

Press Release

Clothing for Modern Tissue Machines

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Heimbach – wherever paper is made.



GROUP

Introduction

Consumption of tissue products has increased consistently over the past few decades – not only in the developed countries of Europe, North America and Japan, but also in the growth markets of Latin America and Asia.

The growing demand and an increased requirement for faster, more economical and higher quality production of a wider variety of tissue products resulted in the continuous development of tissue machines. Tissue was produced on Fourdrinier machines, SBR Machines, S and C Formers, Tisco Formers, Crescent Formers and TAD Machines.

The SBR Machine, for example, produces tissue up to a speed of 1200 m/min. As the forming zone is very short there is a danger of pinholes in the finished product. The C Former was the next development at the end of the 60's and in the early 70's. On these machines up to 5.5 m wide a relatively soft and bulky tissue with a good hand-feel could be produced at up to 1800 m/min. From the beginning of the 90's the dominating construction was the Crescent Former. Subsequently a variety of SBR Machines and S-Formers have been rebuilt as Crescent Formers.

The Crescent Former is a tissue machine with a very simple configuration. Its clothing consists of only a forming fabric and a press felt. Three different press configurations are possible: a single presser roll, two presser rolls and the shoe press, the last being a development of Voith Andritz. The shoe press was introduced with the aim of producing more economically the same bulk and softness as tissue produced on TAD Machines. However, the highest bulk and the best softness values are still achieved on TAD Machines.

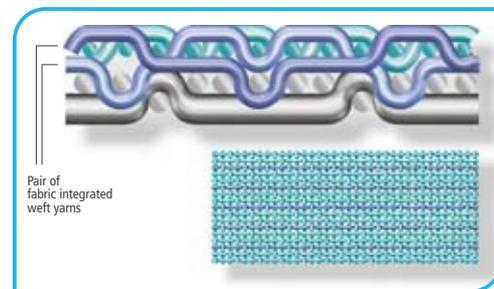
All this continuous development makes it necessary for the clothing manufacturer to develop new clothing concepts designed for

greater efficiency. They permit the tissue producer to increase speeds, improve runnability, reduce energy consumption and to produce a steadily better tissue quality at maximum efficiency.

The Forming Section

When tissue production started on Crescent Formers, the machines ran at speeds of 1200 – 1500 m/min at a width of around 3m. At this time there was no problem in using single or double layer fabric constructions. Later however, speeds increased to 2000 m/min and machine widths up to about 5.5 m. At the same time the expectations of the consumer in relation to softness, bulk and particularly tensile strength were growing rapidly.

The drastically increased demands on tissue forming fabrics created by this development were met by Heimbach with a future oriented new development: the 24 shaft SSB forming fabric PRIMOBOND.TSF (Ill. 1).



Ill.1 PRIMOBOND.TSF from Heimbach



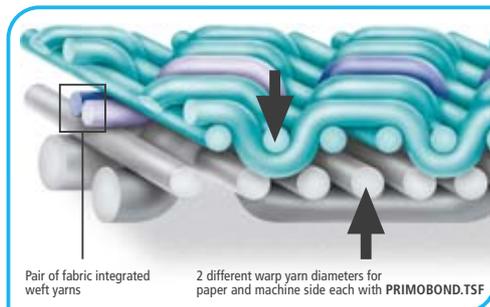
Ill.2 Comparison: mesh width

With its very short mesh width in the machine direction (0.164 mm) (Ill. 2) and its top surface oriented in the cross direction (see Ill. 1) PRIMOBOND.TSF has an exceptionally high fibre support index (FSI 155). The high fibre support ensures improved mechanical retention and as a result a better formation. The sum of these characteristics leads to a particularly soft, bulky

and strong tissue, which can be produced with short fibres. Above all the CD-oriented fabric surface gives good tensile strengths, which permit conversion at the highest speeds.

“Classical” SSB Concept

Produced on special looms the PRIMOBOND.TSF fabrics follow the classical SSB concept: fine MD yarns (warp) on the paper side, powerful MD yarns on the machine side (Ill. 3). Fibre support and wear volume together with diagonal and cross machine stability are increased, without the fabric permeability and thereby the dewatering efficiency being reduced. In this way PRIMOBOND.TSF fulfils the substantial demands of tissue formation to the highest degree. Despite the increase in fibre support and wear volume, exceptional values in relation to dewatering/dry content and machine speed are achieved.

