

Press Release

Non-woven felts for the modern press concepts

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Heimbach – wherever paper is made.



GROUP

Introduction

Some years ago the paper industry began to introduce 'Modern Paper Machine Concepts'. The aims and possibilities of these new technologies included: machine speeds from upwards of 2000 m/min with equal or improved paper quality, eg. resulting from lower two-sidedness, reduced width shrinkage – and in total improved runnability and thereby increased economic efficiency.

The introduction of these new press technologies was and is for Heimbach both a challenge and an opportunity: With their non-woven concept Heimbach have developed a felt design which reaches a maximum nip dewatering in the shortest time and thereby offers the paper maker a particularly fast start.

Construction and function – features and effects

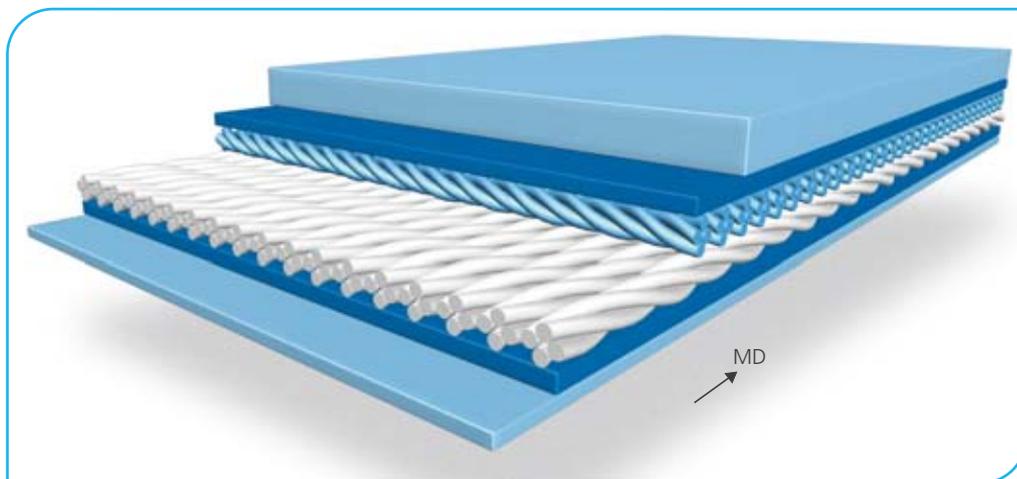
The prerequisite for the basic advantages of this concept is the fact that the construction has no Z-direction yarn system and therefore no weave knuckles. Moreover, the base is composed of non-woven substrate layers positioned flat on top of one another both in the cross direction and in the machine direction.

This arrangement for the non-woven press felt range from Heimbach was given the name: ATROCROSS (III.1).

