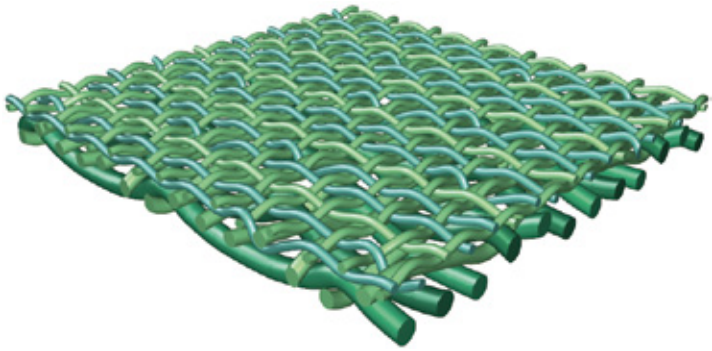
Heimbach

Putting life back into the fabric

Today's papermaker must be able to make paper in the most economic manner possible, and have a forming fabric that is fit for purpose. Given the limitations of traditional SSBs, the time seems to be ripe for a new approach.

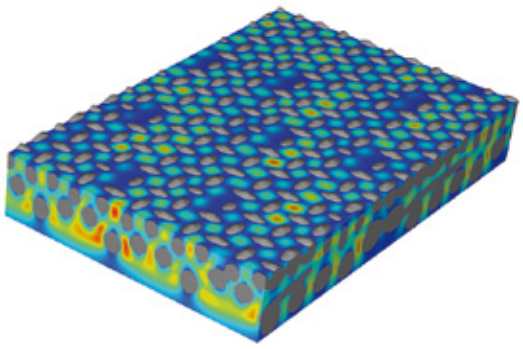
Heimbach has taken up this challenge and has introduced a new family of products that eliminate the inherent issues associated with SSB forming fabrics, allowing a fine structure for formation to be maintained whilst providing the opportunity to put some of the life back into the fabric without increasing the caliper. The brand name for this new family is "Primoselect"; initially the product was developed for the high speed graphical market but it is now being expanded to cover the full spectrum of grades including packaging and tissue.

The Primoselect structure creates a fabric with exceptionally high drainage capacity and ultra-thin caliper. The paperside provides a very fine and low marking sheet-forming surface with high open area, whilst the robust machine side affords dimensional stability and long fabric lifetime. Primoselect has no pairs of binding yarns, as all yarns potentially can bind the layers, allowing the MD and CMD yarns to be offset (which reduces caliper as low as 0,50 mm) and locks all yarns in place. These fabrics are stable and provide exceptionally high degree of drainage. They are unique in the market and patent-protected in Europe and other major regions.



3-dimensional model used for CFD analysis

In the development of Primoselect, modern Computational Fluid Dynamics (CFD) techniques have been used. This technique provides an insight into the drainage characteristics and allows comparison to the existing product line to be made early in the development process, rather than relying on the paper machine to tell how the fabric will dewater.



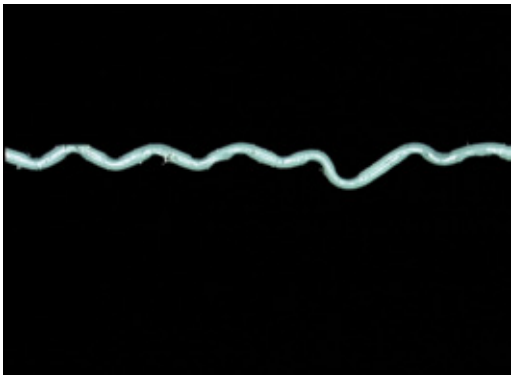
Computer model of the flow velocity distribution: colours represent the predicted speed of water flow through the fabric – from dark blue (slow) – light blue / green / yellow – red (fast)

As Primoselect replaces a pair of binding yarns with just one yarn, the open area can be raised to >40 %, significantly increasing the drainage ability of the fabric, while the offset placing of the yarns ensures an extremely clean and dry running fabric.

