

New felt designs especially for tissue machines

## Optimization of press felts pays off

**'Especially soft, extremely absorbent, and highly tear-resistant' – advertising for tissue paper never lacks for superlatives. High quality is one of the most important characteristics of tissues and toilet paper. Tissue production is just as challenging. Voith Paper has developed efficient press felts for this special application and their acquisition is demonstrably worthwhile.**



*Absorptive and tear-resistant are the main characteristics of a kitchen roll. A facial tissue has different functions, but it should always be smooth and soft. As well as toilet paper – life without it is unthinkable. More versatile cleaning is possible with moist tissue.*

In recent years, many tissue paper manufacturers have attempted to reduce energy, water, and fibers in production while maintaining or increasing paper quality. One important aspect, which is often underestimated, is the use of press felts. Higher production speed, more reliable and increased production, lower energy use, better quality and dewatering – press felts can bring about all of these improvements in tissue machines.

**Special felts for tissue machines**

Which felt design is best depends on the machine design, stock, and the product being produced. Thin, light felts are important for tissue machines, offering high stability across the usually long and wide machines. Voith Paper has developed five different felt types especially for this application: TissueFlex O, TissueFlex V, TissueFlex D, TissueFlex A, and TissueFlex S. Their material and design can be precisely adapted to

the individual needs of every paper machine. The press felts are tailored for every press configuration. In order to achieve the greatest potential from the clothing, the experts from Voith Paper Fabric and Roll Systems test the effects of various felts together with their customers. Thanks to a computer simulation, the characteristics of the felt and paper can be evaluated before production.

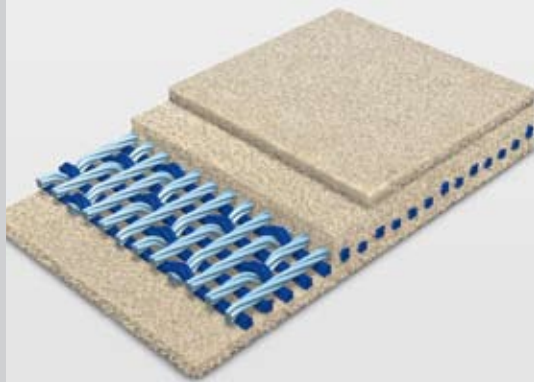
One of the best known felts is the TissueFlex O2. This laminated felt has two base weaves for a high pore volume and bi-component fibers for improved fiber anchoring. With its low tendency for compaction, this standard design from Voith Paper has proven its worth many times over. Its permeability and dewatering capacity are maintained throughout the entire running time. In order to improve the fiber anchoring even more, multifilaments (yarn made from several very fine filaments) can be included in the roll side of the base weave – then the TissueFlex O2P is called for.

**Tri-axial structure is the secret to success**

Increased running time from 60 to 112 days – the TissueFlex V3 press felt by Voith Paper achieved this success on a paper machine, which produces tissue paper with basis weights from 15 to 24 g/m<sup>2</sup> at a speed of 1,600 m/min. In addition, the use of the high pressure shower was reduced to one hour in the first 80 operating days. Increased production and improved moisture profiles complete the improvements achieved by the new press felt.

TissueFlex V3 is a press felt developed by Voith Paper for demanding press positions. The design with the tri-axial Vector structure has been successfully in use since 2005. It provides stability and smoother performance on the paper machine. The TissueFlex V3 is easy to clean with standard conditioning and can handle large amounts of water in the nip. Even under difficult conditions, it ensures easy operation and good

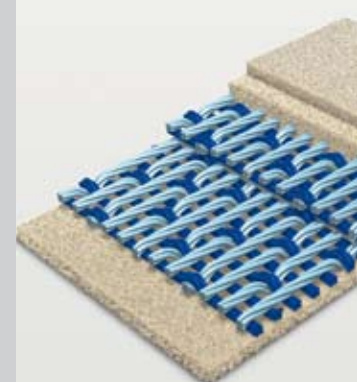
The five press felt types, developed for all requirements of tissue production:



**TissueFlex A**  
Light, single-layer felt, which can be used for machines with lower width and speed.



**TissueFlex D**  
Woven, double-layer felt design, suitable for every machine type and speed range.



**TissueFlex O**  
Laminate felt, which can be tailored to any application through a wide variety of weave structures.

running times. Thanks to the batt-like construction of its polyamide structure, the felt provides a smoother impression on the paper.

**Additional revenue of 720,000 € per year**

But what about the cost of the felt? Many paper manufacturers balk at higher clothing costs. However, they often forget to figure in the cost efficiency in the complete process. One example shows the value of such a calculation. On a Crescent Former, the use of a TissueFlex V3 felt allowed the production speed of 1,500 m/min to be increased by 50 m/min. The result was that the machine produced 120 metric tons more paper per felt and earned 120,000 € more sales. Using only six felts per year results in additional revenue of 720,000 € per year. Extending the running time by 10 days means one less felt and one less downtime per year saving 32,000 €. The significantly lower

use of water and energy leads to additional savings.

