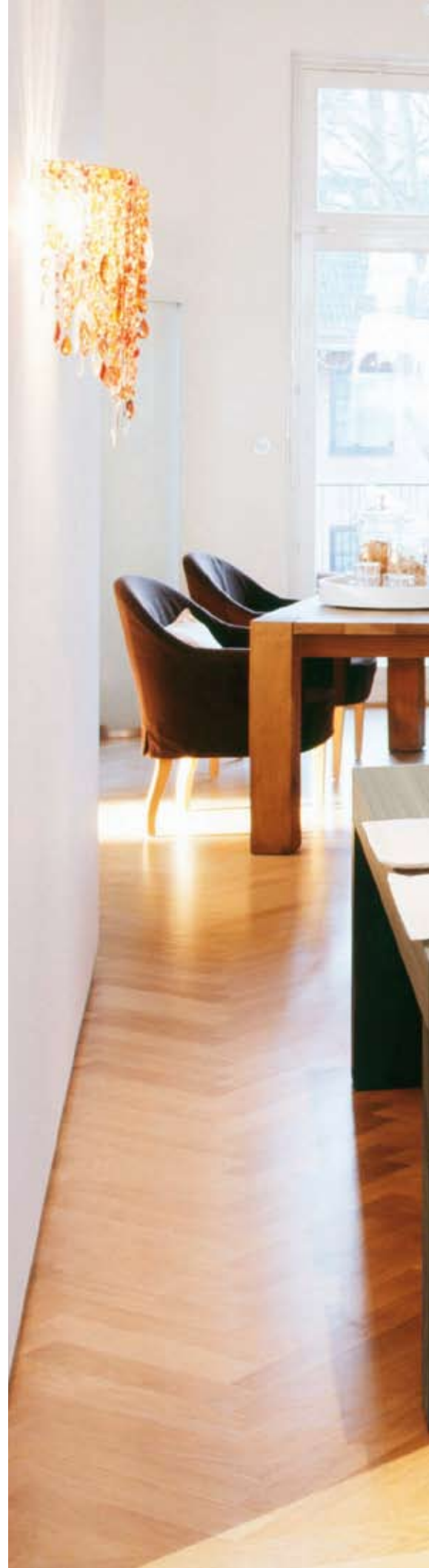


There's a lot of paper in here!

You'd be surprised how much paper there is in your home. Décor papers and overlay papers are found in furniture surfaces, kitchen cabinet panels and laminate flooring.