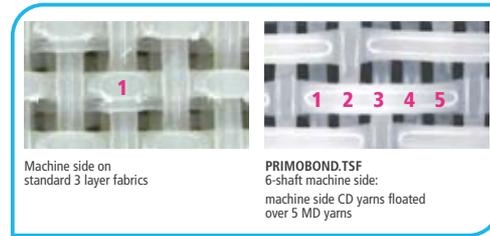


Ill.3 2-warp system

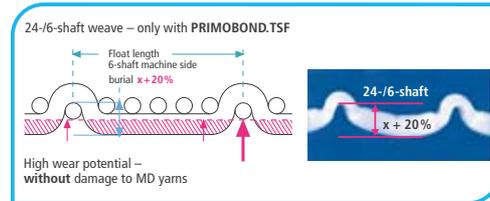
Unique 24-Shaft Technology

At the same time PRIMOBOND.TSF profits from the unique 24-shaft technology, which can only be offered by the Heimbach Group – and from the resulting possible 6-shaft machine side. The significantly longer weave floats of the machine side weft yarns (Ill. 4) create increased wear volume potential and therefore longer life (Ill. 5). Simultaneously the characteristics of the machine side weave layer ensure maximum fabric tensile strength.

Additionally the PRIMOBOND.TSF concept with its fine paper side and open machine side structure ensures a balanced, active dewatering.



Ill.4 Comparison: float length machine side



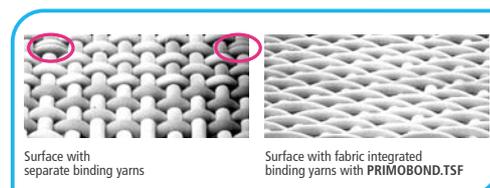
Ill.5 Comparison: wear volume PRIMOBOND.TSF

The high number of tiny dewatering openings guarantee exceptional, but controlled initial dewatering on the paper side. Because of the 24-shaft weaving process and the low number of internal weave knuckles the dewatering process continues undisturbed through the fabric structure.

With the help of these excellent dewatering characteristics and because of the fact that PRIMOBOND.TSF is an especially thin forming fabric with low void volume, the problem of increased water carrying at increasing speed is largely eliminated.

Intrinsic Weft Concept

‘Intrinsic Weft Concept’ is the term used by the Heimbach Group for its CD structurally integrated SSB design with a specially homogeneous and structurally uniform paper side upper layer (Ill. 6).



Ill.6 Comparison: fabric surface

This uses two binding yarns (binding pair) to combine alternately the paper side and machine

side weaves with one another (see Ill. 1 and 3). The distribution of this function onto two binding yarns permits the structurally identical appearance of only one binding yarn at a time on the paper side fabric surface. The resulting absolutely homogeneous fabric surface increases the evenness of the dewatering and thus contributes to an improvement in the paper quality. Furthermore, delamination which can occur with triple layer fabrics is impossible.

The combination of these characteristics in PRIMOBOND.TSF, the 24-shaft SSB Tissue Forming Fabric, which up to now has predominantly run in Europe, ensure that all the demands of the tissue manufacturers and their modern, wide and fast machines are met.

The Press Section

The current level of development of tissue machines and the increased market expectations on tissue products are not only the yardstick for efficiency requirements on forming fabrics, they are also the engine behind the adaptation of modern technologies in the press clothing field. Progressive base weave and batt surface concepts,

