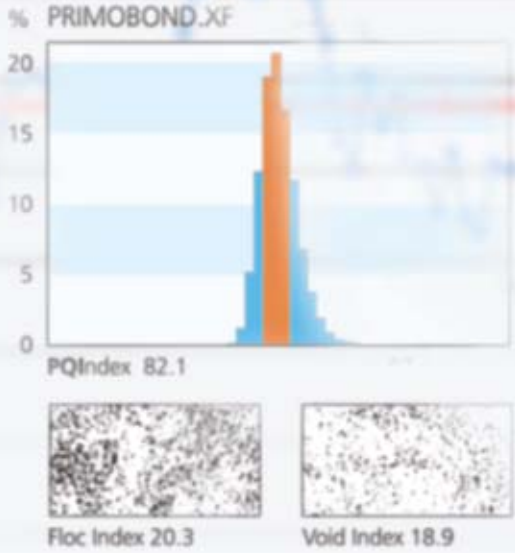

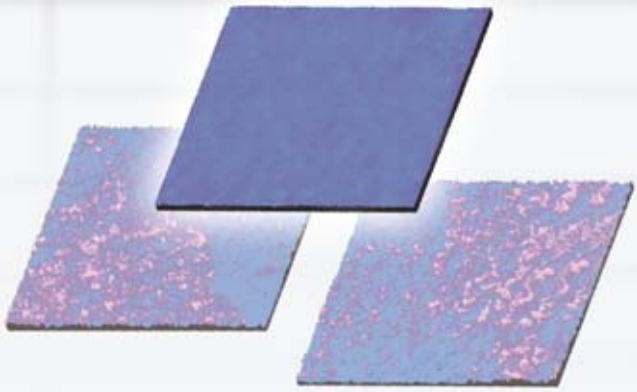

Press Release

Forming fabric and press felt innovations from Heimbach improve the production processes

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Forming fabric and press felt innovations from Heimbach improve the production processes

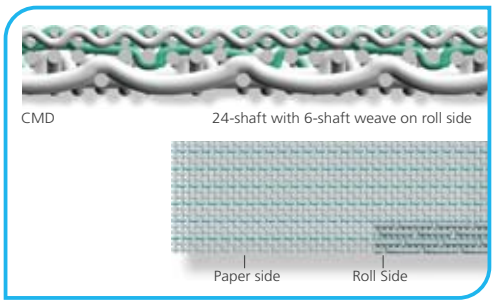
Increase of FSI and stability with ultrafine SSB fabrics

In order to solve the conflict of aims between the desire for the finest possible forming fabric and the necessary process requirement for high dimensional stability, Heimbach has developed a new polymer: STABILON. This polymer will initially be used in the machine-direction yarns for PRIMOBOND.XF, currently the finest SSB fabric from Heimbach (Ill.1).

Ill.1 PRIMOBOND.XF from Heimbach

The new MD material realises two substantial advantages for forming fabrics: 1. an exceptionally high E-modulus providing the fabric with maximum tensile strength, and 2. MD yarns of particular fineness, which is only achievable with the high strength of the new material.

The high level of MD fineness – combined also with very fine CD yarns – provides an FSI figure of over 210. In this way the use of high-tensile materials produces an SSB fabric with the dimensional stability of fabrics for packaging grades whilst fulfilling the wish for the highest levels of fineness (Ill.2). This Heimbach fabric has already proved itself on various types of former and on a wide range of paper grades.

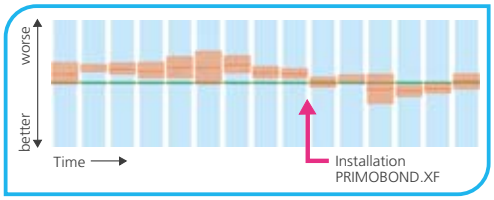


Ill.2 Ultrafine, dimensionally stable SSB fabric construction

Practical applications of process optimisation

The following case study confirms the wide range of improvements for the production process (Optiformer HR, coating base, approx. 1400 m/min). Starting situation: In the top position a standard PRIMOBOND.SF 24-shaft fabric from Heimbach; in the bottom position a 20-shaft standard fabric from another supplier. Aim: Improvement of formation and reduction of two-sidedness.