The MasterJet F/B Headbox delivers optimum performance in the décor paper sector

Enhance quality with new technologies

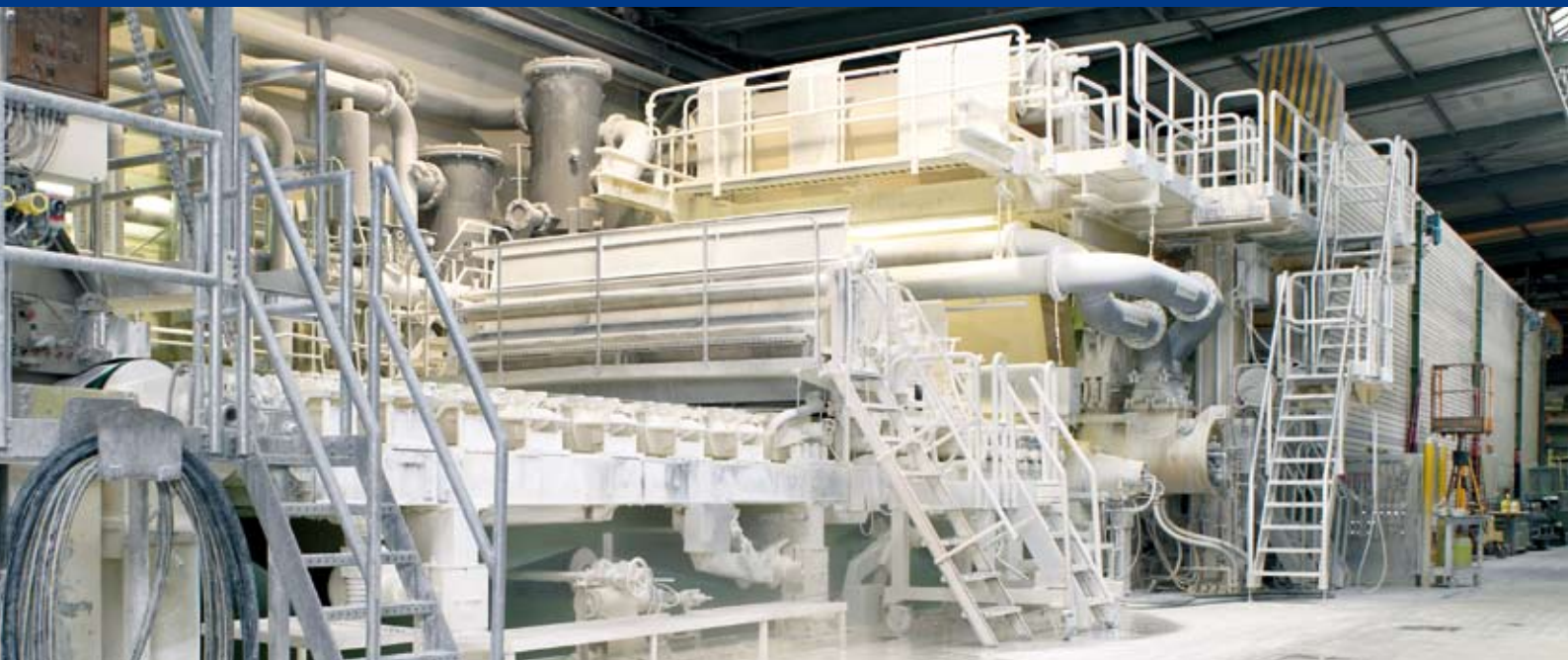
Compared with graphic paper grades, décor and overlay papers have very special properties and need appropriate production machines. Voith Paper has developed technologies that not only enhance the quality of these specialty papers but also make their production more efficient. This includes the MasterJet F/B headbox and the new -EdgeModule edge feed-in system. Voith Paper's ModuleJet and the DuoShake ensure a perfect profile and improved formation of the paper. Voith Paper installed these technologies for a revamp at Munksjö Paper GmbH in Unterkochen. Since then the PM 3 has been one of the most productive décor paper machines.

“It is in those often overlooked specialty paper niches where new technological developments and trends can be spotted.”

Jan Lepper, Sales Engineer Specialty Papers, Voith Paper



Décor paper is used in the furniture industry for kitchen cabinet panels.



The PM 3 at Munksjö Paper GmbH in Unterkochen is one of the most productive décor paper machines.

Décor papers are characterized by very high, uniform dimensional stability. This means that they have to have very good CD and MD profiles. They need good smoothness on one side for good printability. Easy impregnability and a high resistance to mechanical and chemical loads are further properties of décor papers.

Décor papers are produced in very small batches at a machine speed of 250 to 800 m/min. This means that grade changes are the order of the day. The grades differ mainly in terms of ash content and color, with the result that the total system has to be cleaned after every color change. To keep these cleaning times as short as possible, the design of the entire system is focused on smallest possible volumes for piping and vats. The necessary extremely high opacity of the papers is achieved with a high proportion of titanium dioxide of up to 42 percent. Specialty paper machines for décor papers are generally produ-

ced on a width of up to 2.6 meters. However, the web width varies depending on the order specification, and it is not unusual to run webs on widths of only 1.6 meters for short periods. Even just this small selection of particular features shows that the production of décor paper necessitates special design and sophisticated machine concepts.

Intensive workshop on specialty papers

Recently Voith Paper has been inviting industry experts to workshops to discuss specific aspects of specialty paper manufacturing. As Jan Lepper, sales engineer for specialty papers, observes, "It is in those often overlooked specialty paper niches where new technological developments and trends can be spotted."

