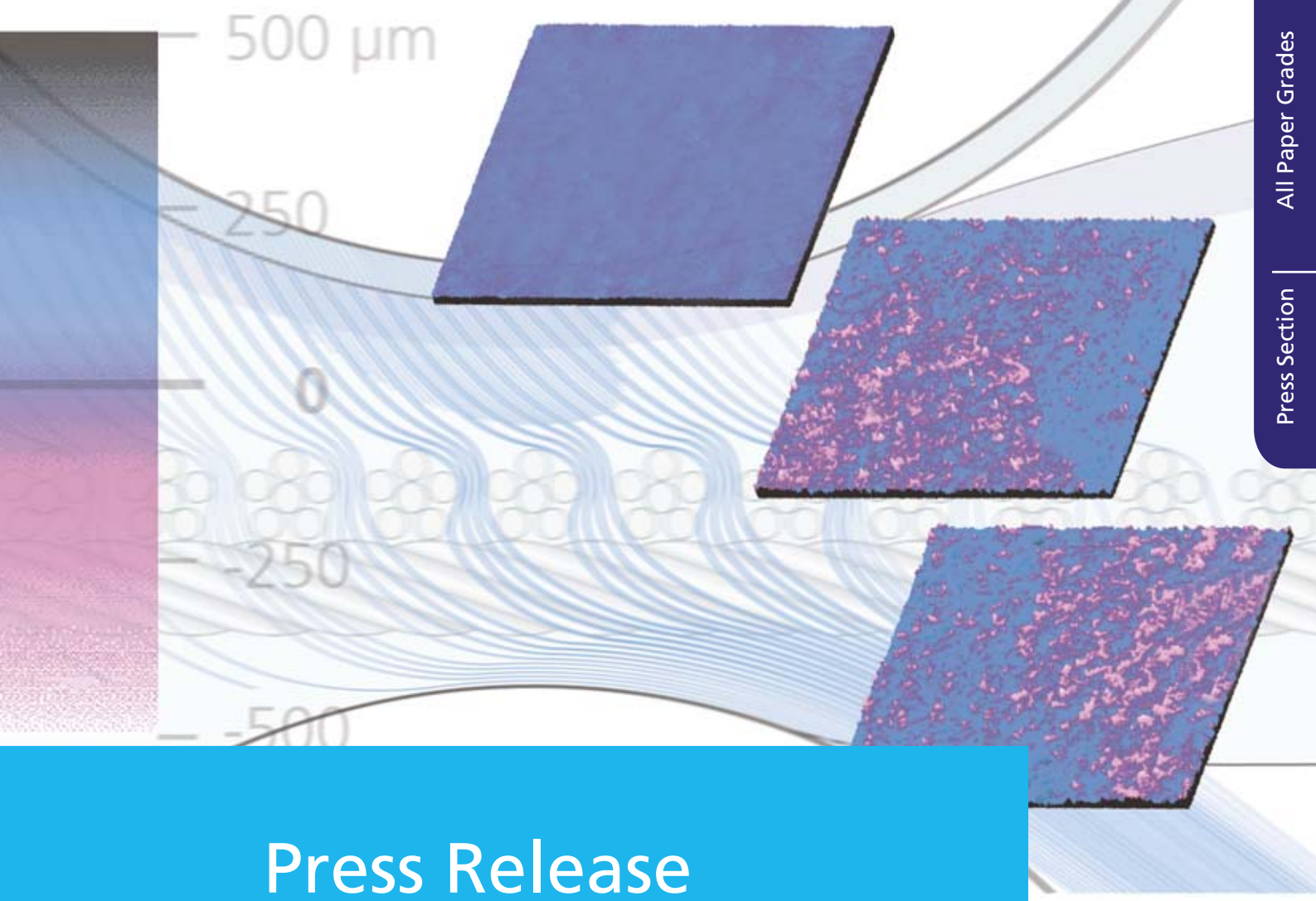

Press Release

New top felt surface from Heimbach

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Introduction

Optimal printability of paper and board is more than ever a requirement of the customer and end user. This applies increasingly also to the "simpler" grades.