After measurements to establish the status quo (On-line formation evaluation (Ill.3) and analysis of paper samples in the Heimbach laboratory), the ultrafine PRIMOBOND XF with its STABILON MD yarns was installed in the bottom position. Already shortly after start-up a significant improvement in the formation could be seen. The on-line evaluation of the formation (Ill.3) showed an improvement leap immediately following the installation of the Heimbach fabric and during its subsequent run (weekly averages).



Ill.3 On-line formation evaluation

In order to confirm this, the Heimbach laboratory checked paper samples from the improved production for formation and two-sidedness. This was carried out by PQI analysis, with which the paper quality, particularly its printability potential, is defined numerically in terms of its sheet density.

This definition is called "Paper/Print Quality Index" and is abbreviated PQI. With it possible differences between the two sides of a paper sheet or between two production runs of the same grade on the same machine can be quantified. Comparable paper grades from different sources can also be compared.

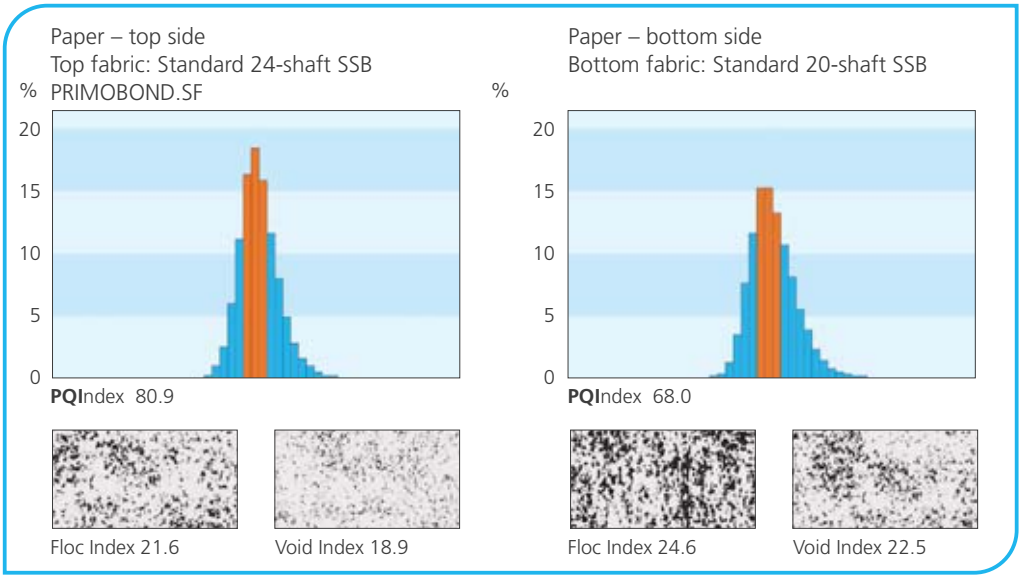
The numerical values from the system are in addition used to evaluate the Floc Index and the Void Index.

(A further description can be found at www.heimbach.com under "Press Releases" and under the title "What is Print Quality?").

