

New forming fabric generation with a unique warp concept

# PrintForm I combines a fine paper side with a stable machine side

In order to meet the higher quality demands of the customer, even finer and thinner forming fabrics were developed for graphical papers. They guarantee very good formation and an even paper surface. The new Voith Forming Fabric PrintForm I combines the advantages of a fine forming fabric with those having a very stable machine side structure. The main advantages are lower water and fiber carrying, higher dimensional stability and less rewetting.

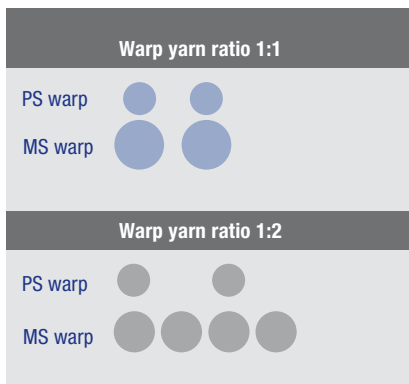


Fig. 1: Cross section comparison of SSB fabrics with warp yarn ratio 1:1 and 1:2.

The fabric construction is the same as an SSB forming fabric (SSB = Sheet Support Binder). This is triple layer with a paper side and wear side layer as well as a binder connecting these layers, which joins the structure on the paper side. Until now fabric constructions have had a warp ratio of 1:1 or 1:2 (paper side and wear side respectively). The paper side layer is principally responsible for the ideal formation of the paper and in order to do this must have the finest structure possible. The wear side layer must fulfil the fabric's requirements for stability in the machine and cross machine directions as well as lifetime on the

paper machine. This is achieved through the use of weft and warp yarns with clearly different diameters on the top and bottom fabric layers.

A finer fabric top side and more stable or rather durable machine side can be achieved in the PrintForm I with its 3:2 warp count ratio that has been introduced.

With this new warp concept, a fine paper side fabric layer is combined with a stable wear side fabric layer to create a new type of forming fabric. The warp cross section of this PrintForm I and one of a standard SSB forming fabric with a warp ratio of 1:1 are laid on top of each other.

The advantages of the PrintForm I Series are illustrated in Fig. 2.

### Less water and fiber carrying

The paper side warp and weft yarns have very thin diameters which are tightly woven to achieve a monoplane surface. In spite of the resulting high fiber support index (FSI) and over 11,600 support points per in<sup>2</sup> (1,800 support points per cm<sup>2</sup>), the PrintForm I has a sufficiently large open surface area. The thin yarns lead to a lower fabric caliper and consequently to a lower, more open void volume. This provides the following advantages for the papermaker:

Fig. 2: Warp yarn ratio standard SSB 1:1 over PrintForm I with yarn ratio 3:2.

Benefits PrintForm I	
Quality	Stability
1. Homogeneous paper side = FSI and SP higher	4. More space available on MS for larger weft diameters
2. Lower caliper, less water carrying	
3. Impulse absorption for low marking tendency	