What we consider to be print quality depends on the subjective evaluation of several simultaneous visual criteria. Firstly, the graphic or photographic presentation itself, the apparent quality of the paper used, the professionalism of reproduction and finally the combination of those criteria which we use to assess pure print quality. The majority of these criteria are even measurable. Colour density and contrast, alignment with colour norms, colour gamut, evenness of colour application, print gloss, registration or print sharpness.

The translation of these quality criteria into printing practice depends substantially on the characteristics of the paper. Those that influence the printing result include surface quality, uniformity, basis weight / volume, porosity /absorbency and dimensional stability. The comparison in Ill. 1 highlights the influence of the paper characteristics on the print quality. This presentation is concerned primarily with the surface properties of the paper.

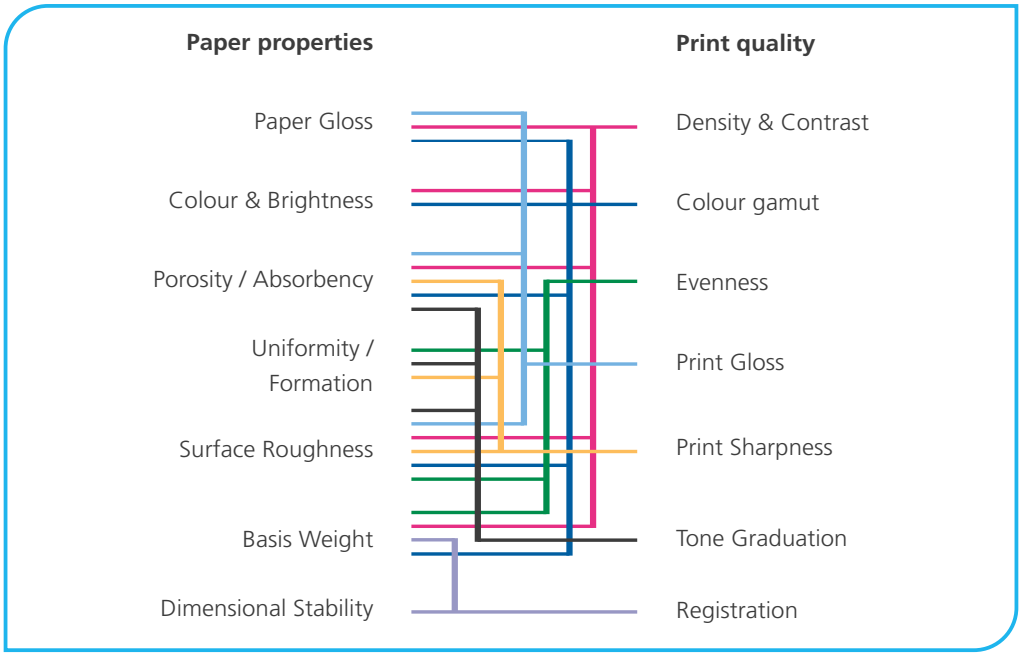
Technological basis

One of the prerequisites for improving printability of paper and board is the improvement of its surface properties. Influences on these are firstly the evenness of fibre distribution which is dependent on the forming process and equally on the forming fabrics used in this process. SSB fabrics from the Heimbach PRIMOBOND range have proved successful in this sense both in the manufacture of graphic and packaging grades.

In the press section the sheet surface is influenced on the one hand by the (ideally minimal) degree of impression from the base weave and/or the batt surface of the press felt. The other major influence on the paper surface is the dewatering process. This involves the influences of both hydraulic pressure and those of speed and regularity of dewatering, of which the latter is substantially determined by the structure of the batt.

Influences on base weave and batt surface marking

The cause of base weave marking can generally be attributed to two factors. 1. from an uneven paper side generally from woven base structures with too



Ill.1 Paper properties – Print quality

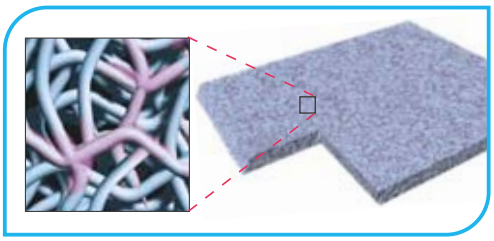
high knuckles at the crossing points, and 2. from an inadequate "mechanical" neutralisation of these irregularities by the covering batt surface.