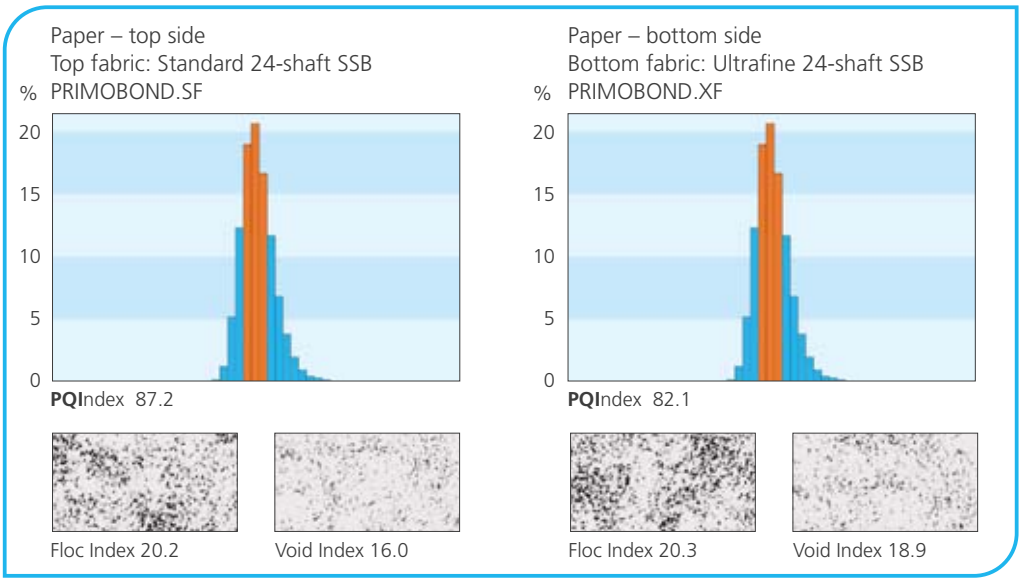
The paper samples were split in the Heimbach laboratory and both halves were analysed with PQI for formation, regularity of density and two-sidedness of the surfaces. The result can be seen clearly in the comparison between Ill.4 – status quo **before** installation of the ultrafine Heimbach fabric in the bottom position – and Ill.5 – the relevant values **after** the installation of this fabric.

The PQI value of the top side of the sheet has increased significantly: by 6.3 points. This means that under the formation-friendly influence of the new bottom fabric the performance of the standard top fabric from Heimbach was also improved. (Such a "mutual optimisation" through the use of two matched pieces of clothing is described by Heimbach as the "Advantage of the Married Couple").

At the same time the PQI value of the bottom side of the sheet was improved, and by an even more impressive 14.1 points.



Ill.4 PQI analysed values before installation of Heimbach bottom fabric



Ill.5 PQI analysed values after installation of Heimbach bottom fabric

The higher PQI value increase on the bottom side in comparison to the top side of the sheet is clearly the result of the ultrafine bottom fabric from Heimbach and signifies a drastic reduction in two-sidedness.

This positive result is additionally augmented by the reduction in the Floc and the Void Indices (compare Ill.4 and Ill.5). In total all these comparisons confirm the improvements in the formation values in comparison with those shown in Ill.3 (On-line formation evaluation). Mission accomplished!

In addition the runnability of the machine was outstanding, including a continuous period of 14 days without a break. (Energy saving / increased production) – undoubtedly achieved through the increased mechanical tensiles of the paper sheet.

This case study proves that as a result of the exceptionally high tensiles of STABILON, maximum fineness = highest FSI values can be obtained together with the highest levels of stability. This material will also make a substantial improvement to paper quality with the forthcoming market introduction of the new Heimbach SSB fabrics.

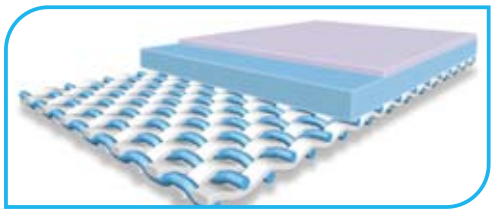
New superfine felt surface on mark-free base structures

Optimal printability of paper and board is increasingly expected by both customer and end-user. This applies also more and more to the "simpler" grades. One of the basic prerequisites is for improvement to surface smoothness. In addition to even fibre distribution and mark-free forming fabrics, the performance of the press clothing is a major influence.

In the press section the sheet surface is influenced (if possible to a minimal extent) by a degree of "impression" (marking) from the base structure or the batt surface of the press felt. Additional influences are both hydraulic pressure and the speed and regularity of dewatering which affect the sheet surface. The latter two factors are substantially determined by the batt structure.

Influences on base structure and batt surface marking

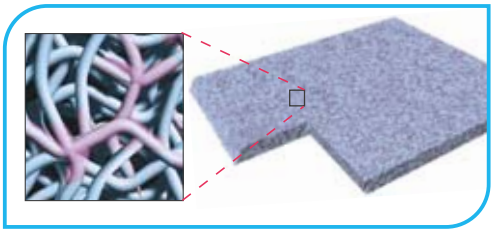
The cause of marking from the base structure is generally explained by two factors: 1. from an uneven paper side mostly of woven base structures, and 2. from an inadequate "mechanical" neutralisation of these irregularities by the covering batt surface. In order to prevent such weave marking Heimbach provides a knuckle-free non-woven base structure (ATROCROSS) or very minimally interwoven structures with flat monofilaments (Ill.6), and effective resilient batt surfaces as additional protection against possible strike-through from the base.



