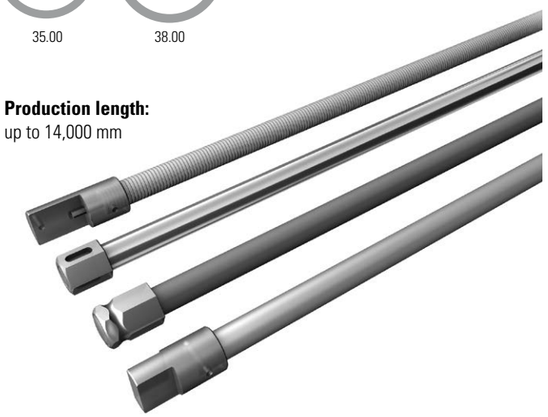
35.00 38.00

seamless pipe

Scope of delivery

	smooth	grooved	wire wound
chromed plated rod	YES	YES	YES
ceramic plated rod	YES	YES	YES
special plated rod (tungsten carbide)	YES	-	-

Production length:
up to 14,000 mm



The base material used for metering rods is a high-alloyed, rustproof stainless steel; the metering rod is analyzed for absolute flawlessness before bringing the cover (chrome, ceramics, special plated) onto the surface on smooth rods.
For grooved rods, GH Beschichtungstechnik creates the profile with special profiling tools. The profile is created in an **individual, material-protecting, cold form-cut - in one step.**

Each rod undergoes a final quality control before being packed.

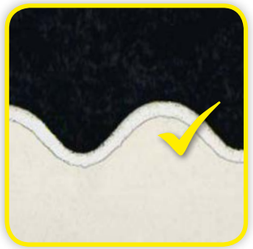
Special properties of grooved rods

In comparison to our competitors – UNIQUE PRODUCTION METHOD

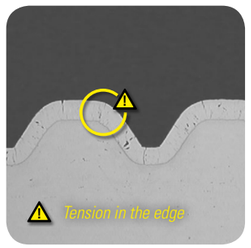
SINUS-PROFILE OF THE ROD THROUGH A SINGLE PRESS PROCESS

- **Greatest possible protection of roll covers (no edges)**
- **Allows high reproduction exactness**
- **Sinus-profile reduces splintering of chrome or ceramic coating**
- **Protection of the coating bed**

ROBACOAT sinus curve



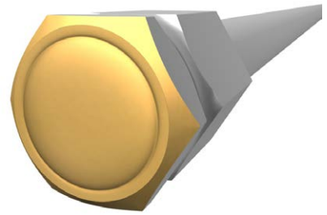
conventional profile



Smooth rods with tungsten carbide coating

For extreme conditions

For special solutions, when even ceramic coatings wear out too quickly. Only available as a package solution with the premium-bed from LERIPA.



Reference 1 - PM 11

Life from 4 weeks to 16 weeks
Machine speed 1300 mpm
Bar length = 9550 mm
Diameter = 24 mm

Reference 2 - PM 1

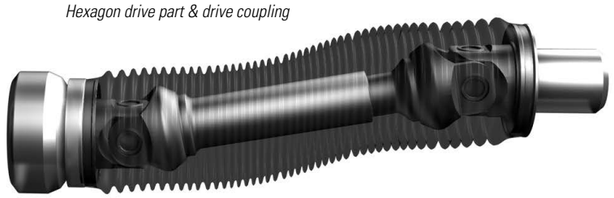
Life from 1 week to 4 weeks
Machine speed 1300 mpm
Bar length = 7370 mm
Diameter = 25 mm

Coupling & connectors

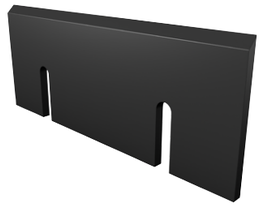
Ultimate PACKAGE SOLUTION

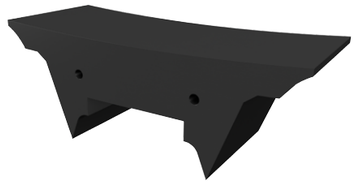
Metering rods with different direct drives

Hexagon drive part & drive coupling



Edge doctors & edge dams





Overview of metering rods

	Max. plating thickness smooth	Max. plating thickness grooved	Max. roughness [Ra]	lifetime low → **high**	investment **fair** → costly	Surface quality low → **high**	Efficiency increase
chrome	50 µm	25 µm	0.2				cost - performance winner
ceramics	50 µm	25 µm	0.3				optimized task: lifetime
tungsten carbide	50 µm	not possible	0.2				optimized task: lifetime