For the prevention of such weave marking Heimbach has the appropriate technical means. For example knuckle-free non-woven base structures or woven structures with minimal knuckles made from flat monofilaments combined with resilient batt surfaces as additional protection from base weave strike-through.

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.

The improvement in the paper surface could be achieved at least in part relatively simply by the use of still finer batt fibres. However, the current fact is that such felts would become too dense.

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. 2).

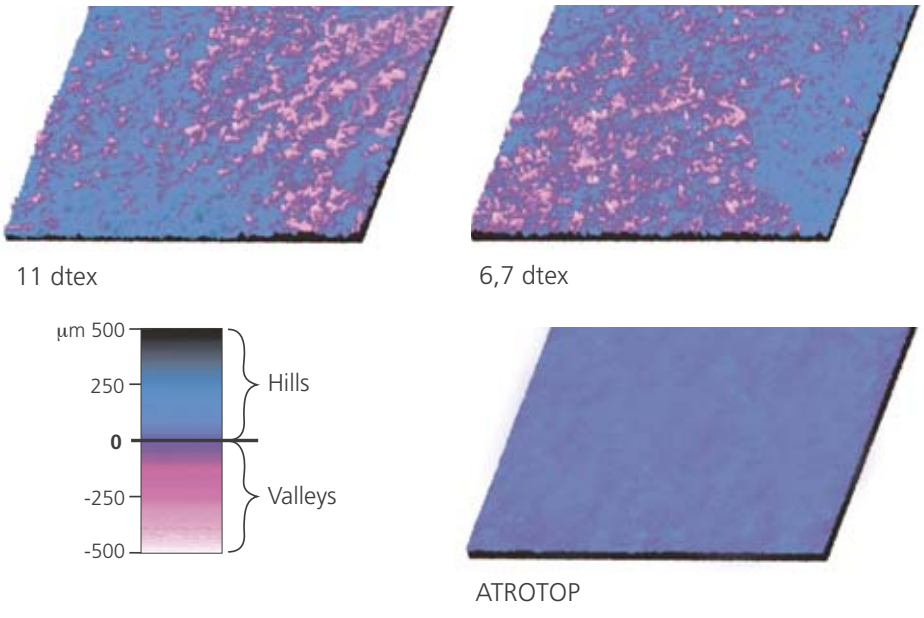


Ill.2 ATROTOP batt surface from Heimbach

Whereas "hills and valleys" can be discerned in the surfaces of previous felts, the topography of the newly developed felt surface assisted by a special manufacturing process is extremely smooth (Ill. 3).

Technological note: this new quality of felt surface is not achieved by the use of excessively fine fibres, but by the unique manufacturing process. That is for an important elementary reason: the felt surface must retain its active dewatering character.

In addition to a possible mechanical impression of the press felt on the paper surface the dynamic



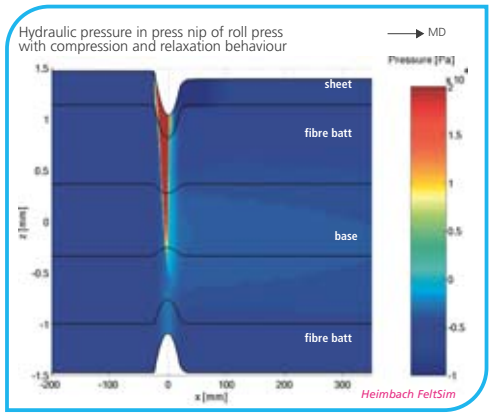
Ill.3 Comparison: Topography of batt surfaces

behaviour of the water under high pressure in the press nip is of great importance. A result of hills and valleys in the felt and paper surface would be the hydraulic development of grooves and furrows in the paper sheet.. All risks of marking are substantially eliminated by the extremely even new felt surface from Heimbach with appropriate base and protective batt layers.

Influences of nip load and dewatering

In comparison with the previously mentioned weave or batt marking the causes of an inadequate paper surface as a result of a poor "Efficiency of Dewatering" are technically more complex. In considering today's high speeds – increasing trend – the influence of the dewatering process on the characteristics of the sheet is increasingly dependent on the cross-sectional structure of the press felt.

