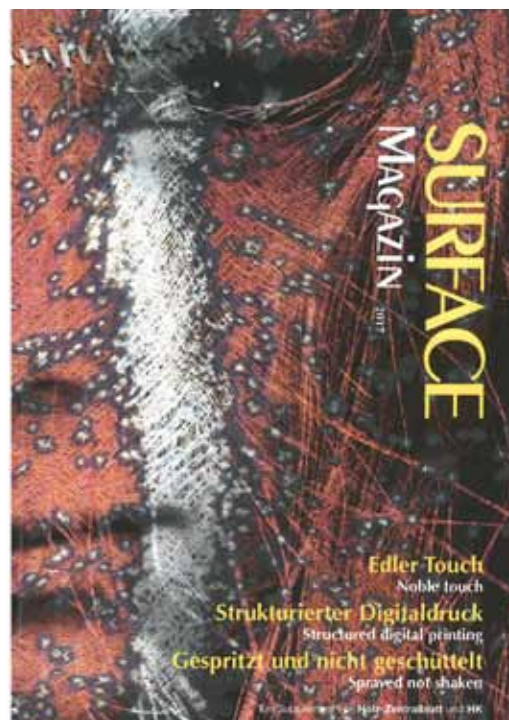


Matt - HighGloss - Structure

KLEIBERIT shows latest “HotCoating” solutions at the LIGNA – second line under development for Kastamonu



With the kind approval of Surface Magazin / DRW-Verlag

Matt-Glanz- Struktur



Visual inspection of the freshly embossed structures on the matt "HotCoating" surface





Feeding the trade fair "HotCoating" line with the protective foil

KLEIBERIT shows latest "HotCoating" solutions at the LIGNA – second line under development for Kastamonu

One of the most interesting and pioneering new methods for surface finishing of laminated (wood) materials or foils is definitely "HotCoating", a technology developed by KLEB-CHEMIE M. G. Becker GmbH & Co. KG (better known as KLEIBERIT) and introduced seven years ago. Surface Magazine provided the first detailed technology report and background story of "HotCoating" in 2012 (pp. 26), and again in 2014 (pp. 24). Back in 2014 there were already more than 30 production lines in operation, of which three were full-format width (2,400 mm). "HotCoating" continued to gain market ground, is today firmly established in the wood/wood-composite finishing sector, and shows sustained signs of a promising future with versatile new fields of use. KLEIBERIT has recently announced and realised a number of further important projects. In February 2017, wood-based panels specialist Pfleiderer (based in Neumarkt, south Germany) announced that it is investing in a "HotCoating" line for its site in Leutkirch. The line, designed for coating wood composite products, high-pressure laminates and compact boards up to a width of 2,100 mm, is due to begin operation in Q1 of 2018. This specific configuration is currently unique in the market: it combines the "HotCoating" method based on PUR components with a high-quality multi-layer coat of UV-curing acrylic varnishes. At a length of 165 metres, is also the world's largest "HotCoating" line. Pfleiderer's declared objective is to provide a full range of functional surfaces – coating systems for furniture manufacturing as well as laminates for outdoor use – as Michael



The Kastamonu delegation at KLEIBERIT's trade fair stand, next to the "HotCoating" exhibition line (photos: Koch)

Wolf, CEO of Pfleiderer Group S.A., announced at the Interzum suppliers' trade fair in Cologne this May. Then followed the joint announcement, at the LIGNA in Hanover, about the investment into a second full-format "HotCoating" line for Kastamonu in Gebze (Turkey), in the presence of Kastamonu's

CEO Halluk Yildiz and Technical Director Yusuf Ilery. This will undoubtedly prove to be another emblematic reference and a further testament to the technology's practicality.

Depth of gloss

Surface Magazine's editorial staff had the opportunity to talk to KLEIBERIT's CEO, Dr. Achim Hübener, at the LIGNA about the latest "HotCoating" developments. Dr. Hübener underlined the importance of the contract for this second new

The "HotCoating" line shown at the trade fair; feeders at the rear



400 mm inline digital printing line in Hanover, for printing and subsequent "HotCoating" in one pass.

line at Kastamonu, for the general public image as well as for the fair visitors. This project and the line under construction at Pfleiderer represent key "new milestones on the HotCoating journey". The basic principle of the patented reactive PUR coating remains unchanged; the improvements are in the coating technology, resulting in a very special "depth of gloss" or "saturated" look based on real 3D effects. The thus generated high-gloss exceeds the 95 gloss unit (GU) mark. There have also been significant secondary improvements including, among others, dust removal via a clean room environment, a better milling process, and improved steering/controlling measurements continuously throughout the whole production run. The fusing temperature range has also been reduced and is now in the 100°C region. This lowers the tension in the carrier material, which is a general benefit of using lower temperatures. High flexibility is a significant quality of PUR



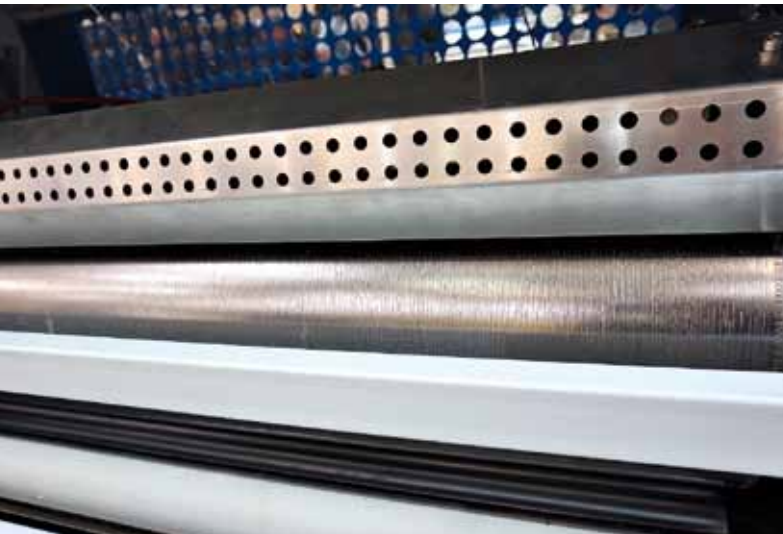
A sample specimen leaves the line at the trade fair



