

Perfect interaction of fabrics, roll covers and doctor blades

## New dimensions in press dewatering

Voith Paper has developed two new suction press roll covers, AquaFlow and SolarFlow, which help to achieve the highest dry contents and lowest energy consumption. The last few months have seen promising field trials and tests being run in the Paper Technology Center.

*Efficient nip dewatering.*

The new roll covers have already demonstrated their advantages at the Leinfelder paper mill in Schwedt:

“The use of SolarFlow and SolarPress is a complete success. The dry content after the press on the PM 3 was increased by 1%,” reports Arno Liendl, Technical Director at Leinfelder Schwedt. Together with other optimization measures, the speed and the output of the

paper machine that produces linerboard paper was also increased.

### **New cover structure is the secret of its success**

The higher dry contents are no longer a coincidence, but come about because the covers consist of innovative, functional layers. The fiber-reinforced multi-layer base with increased material density and aligned

e-module structure lies on the metal core of the roll with the interface. Then the WebNet technology follows, a newly developed three-dimensional polymer layer. It cross-links the multi-layer base with the polyurethane functional layer.

The WebNet technology and the polyurethane functional layer, in particular, have outstanding characteristics. Voith Paper optimized the

latter for the new covers, AquaFlow and SolarFlow. A denser molecular structure increases its elasticity, mechanical strength and abrasion resistance. In addition, the hydrolytic behavior and stability are improved. The WebNet technology comes from the aviation and automobile industries. The Interpenetrated Network (IPN) has been in use there for a long time as a process for connecting different polymers. Now Voith Paper is using this process for its new suction press roll covers. The advantages are enormous: because of the three-dimensional cross-linking of the polymers, the connection between functional layer and roll core is greatly improved. The roll covers show better temperature resistance and clearly higher resistance to chemical and mechanical loads than was previously possible. With these optimized characteristics, the WebNet technology replaces the AST bonding layer developed by Voith Paper in the 1990s.

*“The dry content after the press on the PM 3 was increased by 1%.”*

Arno Liendl, Technical Director at Leinfelder Schwedt

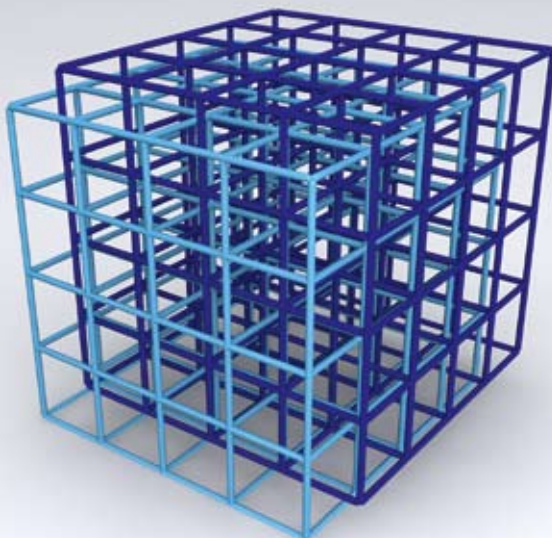
**AquaFlow or SolarFlow?**

The Voith Paper experts individually determine which cover is the best for the given application. “With the NipMaster simulation program, we carry out a dewatering balance with our customers that includes all relevant practical parameters, including the press felts,” explains Michael Weinzettl, Product Manager for polyurethane rolls at Voith Paper. On this basis, it is decided whether AquaFlow, SolarFlow or another roll cover should be used and which surface design would provide optimal dewatering.

Incidentally, the biggest difference between the new roll covers is in the

material used for the functional layer. “The polyurethane that we use for the AquaFlow cover we have even further improved for the SolarFlow cover,” Weinzettl reveals. Therefore, the SolarFlow has even higher surface stability which ensures the best possible operative storage volume in the operating state and load case. This is important given that it is mainly used in the extremely stressed suction press roll position.