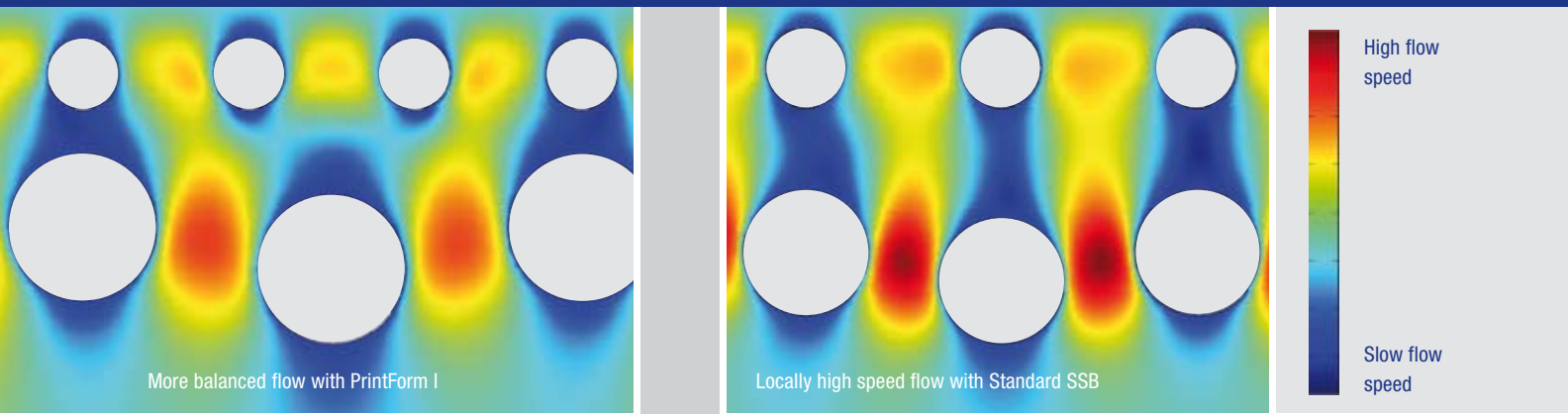


Fig. 3: Flow speed through the warp system.

- Higher dewatering capacity due to an open fabric structure.
- Build up a homogeneous fiber web as a result of high number of support points.
- Higher mechanical retention properties.
- Reduced risk of fiber carrying because of the fine paper side.
- Reduced risk of water carrying due to a reduced fabric void volume.

**High dimensional stability**

The I-Series warp mesh is lower on the machine side through the use of yarns with the same diameters. As a result, more space is created for a higher number of weft yarns or bigger weft diameters. Consequently, in both cases, the dimensional stability and in particular, the cross dimensional stability of the fabric is increased. The advantages are:

- Good cross machine paper profile as a result of the higher fabric cross machine stability.
- Good lifetime properties due to the high wear volume.
- Efficient fabric cleaning because of the open warp structure.

**Less rewetting into the paper web**

The concept of the unique 3:2 warp ratios of the PrintForm I makes the offset of the warp layers to each other possible. The offset of the yarns prevents rewetting into the paper web, as can happen when the fabric meets drainage elements. Consequently this leads to a uniform paper structure and results in a better formation. The open machine side warp structure supports the drainage flow and ensures optimal dewatering. Because of this even higher dewatering results may be achieved.

In Fig. 3 the influence of the warp geometry on the drainage is simulated, while with the 1:1 warp ratio local, higher speed flows occur. These are more balanced with the 3:2 warp ratio. The result is a more uniform and higher flow capacity in comparison to the 1:1 warp yarn ration. The advantages for the papermaker are:

- Better and more homogeneous formation.
- Higher dry content due to reduced rewetting into the paper web.

**Results with PrintForm I**

Trials were carried out on several pilot paper machines under comparable conditions. As a reference, fine graphical SSB fabrics, which are standard for the paper grade, were used. As an example, with SC-A pulp, a super fine SSB bottom fabric was interchanged with a PrintForm I, both with the same permeability. The top fabric was not changed. Higher initial dewatering results were obtained with the

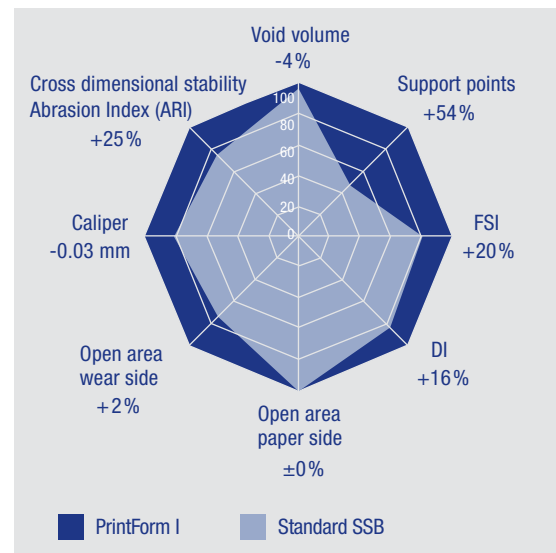


Fig. 4: Comparison of the technical data of a standard SSB and PrintForm I.

PrintForm I in all cases. All other dewatering conditions in the former remained constant. The dry content at the Pick-Up is increased by up to 1.5% (Fig. 5).