Primoselect offset yarns, cross-section showing low void volume and thin caliper

With its thin caliper and high dewatering capability, Primoselect can deliver high sheet dryness into the press section, contributing to the ever important machine effi-

Primoselect high speed gap former cleanliness



No internal abrasion using smaller diameters on high speed SC former where fabrics typically have this problem

ciency by reducing the potential for paper breaks. This is especially useful on older machines where any improvement in dryness translates directly into the speed and output of the machine.

Given today's focus on energy costs, the high drainage afforded by Primoselect can also be used in a different way. By maintaining rather than improving dryness it becomes possible to optimise vacuum levels in the forming section, reduce drive-load and create substantial energy-savings. Using the unique Primoselect pattern Heimbach is also able to use a 0.27 mm yarn and provide the ability to to extend fabric life on high speed machines.

Hamish Parsons

ipw spoke with Hamish Parsons, Strategic Product Manager, Forming at Heimbach, about the highlights of the new concept.

ipw: *How long have you been developing the new Primoselect technology and product family?*

Hamish Parsons: The first picks on the loom were at the end of 2011 and involved the replacement of paired binding yarns with a single binding concept. In 2012 we took the decision to work with a couple of key customers who were prepared to participate in an initial trial phase to prove the concept. The subsequent success of these trials led to the product launch in September 2013 when Primoselect was introduced and made available to the wider market. This essentially means that what is for the market a very new and attractive concept, we are now running in 12 different countries across three continents, has been a technically challenging project worked upon since 2011!

ipw: *Where do you produce this innovative forming fabric?*

Primoselect was initially designed for the graphical segment with fabrics being produced at our lead forming fabric manufacturing plant in Manchester, UK. Further development is currently underway to extend the concept into the Packaging paper segment. Many of our packaging products are made in our Spanish facility and the first designs are already successfully running on several machines. Moving into 2014 we will see an increasing number of options from Spain.

ipw: *You are pointing out that Primoselect can be used for the full spectrum of paper grades – can you describe the specific benefits for the different products?*

The key aspect of the patented technology behind Primoselect concerns the method used to bind the paper and machine sides of the forming fabric together. This technology can then be adapted to produce very fine structures for use on graphical machines, or coarser meshes to provide, for example, enhanced life potential on a packaging machine. The much wider operating window that the new technology offers allows us to build in different attributes to fit the requirements of our customers – whatever grade they are producing. This could be reflected in lifetime improvements that may have been previously unattainable, energy savings or improved runnability associated with higher dryness.

This flexibility is what lies behind our slogan "You choose – together we select" in so far as our customers will have certain wishes in respect of the forming fabrics, and once these have been determined we will explore the various options available within the primoselect family to find the right fit.

ipw: *You are also underlining that it can very beneficial when used on older paper machines. How did you find that out and can you give some more specific information on test runs?*

When we look at the graphical market we see from the runs so far that we are able to achieve a higher dryness out of the paper machine former. This then provides the machine operator choices. On a high speed machine with a double shoe press he may choose to reduce vacuum to obtain the old dryness and save power, while on an older machine that has many limitations on production the extra dryness may be translated into extra speed and tonnes out the door. Again it is about selecting the customer requirement. For older packaging machines this concept also allows higher fibre support while using large wearing yarns for fabric lifetime.

ipw: *Primoselect is praised to enable substantial energy savings. How much could be achieved, compared to conventional forming fabrics?*

This is an extremely difficult question, as it is dependent on many factors including how the papermaker would like to operate his machine. The main benefit of replacing a pair of binding yarns with a single yarn is that the paper side of the forming fabric is then more open. This then typically would provide enhanced capability to remove water, providing an increased dryness off the paper machine former. It is then a choice for the operator as to whether he requires this extra dryness or not. If not, then he is able to reduce the vacuum applied in the suction box area. This can already bring high savings in the use of vacuum pumps – the added bonus is that with reduced vacuum the drag in the former is less and thus the former drive will also reduce. We come back again to the many options presenting the chance to make a choice as to how to derive the most benefit from the advantages available.