Mobile grinding service & repair team

ROBASERV | 42
Mobile repair and service team

ROBASERV®

Analysis and optimization concept for the whole paper machine regarding wear parts

Maximum work safety as well as health and environmental protection
- The only Austrian service team with SCC certificate

Maximum quality
- ISO 9001 certified

Maximum technology
- Intensive cooperation with papermaker school

Major task:

- Service group for maintenance, repair and preventive control of ceramic dewatering elements
- Control on the efficiency of the paper machine
- Inspection of dewatering elements
  (wear control, optical control, sensitive control, UV-crack-control, measuring of surface roughness)
- Reporting

Advantages:

- **Improved runability of the paper machine**
- **Up to 40 % longer fabric lifetime**
- **Risk assumption during installation and dismantling**
- **Optimizing of formation**
- **Optimizing of moisture cross-profile**
- **Reduction of driving power**
- **Increase of dry content**

Well trained and SCC certified team

Surface-control

Laser alignment

Flat bed grinding on the truck

TASKS IN DETAIL:

Inspection

Wear measurement
Monitoring and documentation of wear development.

Visual check
Visual check of the ceramic elements performed by a specialist.

Sensitive check
Scanning for damage to the dewatering elements (edges and surfaces).

UV crack control
Checking for the finest of hairline cracks using UV light.

Surface roughness measurement with a special measuring device
Measuring the roughness of the functional surface.

Report
Documenting all the work carried out, status report, and any recommendations where necessary (actual status, recommendations, list of measures).

"... what is particularly impressive is the professional and painstaking work on the machine as well as the informative and detailed documentation"
(Production Manager)

Service

Manual edge optimization
For the leading-edge dimensions and polishing of sharp rupture and fragment points.

Shape grinding
CNC-controlled precision grinder. Optimizing the entire cross-section of the strip.

Regrinding
for ceramics mounted on the box.

Segment changing on compound strips
Replacing damaged ceramic segments and subsequent grinding.

Leveling & checking of steel boxes
Correcting the evenness of sagging or warped steel boxes.

Laser measurement
Leveling of dewatering elements or entire wire section – both along and across for a running direction with 0.01 mm/m accuracy.

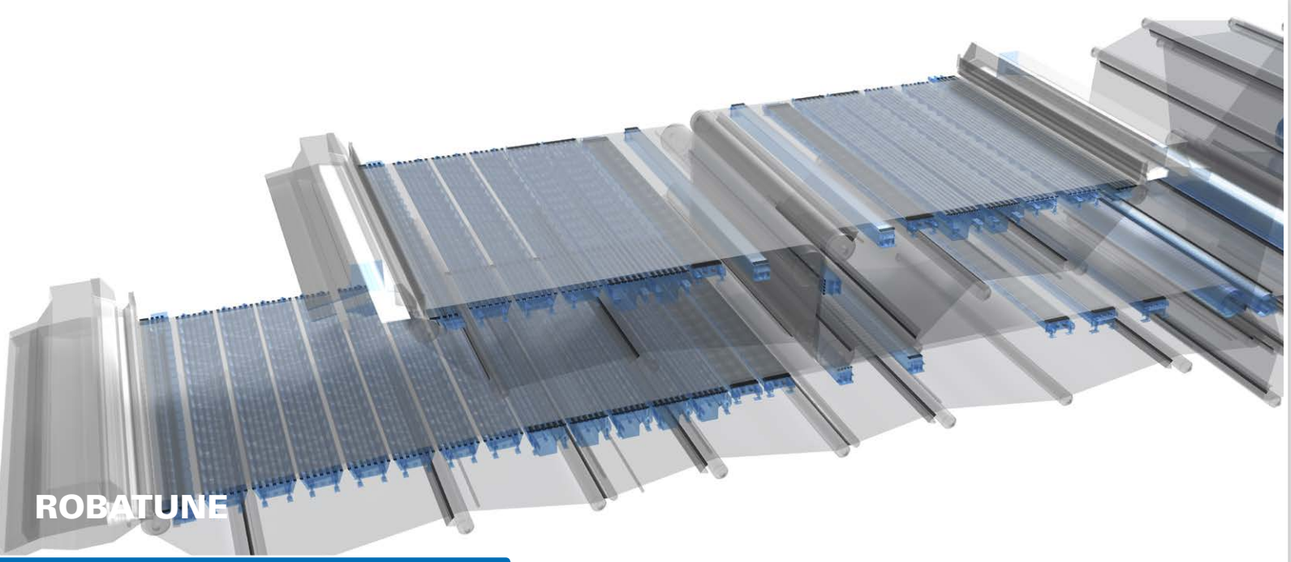
Report
Documenting all the work carried out, status report, and any recommendations where necessary (actual status, recommendations, list of measures).