These results have been confirmed in production plants, where formation has been clearly and immediately improved. On a Fourdrinier paper machine, producing wood containing papers, the formation, all measured by Ambertec, was already improved at the first tambour after installation of the PrintForm I and again after opening the headbox slice up to 0.12 [ $\sqrt{g/m}$ ] (red curve in Fig. 6). As a reference, when the standard SSB forming fabric was used, a formation value of 0.65 [ $\sqrt{g/m}$ ] was achieved (grey curve).

The qualities of the PrintForm I have been confirmed in performance and additional benefits have been seen:

- Higher dimensional stability, flat fabric surfaces in the return part of the PM.
- Lower water and fiber carry.
- Lower fresh water consumption due to pressure reductions in the cleaning system.
- Higher dewatering capacity.
- Improved formation and paper cross machine profiles.
- Increased dry content at the Pick-Up.
- Higher fabric life potentials.

As a result of the unique warp concept of the PrintForm I, a fine paper side can be combined with an extremely stable wear side. The open wear side in particular ensures highly efficient dewatering. The offset of the warp layers leads to a homogeneous drainage and enables good formation. This forming fabric design is especially suitable for positions on paper

machines which have high demands for dimensional stability and higher paper quality at the same time.

**On Focus: PrintForm I**

ProEnvironment	+++
ProRunnability	++++
ProQuality	++++
ProSpeed	++

Section: forming  
 Width: all  
 Paper grade: graphical grades,  
 high quality board &  
 packaging

**Contact**



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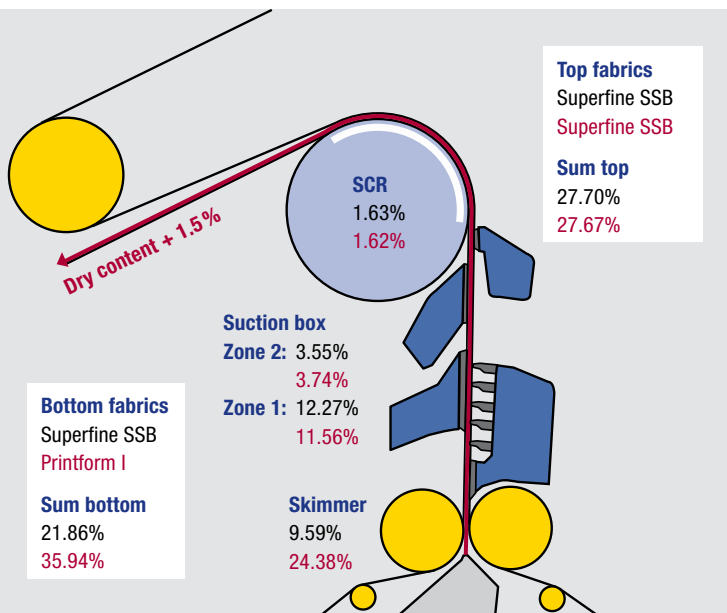


Fig. 5: PM Drainage Results with SC-A+. Increase of dry content by + 1.5%.

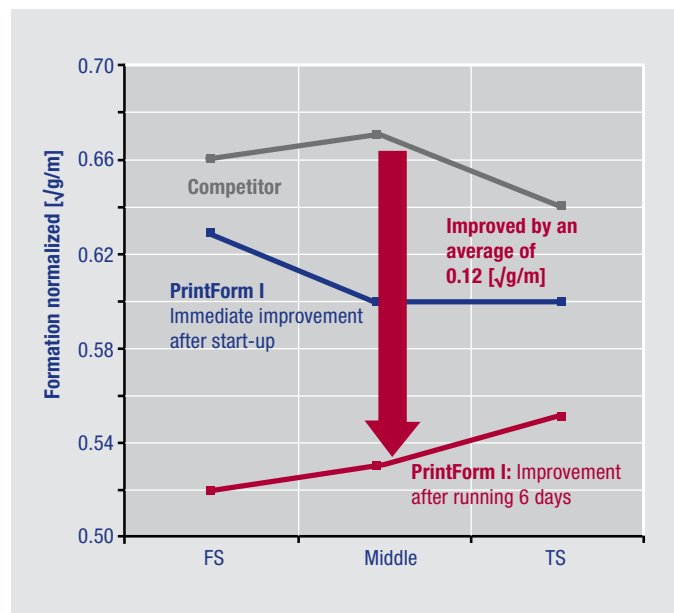


Fig. 6: Sheet Formation – Measured with Ambertec.