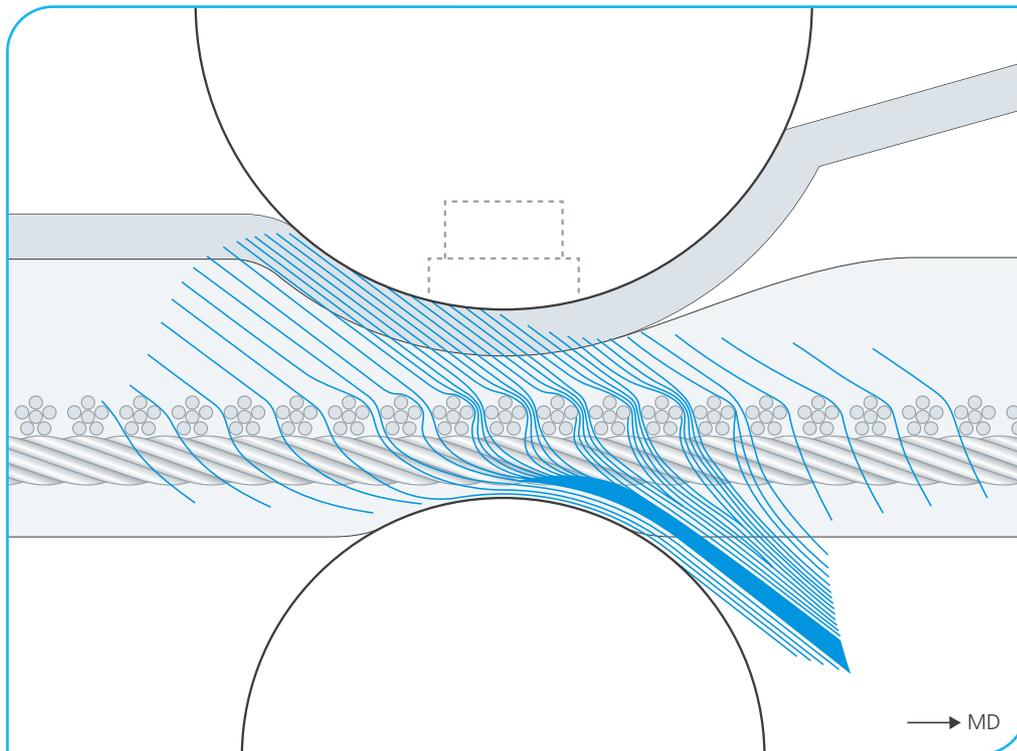
Each yarn substrate is equipped with a substrate batt. A special manufacturing process stabilises the parallel yarns with a high degree of regularity. In this way the individual modules are built up. The individual yarns of the yarn substrates are formed from twisted single monofilaments. Their number, the materials used, the twisting techniques together with the caliper and fineness of the substrate batts are adjusted to the relevant position in the paper machine. The modular units are then finally combined with the paper side and roll side batt surfaces (III.1).

The typical feature of the non-woven base is the paper side yarn substrate aligned in the cross-machine direction (III.1). In this way the yarns operate as "Micro Foils", which "scoop" the water very fast and intensively into the inside of the felt (III.2). This leads to high degree of saturation of the felt even at low specific pressures and additionally reduces rewetting. Only a saturated felt permits effective dewatering. For all these reasons the non-woven felt from Heimbach has proved itself as an extremely fast starter and an outstanding "Nip Dewaterer".

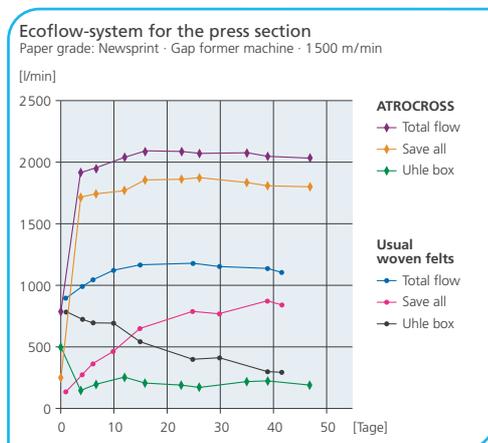
In many cases, these non-woven felts dewater more heavily and faster than usual woven felts – confirmed here with the dewatering curve of a newsprint machine (III.3).



III.1 Non-woven felt ATROCROSS from Heimbach



III.2 Nip dewatering, reduced rewetting



III.3 Comparison: Dewatering newsprint machine

The fast start and the good dewatering can be explained by the combination of three significant constructional features:

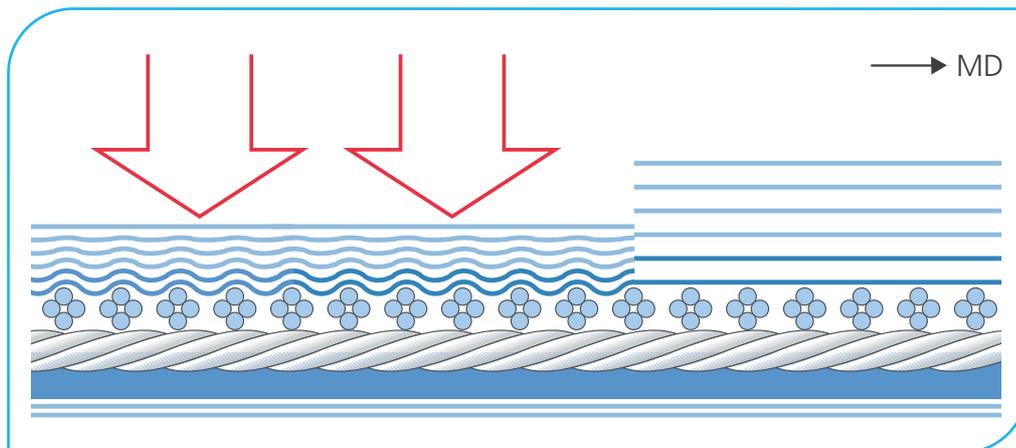
1. The start-up density is virtually identical to the operating density.
2. The “Micro Foils” immediately scoop up high volumes of water into the inside of the felt.
3. The roll-side MD yarns encourage rapid transfer of water through the felt.

Re. 1. The yarn substrates of the non-woven base largely incompressible under press load. Therefore the bulk of the base remains virtually unchanged during the life of the felt (III.2). The paper side batt is especially matched to the constant factor of stability of the base volume. In addition the features of the relevant application dictate parameters such as batt fineness and quantity.

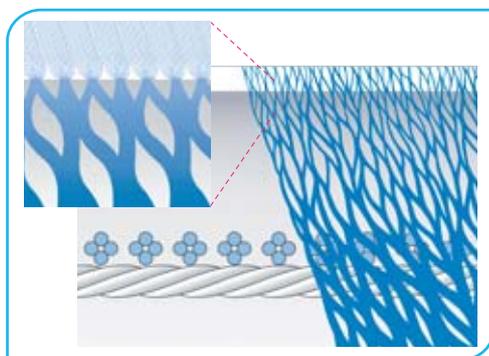
The defined elastic compressibility of the batt package (III.4) – and the resulting highly efficient capillarity in the nip – initiate spontaneous sheet dewatering through the batt into the base (III.5).

Re.2. The cross machine direction alignment of the paper side substrate yarns “scoop” the water from the surface with high energy down into the roll side substrate (III.2).

Re.3. The machine direction alignment of the roll side substrate encourage water flow through the felt – and out into the holes or grooves of the roll or belt and into the save-all (“Nip Dewaterer”). The combination of the fine upper felt structure