Ill.6 ATROMAXX.XF: Base layer paper side

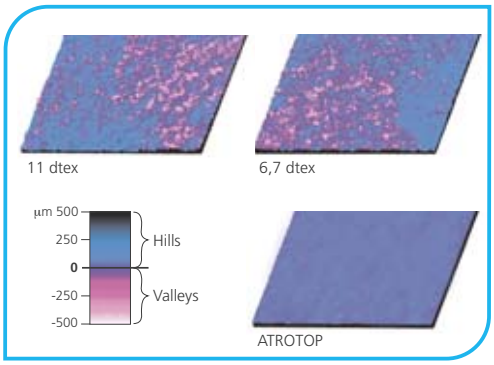
The causes of batt surface marking can be traced to an inadequately even batt surface and / or an uneven distribution of the batt fibres on the surface or in the interior of the batt.

In order to meet the increasing demands on printability and paper surface Heimbach has developed a new style of felt surface: ATROTOP is a batt surface composed of special fibres and has been shown to provide an exceptionally smooth and absolutely homogeneous surface character (Ill.7).



Ill.7 ATROTOP batt surface from Heimbach

In comparison with previous felts the topography of the new felt surface is given a high level of regularity by means of a special manufacturing process (Ill.8). Remarkably, this new type of felt surface is not achieved by the use of very fine fibres, but through the special techniques applied in the finishing process. The primary reason for this is that the felt must retain its active dewatering ability. The use of even finer batt fibres would make the felt too dense.



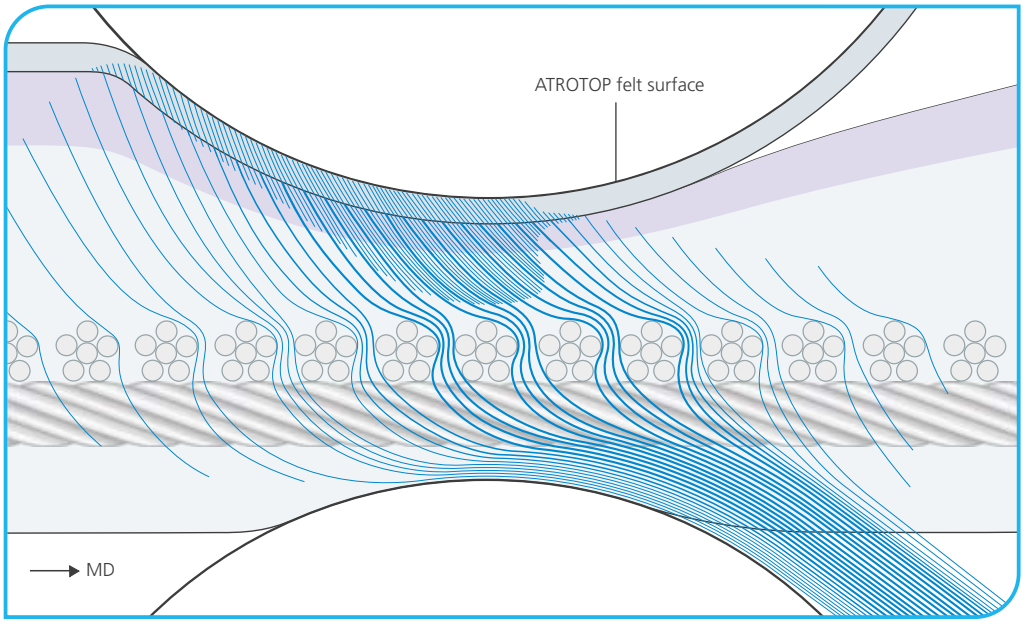
Ill.8 Comparison: Topography of batt surfaces

All risks of marking are substantially eliminated by the extremely even new felt surface from Heimbach as well as by use of appropriate base and protective batt layers.