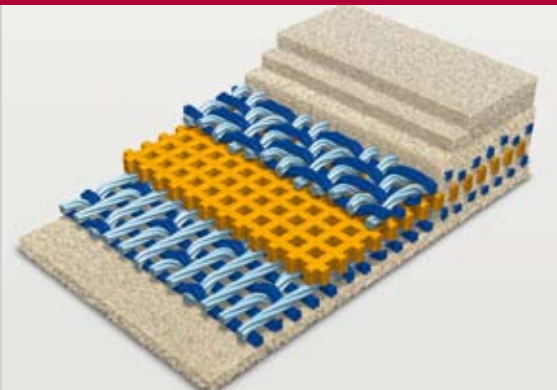
**Effective cleaning**

Van Houtum Papier in Swalmen, Netherlands, started a trial with felts from Voith Paper in 2007. The tissue manufacturer produces 45,000 metric tons of paper tissues and toilet paper annually, using recycled fibers. Voith Paper supplied TissueFlex V3 to the PM 4 Crescent Former and significantly reduced the paper mill's costs. Felt cleaning is particularly simple: the paper machine does not have to be shut down in order to wash the felt and the cost of the preparation is minimal. The felt is washed at low pressure with less water and approximately 50% fewer chemicals per cycle. That reduces costs and extends the running time of the felt by four to six days. Overall, the lifetime of the felts at Van Houtum Papier increased by 20% compared to previous used felts. In addition, production capacity

was increased by 16.2% and the production speed was raised. A further increase of the speed by 4% was achieved by using the TissueForm E forming fabric, which is an ideal addition to the TissueFlex V3.

**Unsuspected potential**

“Our experience shows that coordinating press felts and the surrounding components such as rolls, covers, and wires is worthwhile,” says Martin Ringer, Product Manager Tissue Forming at Voith Paper Fabric and Roll Systems. At the paper manufacturer SCA Edet in Sweden, the TissueForm GP forming fabric and the TissueFlex V3 felt were tested on PM 5 in an initial trial in the fall of 2008. They did not have to wait long for new records. After two weeks, there was already a new production record of 102 metric tons of paper per day. Over the entire running time, the maximum production of 200 to 400 kg per hour was higher than before. The



**TissueFlex S**

*This felt stands for maximum bulk retention and highest dewatering performance in the nip, as well as longevity in use.*

**TissueFlex V**

*In this felt, the Vector layer is built in. It is a non-woven, tri-axial substrate layer with high elastic behavior along the x, y, and z axes. The product comes as both double-layer and triple-layer felt; available as seam fabric and endless felt.*

2.5-layer forming fabric and the felt with tri-axial Vector technology from Voith Paper led to optimum operating conditions.

Production records were also recorded at SCA Prudhoe in the United Kingdom. Voith Paper conducted several optimizations on PM 1 in 2008 by modifying the TissueFlex shoe press and supplying an improved TissueFlex V3 press felt and a QualiFlex press sleeve. The responsible person for PM 1 at SCA Prudhoe, reports, “Thanks to the improvements, we saved 20% energy in the dryer. We are pleased with both the financial savings we achieved and the positive environmental aspects.” The dewatering performance is improved and record breaking production output has already been achieved.

**Current development making progress**

“Turn the wheel and spin the thread!”

– that’s an old German weaving song. The song fits with Voith Paper Fabric and Roll Systems in Dueren, Germany, because not only are most of Voith’s tissue felts produced there, but also the necessary fibers. Complex polyamide fibers are processed into high quality felts on industrial weaving machines. The clothing experts produce some 140 metric tons of tissue felts annually.

Development has not stopped. “Currently, we are working all out on a new felt,” reveals Hubert Walkenhaus, Development Engineer at Voith Paper Fabric and Roll Systems. “The structure is greatly improved and provides an optimized pore volume and a large contact area to the paper.” Initial trials with the polyurethane SolarSoft roll cover and the new press felt are currently underway at the Voith Paper research center in Sao Paulo, Brazil. Despite the reduction of vacuum, this clothing concept achieves the same dry content. Other initial

production trials are very promising. For example, on a 5 m wide tissue machine with a production speed of 1,900 m/min, the felt saves 60 to 100 kWh of energy per metric ton of paper produced.

**On Focus: TissueFlex**

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

Section: press  
Width: all  
Paper grade: tissue

**Contact**



**Klaus Grusemann**  
klaus.grusemann@voith.com