III.4 Elastic compressibility of batt package



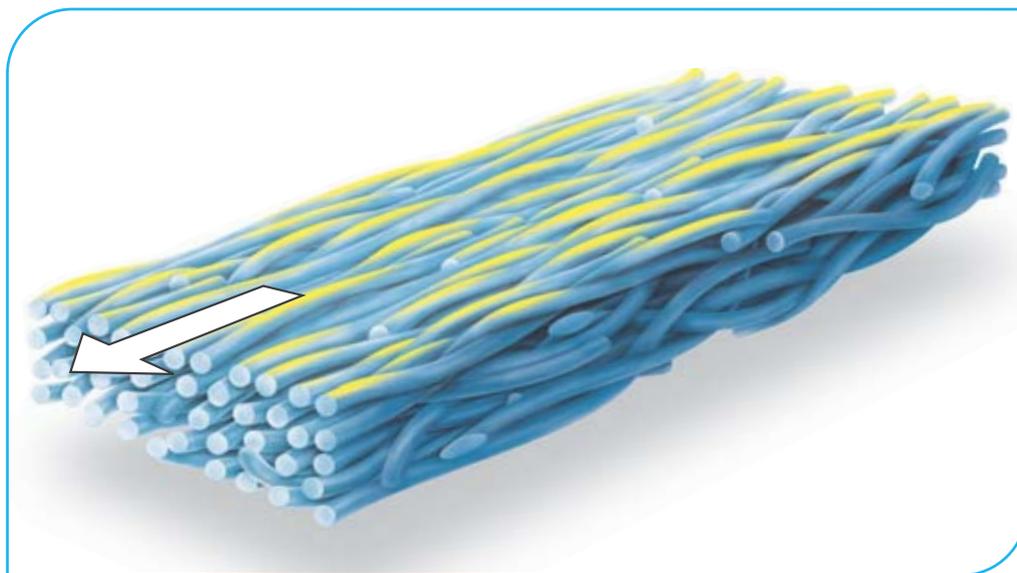
III.5 Water removal paper – roll side

becoming more open below ensures that the water flow is optimally directed from the paper to the roll-side (III.5).

Summarized

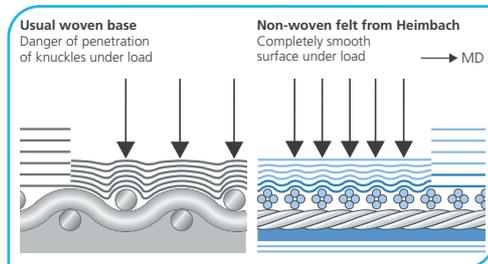
The secret of the fast start of ATROCROSS lies in its immediately starting dewatering operation at a high level of efficiency – and the secret of its constantly good dewatering lies in the fact that this high level is maintained during the whole felt life.

Non-woven base plus MD oriented paper side batt layer
Specially for application on machines making high grade papers and boards Heimbach developed a non-woven felt with a MD batt module as the fine paper side surface (III.6). This MD batt produces an extremely even, smooth paper and board surface.



III.6 MD oriented batt from Heimbach

In addition, the non-woven and therefore knuckle-free base ensures very regular pressure distribution and prevents weave marking (Ill.7).



Ill.7 Comparison: Pressure distribution

Flat fibres against two-sidedness

Smoothness two-sidedness particularly on Sympress and Duocentri-presses in fine paper machines can be a cause of poor paper quality.

By the use of the special combination of "ATROCROSS base with paper side batt composed of a specific quantity of flat fibres on the felt surface" the two-sidedness can be significantly reduced.

Extension of module variety

The emphasis of the extension of module variety towards more precise adjustment and universal application designs especially in improved control over high water volumes on high speed machines.

To achieve this and at the same time to increase resistance to stretch and tensile strength, Heimbach have developed a basic design with 9-ply MD yarn substrate and optimised substrate batt (Ill.8).

Additionally, for the handling of high water volumes a 3-layer special design was created (Ill.9), which has already run with great success.

Particularly for fast machines the start up of a felt is of great importance. A high start up speed always means a considerable production increase (Ill.10 "Money Triangle"). If a 10 m wide newsprint machine (45 g/m²) as a result of optimal start-up dewatering can run 100 m/min faster, the gain in production amounts to about 65 tonnes per day.

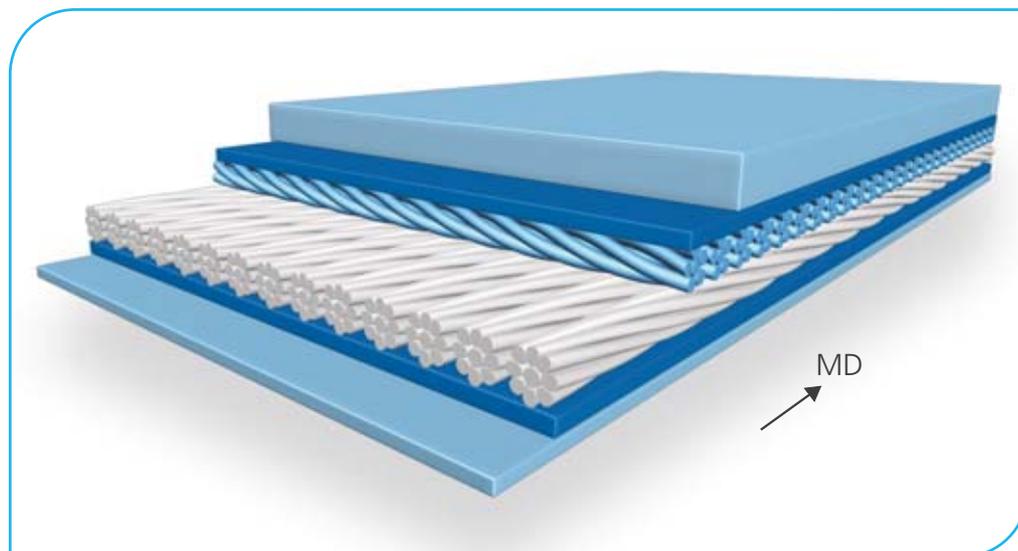
Case study:

Production in relation to start-up speed

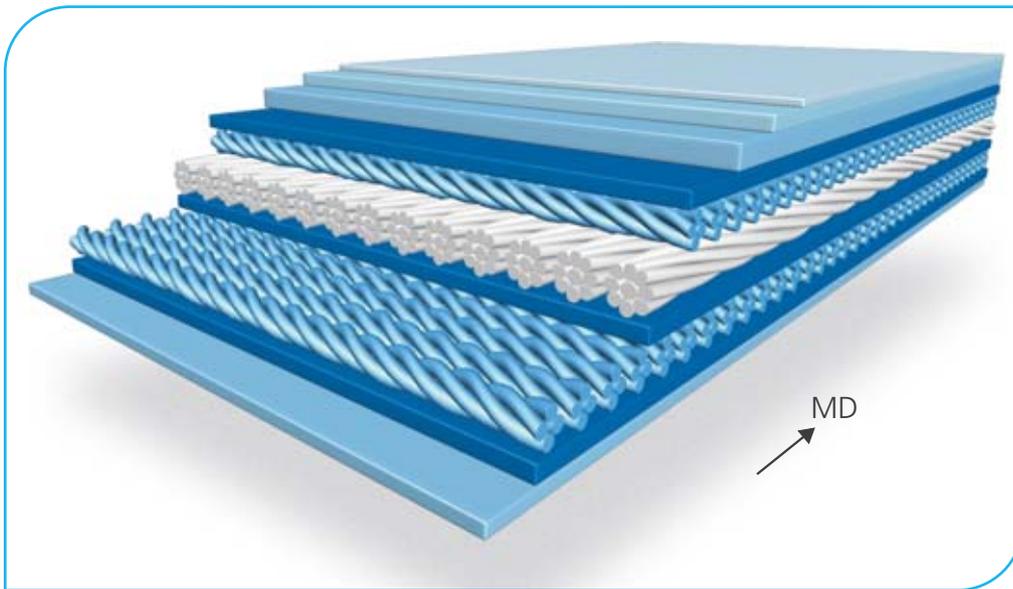
Machine width	10,0	m
Paper basis weight	45	g/m ²
Increased speed	100	m/min

Production gain

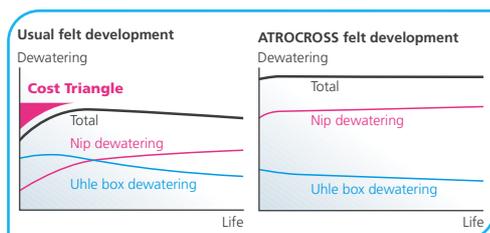
per minute	45	kg
per hour	2,700	kg
per day, about	65	t



Ill.8 Non-woven felt with 9-ply MD yarn substrate



III.9 Non-woven 3-layer special design



III.10 Comparison: "Cost Triangle"

The enormous nip dewatering potential and the efficiency of ATROCROSS have also been demonstrated on most of the shoe presses around the world, and especially on the single shoe presses too.