Influences of nip load and dewatering

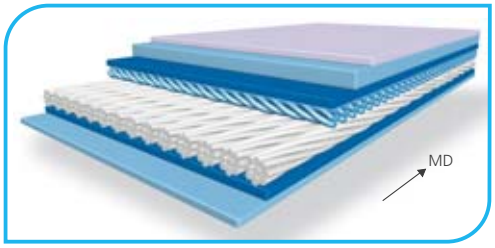
The causes of a poor paper surface resulting from inadequate "Dewatering Efficiency" are technically more complex. In the press nip of a conventional roll press the actual dewatering takes place within a "distance" of about 50 mm. At "only" 1500 m/min paper sheet and felt pass through the nip in 1/500th of a second. This requires, assuming optimal saturation, that the whole felt structure is able in this extremely short time interval to take up evenly an appropriately high water volume for the grade concerned (– and obviously to be able immediately to release it again).

The prerequisite for the initiation of such a High speed water take-up is a paper side batt surface which at the same time is extremely smooth, optimally regular, very fine and yet open (Ill.9). "Extremely smooth": to ensure that as many contact points as possible with the sheet initiate the capillary water flow into the felt. "Optimally regular": to ensure that the water flow is as even as possible over the whole felt surface. "Very fine": to provide the water with as many dewatering channels as possible and to avoid damaging horizontal flow. And finally "open" to allow handling of the necessary water volume in the minimal time interval (Ill.9).



Ill.9 ATROTOP with ATROCROSS base: High speed water take-up

For the appropriately optimal continuation of the dewatering process the knuckle-free combination of base substrates is particularly suitable. The prerequisite for the basic advantages of the concept: No yarn system in the Z-direction and therefore no weave knuckles. Furthermore the base is composed of non-woven yarn substrates, which combined with the batt surface lie flat over one another in cross- and machine-directions (Ill.10).



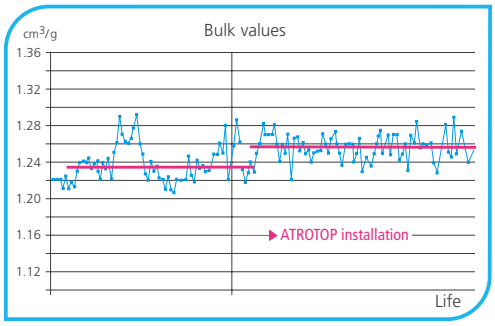
Ill.10 ATROTOP with ATROCROSS base

The special feature of the base is that the paper side layer is aligned in the cross-direction. In this way the CD yarns function as "microfoils", which "shovel" the water fast and intensively from the sheet into the interior of the felt (Ill.9). This provides a high level of felt saturation and reduces rewetting. For all these reasons the Heimbach non-woven felt has proven to be both an extremely fast starter and an unambiguous nip-dewaterer.

Case study

Case studies from the installation of the new felt surface indicate a variety of successes – not only in terms of process improvement and quality optimisation, but also to a considerable extent as improvements in efficiency:

A fine paper machine had a consistently high usage of chemical pulp in order to achieve acceptable bulk figures. After installing ATROTOP felts the consumption of chemical pulp was reduced on average by 4 g/m^2 whilst at the same time obtaining very good volume values (Ill.11). The use of the new felt surface brought a saving of over 20t chemical pulp per day and at the same time significantly improved the sheet surface.



Ill.11 Development of bulk values

Energy advantage through faster start-up: Because of its ideal start-up dewatering, a non-woven felt can be started up almost immediately at maximum production speed. If, for example, a 10 m wide newsprint machine (45 g/m^2) can run 100 m/min faster as a result of optimal start-up dewatering an additional production of about 65 tonnes per day can be achieved. In addition there is the energy advantage: despite higher production, virtually unchanged steam consumption in the dryers.

The new ATROTOP surface and, for example, the ATROCROSS base provide all the preconditions for a maximum "Dewatering Efficiency". Both create in this way a combination of mutually supporting process characteristics promoting a precise, balanced dewatering pressure for the sheet and a fast and even highly functional dewatering.

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