SCC
Our employees have received the best possible training and are SCC-certified.

Logistics

Assumption of risk
For assembly and disassembly (60 to 70 % of damages to strips occur due to improper handling during assembly and disassembly).

Spare parts stock check
Inventory of available spare parts and recommendation for optimized storage.



ROBATUNE | 44

combines various areas and in addition to dewatering calculations/measurements or activity enhancement in the paper, also offers vacuum systems and steel boxes.

The ROBATUNE domain combines various areas and in addition to dewatering calculations/measurements or activity enhancement in the paper, also offers vacuum systems and steel boxes. The flexibility of the paper machine is that much more important in times like these. An interplay of our services will make perfect customization possible for you.

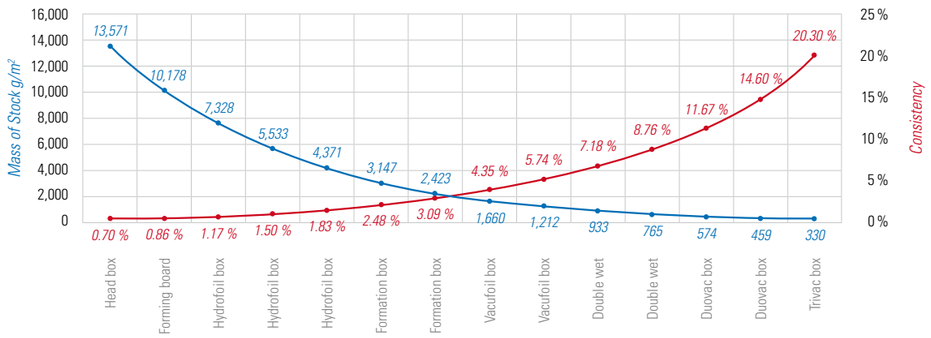
ROBATUNE™ offers you

- Analysis of the actual situation through a consistency measurement on-site
- Optimization suggestions (replacement of individual boxes, re-arrangement or supplementation of dewatering elements)
- Electronically controlled vacuum valves
- Project accompaniment during the modification
- Situation analysis after the modification

Advantages

- **Increasing the dewatering capacity**
- **Increasing the activity in the paper**
- **Increasing the machine speed**
- **Determining the actual dewatering capacity of individual elements**

Dewatering calculations / measurements



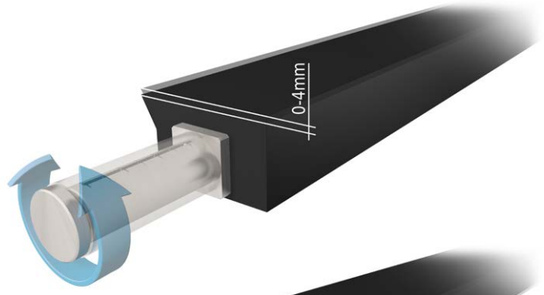
Suggestions for improvement on the subject of dewatering can be implemented by us on our premises or on your machine. The technical design of the dewatering with the relevant information is carried out on our premises, such as: consistency, water quantity per element,… The basis of this design is the current situation of the paper machine or the additional information provided by the customer.

Of course, the LERIPA team can also carry out consistency measurements on-site, to ensure that critical information like the actual dewatering capacity of a box is also correct. Essentially, the improvements in the dewatering are in the controlled increase in the dewatering capacity of the wet section, for example, to increase the dry content before the press section or the machine speed.

However, our recommendations are not limited only to the dewatering capacity, but also to the improvement in the material activity and hence, the paper quality.

Increasing the ACTIVITY IN THE PAPER

We tune the wet section between the first hydrofoil and the first flat suction/top former/ply-bond that is especially sensitive for the formation. Depending on the machine type, the speed and the paper quality, we recommend different measures for increasing the activity. One important part of all recommendations is to design a zone that is as flexible as possible to equip the machine for different requirements.



Height setting:
With the new formation strips, whose height is continuously adjustable, the activity for any operational state can be tailored optimally. The height of the positive pulse, which is responsible for the formation improvement, changes with the height of the adjustment range.