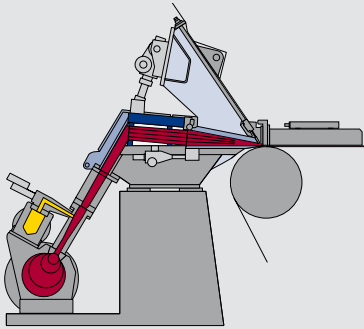
For example, experts from the décor paper industry gathered at Voith Paper in the spring of 2008 to attend

the intensive workshop on headbox technology for décor papers. Participants looked into the successful Voith Paper installations at Köhler in Kehl, Munksjö in Unterkochen and Felix Schoeller in Pensa.

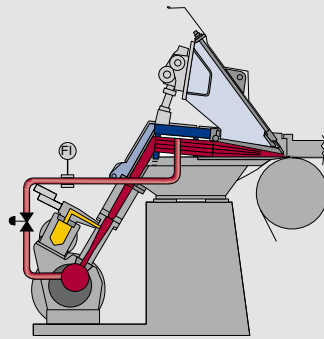
In terms of the headbox, the turbulence generation principle using rectifier rolls (RollJet K) was long considered the measure of all things in décor paper production. In recent years, however, the hydraulic headbox, particularly the Master Jet F/B developed by Voith Paper, has established itself as the technologically far superior solution. Consequently, this key element was the main topic at the décor papers workshop.

To discuss these trends the workshop participants also gained an insight into Voith Paper's R&D activities. This includes the PTC (Paper Technology Center) in Heidenheim, where the latest developments are tested at the large paper pilot plant. The décor

MasterJet F/B



EdgeModule



DuoShake



For décor paper machines Voith Paper uses the MasterJet headbox in conjunction with the EdgeModule edge feed-in system to achieve optimum fiber orientation at the web edge. The DuoShake shaker ensures a particularly homogeneous distribution of the fibers in the sheet.

paper manufacturers in attendance were impressed by the system's research and investment potential, even if they did have a bit of a chuckle about the paper machine speed: "2,400 meters per minute? We can manage that too – on the winder!"

Hydraulic headbox – proven technology with new features

In discussing the headbox, the customer workshop was picking up a central theme. After all, for papermakers it is considered to be the heart of the paper machine. Only by using a correctly designed, precision engineered and adjusted headbox, which applies the suspension evenly onto the fourdrinier wire, can important paper properties be maintained - for example, the CD basis weight profile, main fiber orientation, homogeneous formation and flatness of the paper. The MasterJet F/B headbox is a modern, flexible design from Voith Paper. Thanks to its special ribbed design for upper lip holder and table it does not need any components over the machine width apart from the upper and lower lip. The so-called C-clamp design princi-

ple also ensures minimal force transmission to the machine foundations by preventing the nozzle forces from being supported by the side walls. When upper and lower lip undergo thermal expansion, the geometry of the slice opening changes only slightly. There is no need for a complex heating system and heating chambers at the headbox.

In order to deflocculate the fiber suspension, the hydraulic headbox has to generate turbulence. This is done by passing the suspension through turbulence pipes with escalating diameter increments, the well known step diffuser. The resulting pressure shocks generate high shearing forces, which deflocculate the suspension. The high micro-turbulence in the MasterJet F/B headbox, allows optimum jet stability even at high speeds. For the greatest possible accessibility to the rear wall, the distributor pipe and the upper lip holder of the MasterJet can be opened over the width of the machine.

The EdgeModule edge feed-in system is an innovation for these paper grades and can be installed in new

MasterJet headboxes. With this EdgeModule, it is possible to adjust the volumetric flow of the suspension at the edges of the headbox to an optimum. The module thus allows the web edge, which is particularly critical for this grade, to be controlled. The control range of the EdgeModules is up to two meters towards the machine center. The main fiber orientation at the edge can be adjusted by up to eight degrees. The EdgeModule technology offers advantages for all grades of paper in which good fiber orientation is demanded. The EdgeModule is used on headboxes for fourdrinier, hybrid-former and gapformer paper machines and has already proven effective in practice, including in décor paper production.