ipw: *Fabric lifetime is another important topic: How does Primoselect perform in this regard compared to conventional forming fabrics?*

On many paper machines we are limited with regard to how high the caliper of the forming fabric can be due to the tendency for a forming fabric to carry water within its void volume. By the nature of the Primoselect weave pattern we are able to offset the machine and cross direction yarns. This offset reduces the fabric caliper and thus allows us to put larger yarns into the fabric than would otherwise normally be used. The simple change of moving from a 0.25 mm wearing yarn to 0.27 mm immediately provides a 17 % increase in available wear volume on the machine. If this is then combined with lower vacuum as mentioned above then the wear rate is further reduced providing additional life potential. We are working with our customers to look at the overall cost of paper manufacture when running Primoselect, rather than just the fabric cost.

ipw: *Runnability of Primoselect seems to be well above average as well. Can you explain what has to be done to fully take advantage of this?*

An additional benefit that became apparent in the early trial runs was the capability of these designs to maintain former cleanliness. Cleanliness of the inside loops of the former is certainly desirable for machine operators and a cleaner machine means less breaks. Combining this with a drier, stronger sheet exiting the paper machine, means Primoselect can be a great help improving the machine efficiency.

With the increased use of recycled furnish, fibre quality is also reducing. This can have the effect of creating internal wear within the forming fabric, something unheard of in the past but becoming increasingly common. The unique weave pattern of Primoselect effectively eliminates this issue, maximising the life potential of the wire. We are using the fabric design to bring this lifetime back, ensuring planned stoppages on the machine are minimised.

ipw: *How are customers responding to the Primoselect portfolio? Apparently, graphic paper production was the first target. Now, Heimbach is promoting the technology for packaging and tissue grades as well. How is the customers' reaction in these segments?*

The higher drainage capacity of Primoselect is now well proven and has allowed us to improve the application methods by which the appropriate specifications are selected. To take an example a typical gap former may run a 350 cfm wire on the inner position and a 380 cfm wire on the outer. This same machine with Primoselect would likely end up having a 310 cfm on the inner and 340 cfm on the outer to give the benefits above while also optimising the formation for the paper grade. This selection process while working with the customer has been a great success as it builds the trust required for long term partnerships.

You are right about the graphic sector being the initial target, and we are now exploiting our experiences in this to now build a successful portfolio of designs for other paper grades. Tissue is the natural extension, as a successful tissue design still requires a very thin, fine and open design with a slight modification to the weave. In this case we have started with an ultra-thin product targeted at Crescent Formers, with additional specifications suitable for other tissue configurations to follow later in 2014. For packaging machines we are well on the way to having long floated, high life options for the market with our first trial starting up on a packaging gap former in Europe. So far this wire is running well and we will further evaluate it in the coming weeks. We also have a number of standard Primoselect options woven in Spain and UK in standard six float designs that are running successfully on fourdrinier machines across Europe. Further options in the standard six float and long float Primoselect designs are underway.

ipw: *It seems as if Primoselect is a pretty good deal for paper makers – is this also true regarding its price/ROI?*

It is a great product that is currently suitable for many machines. The cost of the wire is only one component in the overall papermaking budget and where Primoselect can be used it has the ability to contribution to overall cost reduction through a combination of higher dryness, lower energy consumption, improved runnability or longer lifetimes.

At Heimbach we are well aware of the pressures confronting our customers and our development efforts are primarily focussed on helping our customers reduce wastage in the papermaking process. We therefore feel very comfortable in stating that Primoselect users should expect a good ROI on the cost of these products.

Thank you for the interview! **S. Haase** ■