

Long fibers are used for the composition of wet laid nonwovens. The fibers can be up to 40 mm long and must be dispersible in water. For homogeneous formation of the fibers, a suspension with low stock consistency is necessary in which the long fibers can be well-distributed. The stock consistencies are from 0.1 to 0.8 g/l. For comparison with graphic papers, stock consistencies of 5 to 8 g/l are required.

The low stock consistencies require a large throughput quantity in the headbox. In the wet laid nonwoven process, an inclined wire as sheet formation unit is necessary in order to handle the large throughput quantities. For over 40 years, Voith Paper has been building inclined wire machines with the brand name HydroFormer, which is continuously being further developed and improved. In Düren, Voith Paper operates a HydroFormer pilot line that can be used for customer trials.

Along with single-layer HydroFormers, Voith Paper has also developed HydroFormers that can produce multi-layer products. With multi-layer headboxes, the suspensions of the separate layers are individually fed into the sheet formation space via headers and tube banks. Flexible lamellas separate the flows in the last headbox section as the suspensions enter the forming area.

The capacity of wet laid nonwovens facilities can be between 2000 tons per year for light products such as tea bags (12 g/m²) and 115,000 tons per year for glass fiber mat products (122 g/m²). Machine widths between

1 and 5.3 meters are common; the basis weight ranges are between 10 and 300 g/m². Wet laid nonwovens facilities operate at production speeds between 50 and 550 m/min.

We present two exciting application examples from Voith Paper in the area of wet laid nonwovens technology.

Typical HydroFormer of a 5 meter wide glass mat machine.



Application example 1: Glass fiber mats

The largest glass fiber mat machine in the world

In the last few years, the demand for glass fiber mat in the US has noticeably increased - on the one hand, due to the booming construction industry, on the other hand, due to many hail storms and hurricanes that have destroyed residential roofs. One of the leading glass fiber mat manufacturer in the world responded to the growing market in 2007 with construction of the largest glass fiber mat machine in the world located in the United States. Voith Paper supplied the HydroFormer GV2, the binder impregnation section and the white water circulation system for this machine.

“The challenge of this project was to build a glass fiber mat machine for which there was no fan pump on the world market that was large enough.”

Dr. Klaus Afflerbach, Technical Sales Manager, Voith Paper

The three-layer glass mat was produced with the HydroFormer from Voith Paper.

Glass fiber mats are used as the base material for floor coverings, asphalt shingles and asphalt rolls, among other products. There are older glass mat machines operating in the width ranges of 2 to 5 meters. But to achieve higher production capacities the latest installation is the largest glass mat machine in the world. The formation width of the new machine is 5,300 mm with production speeds of over 400 m/min.

For machines of such wide widths annual production capacities of over 100,000 tons of glass mat can be produced with typical glass mat basis weight ranges of 50 to 140 g/m².

“The challenge of this project was to build a glass fiber mat machine for which there was no fan pump on the world market that was large enough,” explains Dr. Klaus Afflerbach, technical sales manager at Voith Paper. In manufacturing glass fiber mats for roofing, the stock in the headbox must have a very low consistency. Only in this way can the 25 - 40 mm long fibers form a uniform mat on the wire. The end product is then distinguished by high tear resistance. But the required white water circulation quantity of up to 500,000 l/min could not be attained with any available fan pump at the low pressure levels below 2 bar. The engineers of

Voith Paper developed a suitable design for the headbox and associated white water circulation system for the new forming section. The resulting system incorporates two fan pumps to achieve the high flow requirements. This arrangement also provides the possibility of producing two-layer glass fiber mats if desired. To accommodate the two fan pump flows the forming section must be equipped with a two-layer HydroFormer headbox.

The two conically parabolic headers of the headbox are arranged counter to one another. Feeding is done with one header from the drive side, and



HydroFormer

Worldwide unique technology for production of three-layer wet laid nonwovens

Voith Paper is the world market leader in wet laid nonwovens facilities and offers with the HydroFormer a unique technology for production of one-, two- and even three-layer wet laid nonwovens. The flexibility makes it possible to produce wet laid nonwovens for special applications such as filter, overlay and filter papers for coffee pads. The Voith HydroFormer is used in the most high-power wet laid nonwovens machines worldwide with production speeds up to 550 m/min and production widths up to 5,300 mm.

the other header from the tender side. Stock preparation and white water circulation system are also designed with two approach flow systems. Different fibers and fiber mixtures can thus be used in both lines of the stock preparation and the white water circulation system.

“Preliminary results from two layer glass mat production evaluations have shown that the quality of the glass fiber mats is noticeably better than on comparable older machines. Both the formation as well as the profiles of the glass fiber mats show clear improvements,” reports Dr. Klaus Afflerbach.