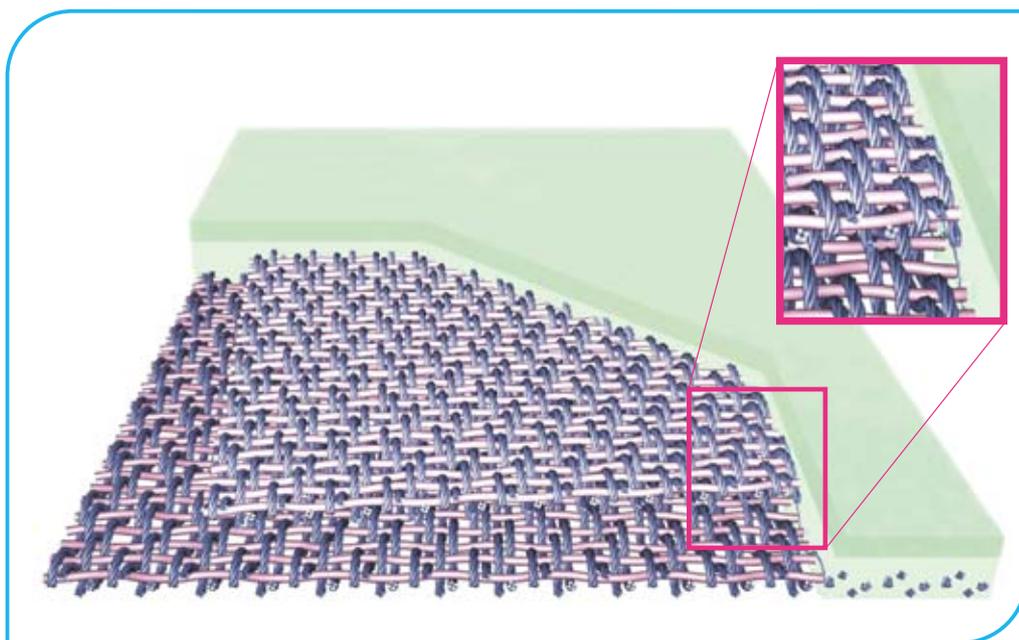
new fibre generations and needling techniques utilised by the Heimbach Group produce up to date and future oriented press clothing which meet the production and efficiency demands of the tissue machines of today and tomorrow.

This Heimbach Group contribution towards meeting the latest demands on clothing is called ATROMAXX.T – the tissue press felt with a multi-axial base weave and a paper side batt surface composed of flat fibres (Ill. 7).

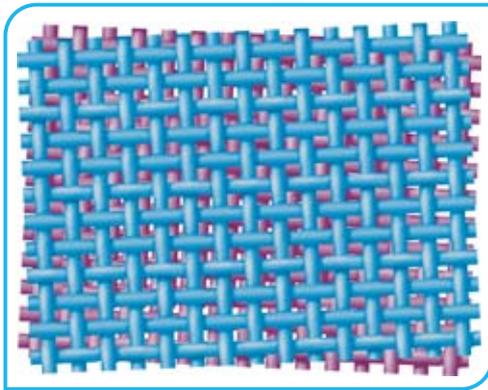
Multi-axial Module Concept – Great Variety and Perfect Function

The tissue felts of the ATROMAXX.T range consist mainly of single layer base modules arranged counter diagonally, which on the paper side (plus machine side on seamed felts) are equipped with variable batt surfaces.

The constructional heart of the multi-axial felts in terms of their efficiency for tissue production is the base module. The counter diagonal arrangement of the bases on top of one another means that a collapse of the modules into one another is impossible (Ill. 8).



Ill. 7 ATROMAXX.T from Heimbach



III.8 ATROMAXX.T – multi-axial weave combination

The Diversity

The combination of differently woven base modules within a felt has long been a feature of the Heimbach Group's lead in the clothing industry. This range of technical possibilities was the prerequisite for the multi-axial module concept for tissue felts from the Heimbach Group.

The special combination of the woven base modules into "independent" diagonal structures is unique and can only be produced by the Heimbach Group. The manufacture of the individual modules is carried out separately in a patented process. The multi-axial ATROMAXX.T concept permits the manufacture of various double layer

base combinations from the woven single modules. Added to this are the variations permitted by modifying the base modules themselves – in yarn spacing, materials, single monofilament or plied yarns, the use of single flat monofilaments in the machine direction on the paper side for more even pressure application (III. 9), and a wide variety of other possibilities.