Both with AquaFlow as well as with SolarFlow, the structure of the new polyurethane functional layer facilitates deeper grooves for more efficient dewatering. Specifically, this means: the groove depth in the case of the AquaFlow cover extends to



*WebNet technology – a three-dimensional cross-linking of polymers.*

2.3 millimeters with a groove width of 0.5 to 0.9 millimeters. The land width in between can be 2.0 to 2.5 millimeters wide. In the case of SolarFlow, these dimensions are even more ideal: The grooves are up to 3.0 millimeters deep and 0.4 to 0.9 millimeters wide – with land widths between 1.8 and 2.5 millimeters. The storage volume of the covers is expanded by means of the deep grooves and the water can run off more quickly into the save-all.

**Higher level of dewatering and a longer service life**

The result is very efficient nip dewatering with reduced hydraulic pressure build-up in the press nip. Blind holes in the cover surface can be omitted, if applicable. Uhle box dewatering for the felt conditioning can be reduced – and therefore a lot of energy is also saved. In addition, up to now blind holes could led to

shadow marking in the paper produced. In a paper machine that produces photocopying paper with the aid of SolarFlow, shadow marking was eliminated using this method and the dry content increased by 0.7 to 1%.

resistance until a new cover is required. At the same time, the dewatering conditions remain more constant in the press nip, since sufficient dewatering capacity is available due to the innovative groove geometry.

*“We see a lot of potential in the interplay between roll cover, felt and doctor.”*

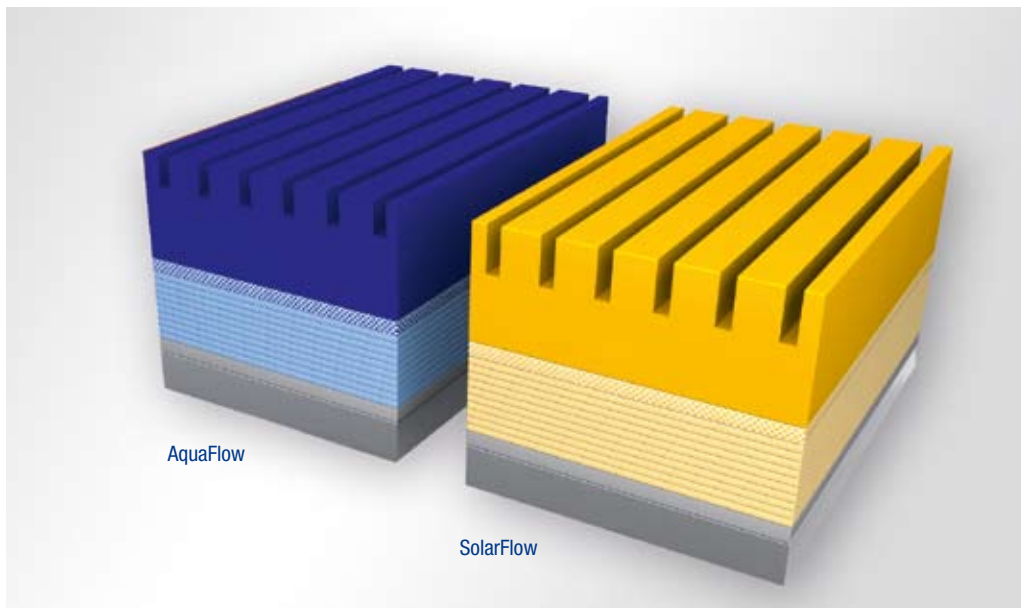
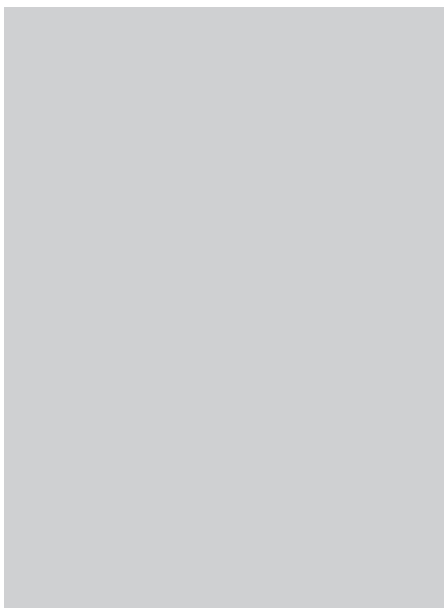
Peter Moedl, Product Manager press felts, Voith Paper