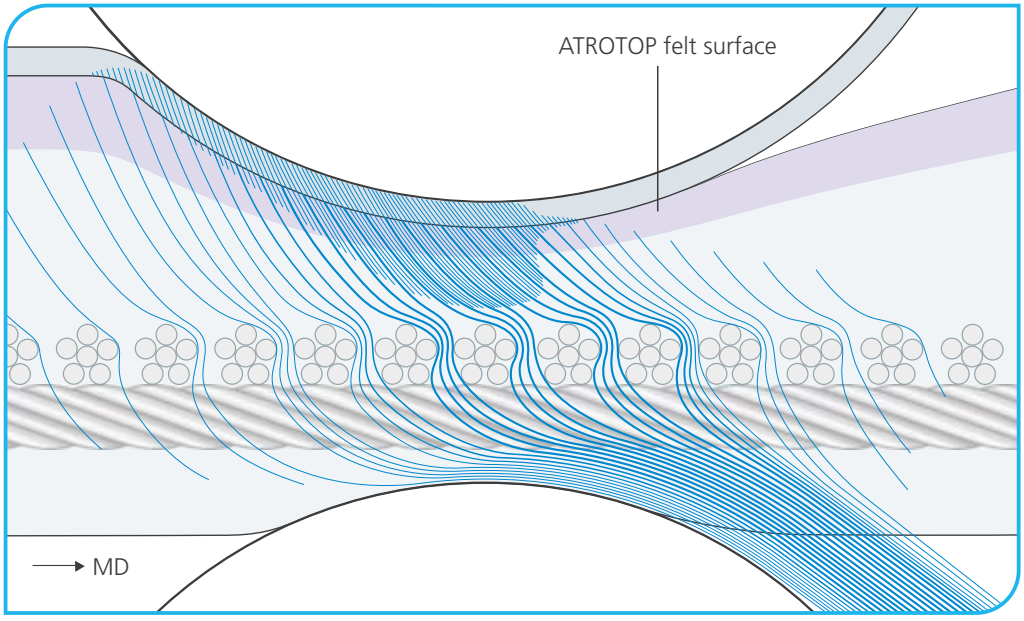
Firstly, a basic calculation can be made of the available time interval for the dewatering process. In the press nip of a conventional roll press the actual dewatering process takes place within a "distance" of about 50 mm (Ill. 4). In a 1500m/min machine paper sheet and felt pass through the nip in 1/500th of a second. Within this minimal time interval the felt structure affects in its micro-range the properties of the sheet



Ill.4 Hydraulic pressure in press nip of roll press

in general and its surface in particular. Expressed simply – the press felt must dewater as efficiently as possible 50 mm of the paper sheet in 1/500th of a second and at the same time leave behind a perfect paper surface. 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. 5).



Ill.5 ATROTOP: High speed water acceptance

"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.

The subsequent course of the dewatering process through the felt into the water-removing elements is not being covered here. Obviously Heimbach has the relevant technologies in various felt concepts suited to nip-dewatering (Ill.5) and/or Uhle box dewatering. In combination with the newly developed felt surface they offer the ideal clothing for first class paper surface characteristics.

The new ATROTOP surface provides all preconditions for a maximum "Efficiency of Dewatering". The felt surface creates in this way a combination of process features to provide a precise, balanced dewatering pressure in the paper and a rapid, even dewatering resulting in an extremely even dry content across the whole sheet.