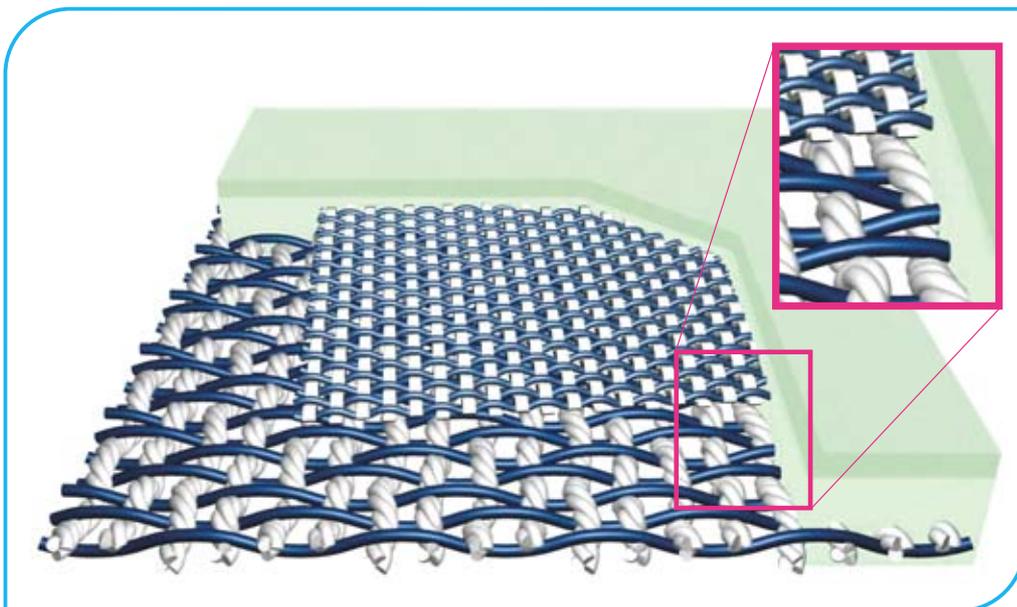
This variation diversity of ATROMAXX.T means that for (almost) every tissue maker the Heimbach Group is able to supply specifically designed clothing precisely to meet "his" application conditions and "his" needs in terms of efficiency improvements.

The Function

The impossibility of the base modules collapsing into one another is at the heart of the multi-axial construction. But also the 3-dimensionality of the structure is a further major feature.

All ATROMAXX.T base modules have their own constructionally in-built Z-direction stability (III. 10).

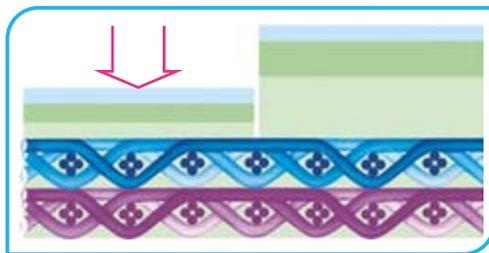
"Constructionally in-built" means for example that the specific characteristics of the different modules: softness, resilience, wide permeability range, high



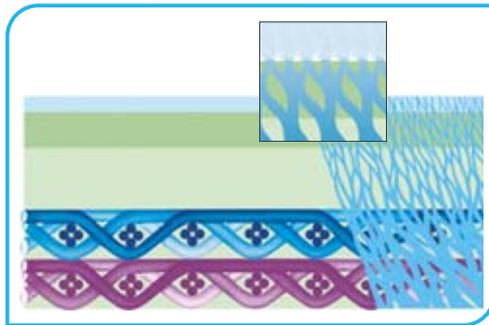
III.9 ATROMAXX.T with paper side flat monofilaments

compression resistance and freedom from marking, can be combined with one another to meet the required ideal.

The result of this combination produces optimal compression resistance characteristics of the whole felt structure – and thereby a precisely even pressure distribution at the Yankee cylinder together with a highly efficient dewatering (Ill. 11) and a straight moisture profile.



Ill.10 Stability in Z-direction



Ill.11 Highly efficient dewatering

The virtually unchanged permeability of the felt structure – adapted to the pressure conditions and nip characteristics – is a further result of combining the variable base modules.

Selected fibre materials and particularly the variety of manufacturing options all contribute to the dimensional stability of ATROMAXX.T felts.

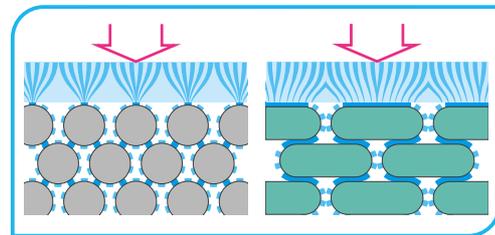
Flat Fibres for Surface Batts

High sheet contact, maximal initial sheet dewatering, even pressure application at the Yankee cylinder, significantly reduced energy consumption and trouble-free sheet release: these are the demands on the modern tissue felt – and also appropriately on the felt surface.

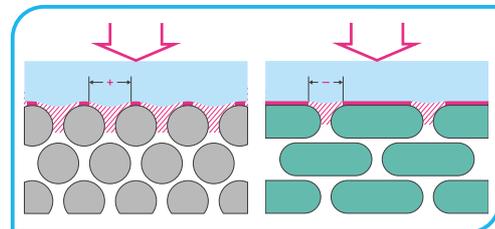
The special flat fibre top surface on the highly elastic and pressure regulating batt package of circular cross section fibres on ATROMAXX.T tissue press felts fulfil all these expectations (Ill. 12-14).