An improved service life is another advantage of the new covers. That has also proved to be the case in practice. In the case of a paper machine that produces testliner and corrugated medium, the grinding interval has doubled due to the use of a new cover, with a simultaneous increase in nip dewatering. That is because of the high-quality polyurethane which lengthens the grinding intervals by means of its abrasion

**Research with felt and doctor**

A paper mill in Europe had similar experiences in the production of wood-free coated premium paper. Here, the cover had a positive effect on the felt used. The running time of the pick-up felt was increased from 21 to 32 days and the felt start-up was substantially improved. Several tests by Voith Paper – both in paper mills and also on test paper

*AquaFlow and SolarFlow – deeper grooves for more efficient dewatering.*



machines – have shown how strong an effect the roll cover has on the press felt. At one paper mill, the running time of the felts was increased by one of the new roll covers from 14 to 45 days. But Voith Paper’s research work doesn’t stop with the interplay between roll cover and felt. “We see a lot of potential in the interplay between roll cover, felt and doctor,” explains Peter Moedl, Product Manager for press felts at Voith Paper. Maximum dewatering can only be achieved if all three components are optimally coordinated with one another. “If my roll cover is ingenious but felt and doctor don’t support its functions or even impair them, I don’t utilize the full potential,” says Moedl.

**New E-Flex felts tested**

Test runs at Voith Paper also included the newly developed E-Flex press felts. These are structure optimized

felts by adding polymer particles to surface or base structure thus enhancing the ‘bridging’ effect over the roll cover grooves. They provide the most homogeneous pressure transfer. Resilience is improved, which leads to fast start up, high nip dewatering and steady state performance over the entire felt life. The pore volume distribution in the felt can be adapted to the position need.

**Promising tests**

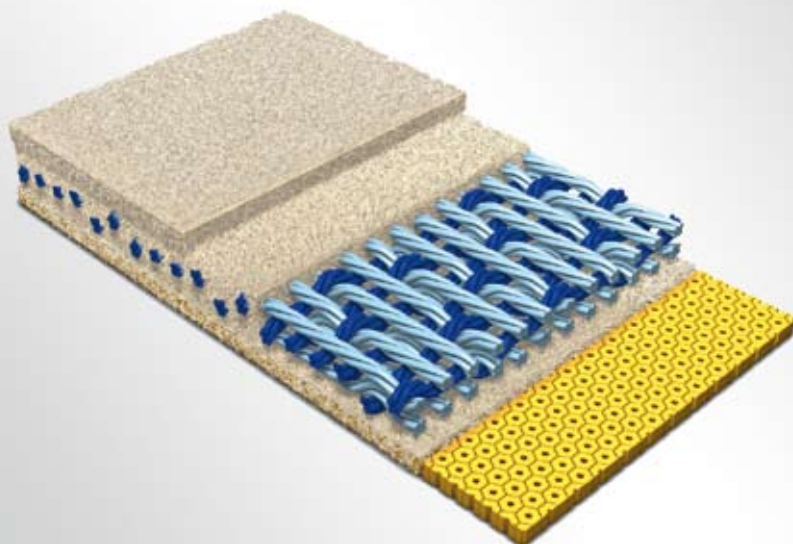
Voith Paper has already tested several combinations of roll covers and felt designs on the VPM 6 test paper machine at the Paper Technology Center in Heidenheim. With optimal coordination of these two components, the greatest dewatering potential by far is the result. The tests show that the groove capacity of AquaFlow and SolarFlow can be fully utilized with E-Flex press felts, even under pressure. If, in addition,

the doctoring is coordinated with the composition of the roll cover, the best results are realized. Along with an increase in the dry content, the tests also show a big potential for further energy savings in the press section.

With consistent dewatering via the groove, there can be noticeably reduced uhle box vacuum and suction press roll vacuum. In addition, this has a positive effect on the drive energy required in the press.

SolarMax will soon be the rising star in the market by combining a new groove design of polyurethane suction press roll cover with a matching press fabric. SolarMax is designed for energy efficient dewatering in the press section.

*E-Flex – structurally optimized press felts.*



**On Focus: AquaFlow and SolarFlow**

ProEnvironment	+++
ProRunnability	++++
ProQuality	++
ProSpeed	++++

Section: press  
Width: all  
Paper grade: all

**Contact**



**Andreas Weis**  
andreas.weis@voith.com