ModuleJet guarantees optimum CD basis weight profile

Another crucial factor in décor paper production is controlling the CD basis weight profile according to the dilution water principle. This principle is not only applied for hydraulic headboxes, but also for the rectifier headboxes still found in older machines. Here,

Voith Paper offers the ModuleJet technology, which is also ideal for rebuilds. This dilution technology produces very good CD basis weight profiles with optimum fiber orientation (TSO – Tensile Strength Orientation), around 20 to 50 percent better than that achieved using the slice adjustment method. In addition, the system ensures stable web run, good flatness properties and improved productivity. Following a grade change a substantially shorter settling time is also achieved.

The heart of the ModuleJet is special valves, which inject low consistency white water by zones according to requirements. The dilution water is supplied to the valves via a cross flow header. It is mixed with the HC stock in the mixing chamber. A downstream throttle valve again ensures that the suspension is well mixed. Despite sensitive detection methods there is no evidence of an unequal ash CD profile resulting from the CD

consistency differences generated by the ModuleJet controls.

High shake frequencies with DuoShake

A shaking unit is used for décor papers to reduce the MD/CD ratio of the breaking length and to improve formation. Voith Paper has developed the DuoShake, in which the vibrating mass of the breast roll is counterbalanced with counterweights. This prevents forces being transferred into the machine foundation and allows larger strokes and higher shaking frequencies than were possible using conventional shaking units. The effect of the DuoShake was investigated using a sheet split analysis. On the basis of the main fiber angle and the anisotropy value (measure for the intensity of fiber orientation) Voith Paper determined in several investigations that the DuoShake generates a high turbulence particularly on the layer close to the wire. On the whole

this produces a far more homogeneous distribution of the fibers in the sheet.

Successful deployment at Munksjö Paper

Several Voith Paper components have been installed at the same time into the PM 3 for décor paper at Munksjö Paper GmbH in Unterkochen. Together with the existing DuoShake, the MasterJet F/B headbox now ensures excellent sheet formation. The MasterJet F/B is additionally fitted with an EdgeModule. The ModuleJet dilution technology guarantees excellent CD basis weight profiles. The automation system at the Unterkochen plant was also extensively rebuilt by Voith Paper Automation. This allows the best possible use of the profiling technology. As well as the robust OnQ scanner for precise measurement of profiles, the OnQ Profilmatic control software is also used. It controls the profiles with features

The MasterJet F/B headbox with ModuleJet and EdgeModule guarantees excellent profiles and balanced turbulences.



such as adaptive tuning and auto-mapping. In addition, the OnView platform allows a much better insight in the data collected on the PM 3. It enables the machine operators to react faster and more effectively to the process conditions.

Multi-layer sheet formation for overlay paper

To manufacture wear-resistant surfaces, such as flooring, a corundum-filled overlay paper is pressed together with an already impregnated décor paper and the panel, MDF-board or other substrate. This paper exhibits quite different properties from the décor paper and is produced using a different production technology.

Overlay paper consists of extremely long fibers, which makes it necessary to use a special sheet forming device with an inclined wire former, the so-called HydroFormer. Compared

with the production of décor paper, an extremely low headbox consistencies of 0.01 to 0.08 percent is necessary for overlay papers, resulting in a high throughput of 6,000 to 85,000 l/min*m. For comparison with décor paper production, the throughput at same width is 3 to 12 times lower (1,800 to 6,500 l/min*m). The pipe dimensions of the HydroFormer are correspondingly large.

For good wear resistance, as much corundum as possible needs to be bound into the sheet. To achieve this, Voith has developed multi-layer sheet formation for the HydroFormer. This technology requires three stock feed systems and a headbox with lamellas that keeps the layers separate until dewatering. Trials with colored fiber stock have shown that the layer separation works extremely well. The sheet structure can therefore be configured in individual layers with different properties. For example the middle layer can contain corundum.

Due to the fibers on top and bottom of the corundum layer, the embedded corundum is prevented from dissolving out of the compound during the subsequent processing. The increased corundum content provides the product with an extremely high wear resistance.

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At Munksjö Paper in Unterkochen all process parameters can be analyzed and adjusted quickly and easily using the OnView platform.