In addition the flat fibres under the influence of paper side wear maintain their mass longer during the felt life and ensure longer retention of the smooth characteristics of the felt surface (Ill. 15).

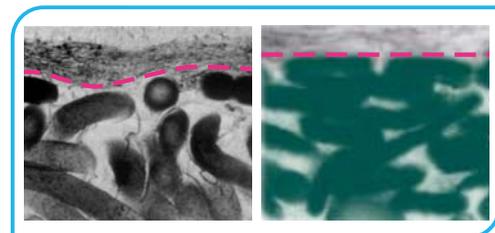
This ensures the effective functioning of the felt throughout its whole life, for example in significant energy saving.



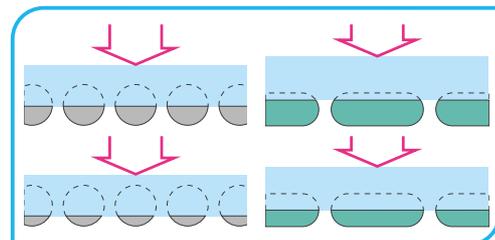
Ill.12 Comparison: initial sheet dewatering



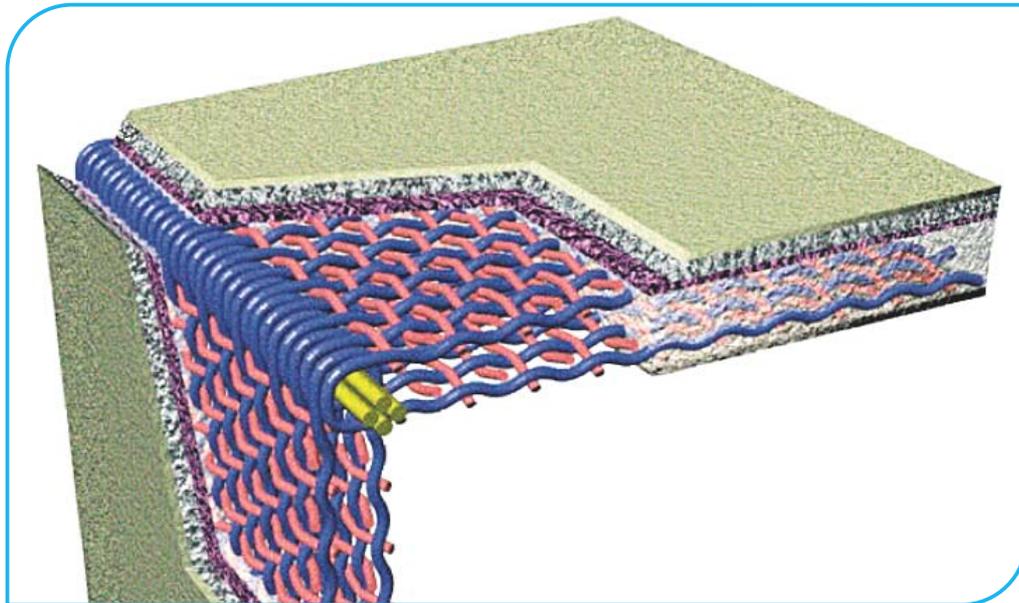
Ill.13 Comparison: contact surface / sheet



Ill.14 Comparison: circular cross-section fibres / ATROMAXX.T flat fibres



Ill.15 Comparison: fibre wear



III. 16 ATROMAXX.T CONNECT from Heimbach

ATROMAXX.T CONNECT

Based on the characteristics of the multi-axial module concept the Heimbach Group have extended the ATROMAXX.T range to include the seamed felt ATROMAXX.T CONNECT (III. 16). Whilst retaining the range of variation they have succeeded in producing felts with a homogeneous seam area and a secure batt overlap, which combine perfectly the advantages of the endless constructions with the specific advantages of seamed felts – increased installation safety and reduced down time for installation.

Summary

In addition to the expectations described here on modern tissue clothing and their fulfilment with PRIMOBOND.T and ATROMAXX.T, practical, time-saving and safe installations, long life with (almost) identically high efficiency levels and high production safety are the standard for all the tissue clothing from the Heimbach Group.

With PRIMOBOND.T and ATROMAXX.T the Heimbach Group offers a trend-setting range of clothing for economic production on fast, wide tissue machines.