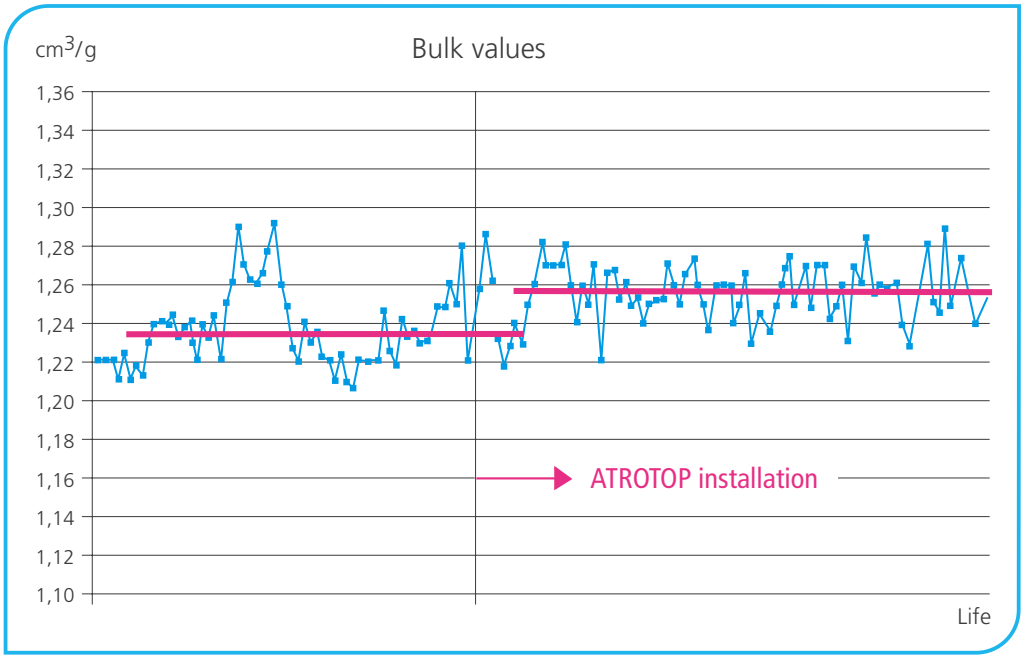
Case studies

Case studies from the installation of the new felt surface indicate a variety of successes. These successes include not only process improvement and – in line with the aims – quality improvements to the paper, but also to a considerable extent improvements in efficiency.

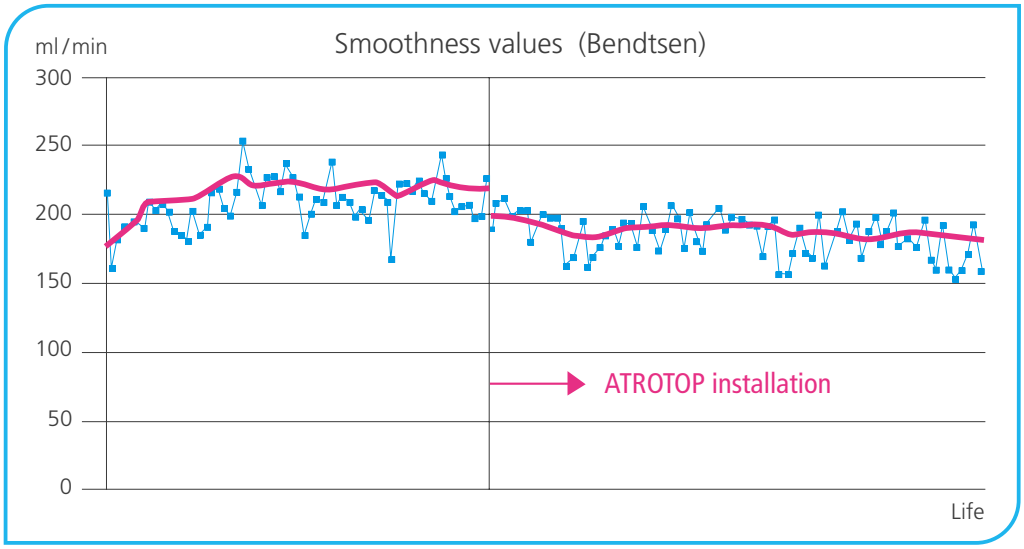
Two examples from practice support this.

A fine paper machine had a consistently high pulp usage 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. 6). 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.

On a board machine the smoothness figures needed to be improved. After installing ATROTOP in both the top and bottom positions a reduction of up to 20% in the Bendtsen values was obtained (Ill. 7). Simultaneously two-sidedness was reduced to virtually nil.



Ill.6 Development of bulk values



Ill.7 Development of smoothness values

In the case of special demands for printability ATROTOP has performed exceptionally in practice. Combined with knuckle-free, non-woven base structures the new felt surface from Heimbach offers an attractive solution to customers for better paper characteristics.