Angle adjustment:
With the new hydrofoils, whose height is continuously adjustable, the dewatering capacity for any operational state can be tailored optimally. Thus, changes in the grammage or the speed can be carried out without any modifications in a very short time without having to compromise the product quality in any way.

Vacuum system

Optimizations do not restrict themselves only to the dewatering elements themselves, but the vacuum system also has to be tuned to conform to the new requirements. One important part of this is represented by the electronically controlled vacuum valve, to control the low-vacuum range as well as the high-vacuum range individually, and thus, through the optimally created vacuums, have a positive effect on the paper quality/dewatering capacity. The valves can either be connected directly to the DCS or if desired, controlled on a separate control panel.

The advantages of the Röchling Leripa vacuum valves are:

- **Constant vacuum level**
- **Stable control of the low-vacuum range as well as of the high-vacuum range (0.001 bar accuracy)**
- **No compressed air required to hold position**
- **Savings potential up to €500 / year & valve, as compared to traditional systems**

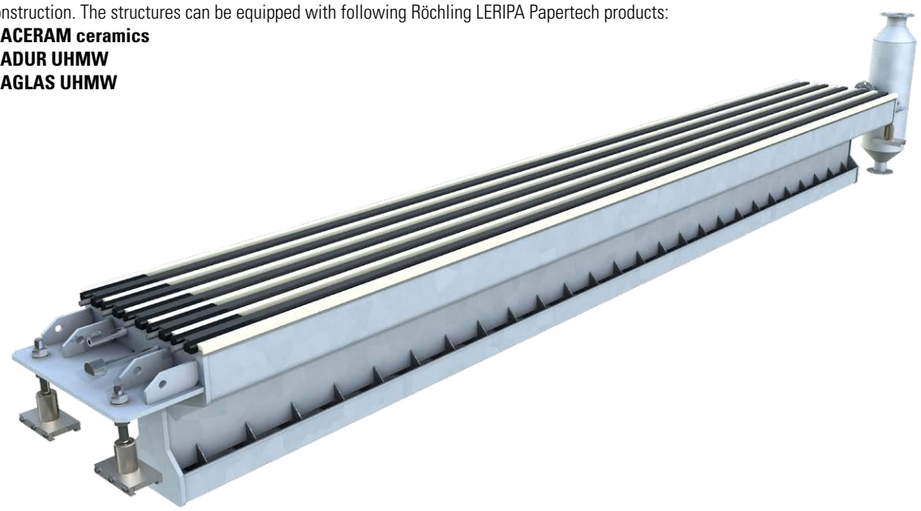
Steel constructions

ROBASTEEL™
The firm structure below

The structures are made of stainless steel, Grades 316L, 1.4404 / 1.4571 according to DIN 17440

All stainless steel structures are designed according to the finite element analysis, to grant a torsion free and stable construction. The structures can be equipped with following Röchling LERIPA Papertech products:

- **ROBACERAM ceramics**
- **ROBADUR UHMW**
- **ROBAGLAS UHMW**



Various types of structures:

Forming box
Hydrofoil box
Formation box
Vacufoil box

Wet suction box
Flat suction box
Duovac box
Trivac box

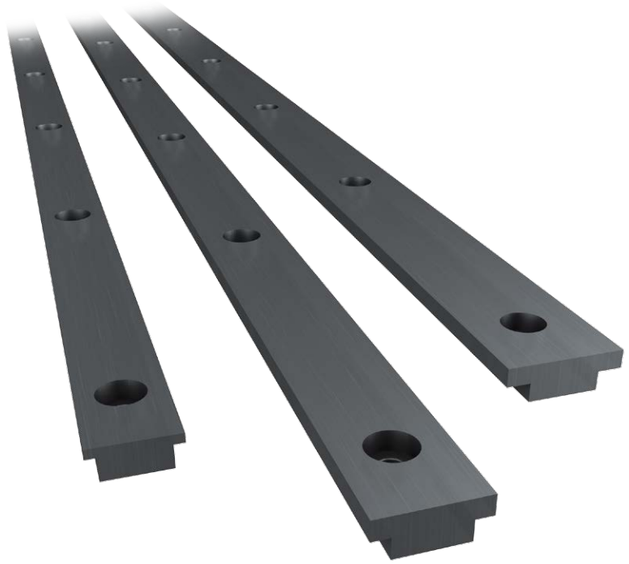
Low-vac separator
High-vac separator

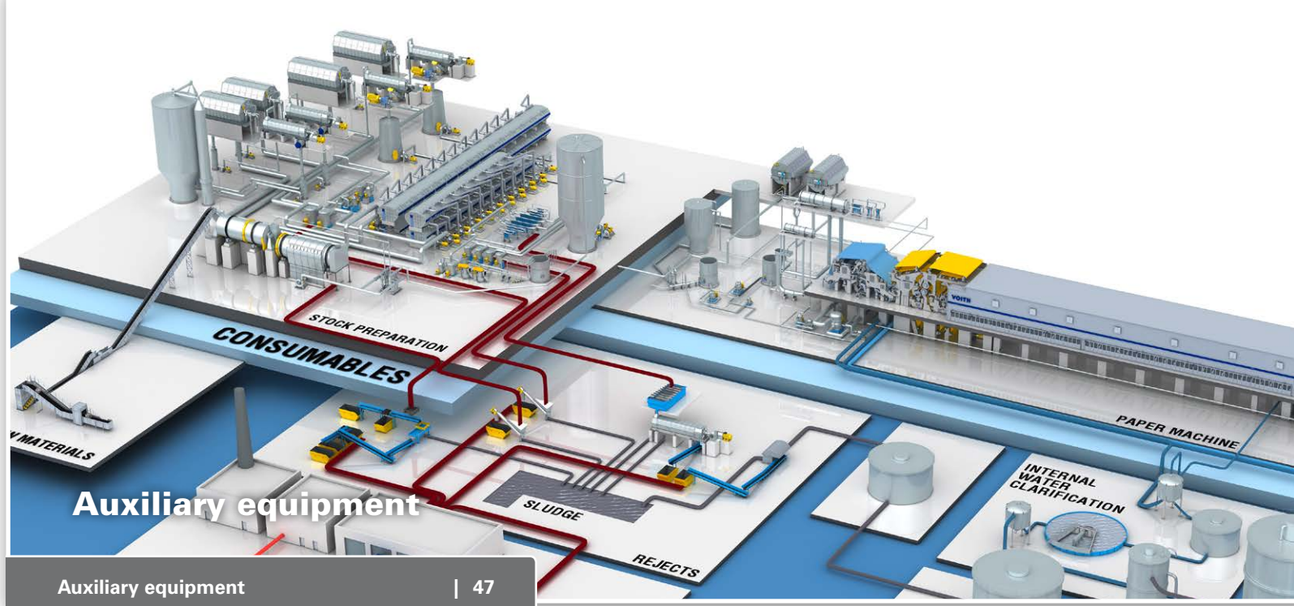
FRP-T-bars

Röchling LERIPA Papertech uses FRP-VE (Fiberglass Reinforced Polymer on a Vinylester base) for T-bar profiles. The increased stability of all FRP components is created by using an extremely high grade of glass fibers in the pultruted form (up to 75 % glass!).

Röchling LERIPA Papertech uses this kind of FRP T-bars as standard for all paper machines up to 1,200 m/min (4,000 feet/min) for VOITH Paper as well as Valmet Paper.

Each design is possible,
but we offer the following LERIPA standards:
- 25 x 10
- 25 x 16
- 30 x 12
- 37 x 12
- 37 x 16





Auxiliary equipment | **47**
Plastic wear parts
ROBADUR, ROBAGLAS, ROBALIT 61, ROBACER

In addition to the standard wear parts for paper machines, we offer a wide range of UHMW-PE wear parts for equipments beside the paper machine.

In the following equipments beside the paper machine there are numerous applications for highly wear-resistant plastic parts:

- **twin wire press**
- **wash press**
- **gravity table**
- **chemi washer**
- **gap washer**
- **disc filter**
- **disc thickener**
- **screw conveyor lining**

More information is available upon request.

All wear parts for auxiliary equipments are produced in the following qualities:

ROBADUR: CLASSIC line
ROBAGLAS: premium line
ROBALIT 61: perfect surface
ROBACER: extreme conditions

These plastics are mainly characterized by their special long-term sintering process, a very high molecular weight and additional additives which are specially aligned for the paper machine. These advantages ensure an exceptionally long life for plastics and a low friction coefficient.

Further material details can be found on page 15.

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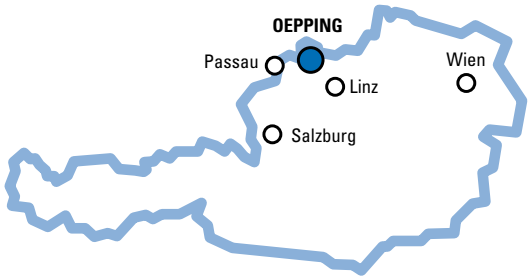

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