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Embossing rollers that provide the "HotCoating" structures, in operation at KLEIBERIT's trade fair stand



components. Even after hardening, they can be formed or 3D patterns can be applied, as was demonstrated on a pillar at the company's stand at the LIGNA. Flawless rounded edges with a 2mm radius can already be realised. KLEIBERIT is currently working on narrowing the radius down to 1mm, as required by the kitchen industry - it looks likely that a solution will be available soon.

Faster feed rates, improved hardening

Another exciting topic is roll-to-roll foil coating, usable for all kinds of laminating, which also opens new perspectives in combination with digital printing. KLEIBERIT demonstrated this live at the LIGNA in Hanover. On show was an inline digital printing line with a working width of 400 mm, that showed printing and subsequent 'hot coating' in one pass, a method that the company recently enhanced in cooperation with machine manufacturer Huser GmbH (from Herbolzheim, southwest Germany). Its compact integrated digital printer is worth

a special mention. The unit can create embossed structures, thus providing novel profile wrapping and surface lamination options for paper manufacturers. In future, paper laminations up to a width of 1.60 metre will be possible; an interesting feature for companies in door, flooring and furniture manufacturing, which can then laminate large surfaces and simultaneously coat the edges. In roll-to-roll foil coating, 60-80 m/min. feeds are currently realistic. The achievable top speeds for boards are around 25 m/min., a significant improvement on the previous 10 m/min. New raw material formulations have additionally brought improvements in the hardening process. The fast basic hardening of the surface considerably facilitates handling both in the line run and during the subsequent stages. Levelling for high-gloss materials takes around one minute. A protective foil is always added at the end of the line, in compliance with the standard requirements of the furniture and kitchen sectors. In practice, the boards can then be delivered after 24 hours.

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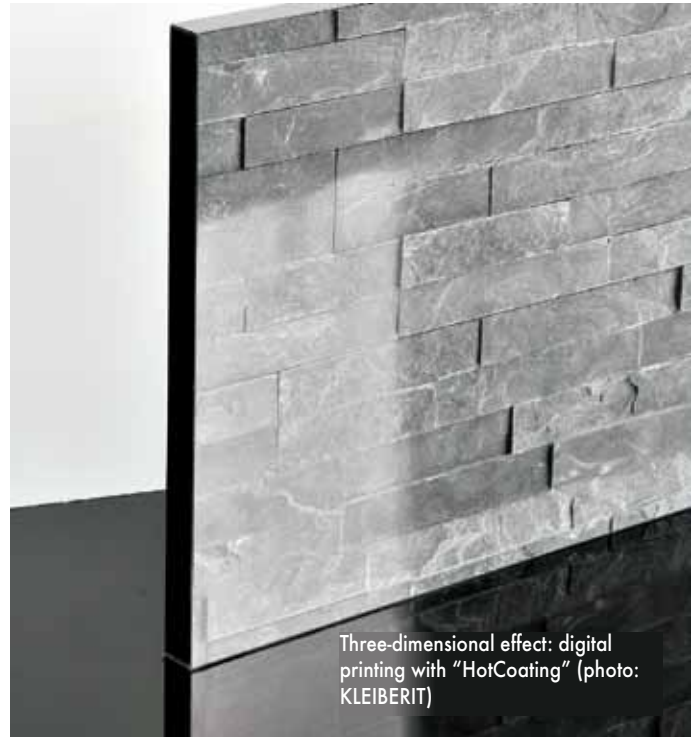
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Flawless rounded edges with a 2mm radius are currently possible with hardened "HotCoating" (photo: KLEIBERIT)



Three-dimensional effect: digital printing with "HotCoating" (photo: KLEIBERIT)

Super matt and high-gloss available at the push of a button

A completely contrary trend to high-gloss is super matt, which is gaining popularity and generating sales volumes. Here again, "HotCoating" gets to pull another ace from its sleeve, as the super matt surfaces with extremely low glossiness are achieved by physical means – which offer numerous other benefits alongside preventing glossing – rather than with chemical matting agents. Furthermore, apart from re- or retrofitting the production line with special units for hardening and matting the UV-polymerizable materials, no further changes are required (see Surface Magazine's report from 2014). When UV paints and varnishes are hardened according to the methods developed by Innovative Oberflächentechnologien GmbH from Leipzig, to begin with extremely short-wave light is applied in the absence of

oxygen. Directly afterwards, the surface is radiated with a medium-pressure UVC emitter, where the very high-energy light photons break down the molecular double bonds of the paint molecules. Radicals are formed and polymerization ensues immediately, resulting in super matt surfaces that are extremely hard and scratch-resistant, and that will also not gloss. One single production line, then, can cover the full scope of high-gloss to super matt in any range of quantities while retaining all the positive features – a major factor for the second line at Kastamonu. With this investment, the Turkish company expects to achieve a further step towards worldwide market leadership in this sector. It is also important to mention the crucial role of dekoraPUR, KLEIBERIT's daughter company from Barsinghausen (near Hanover), which provides key support for newcomers and major line investment projects alike. A reference system with

the latest varnishing technology is already up and running in Barsinghausen. As a result, Pfleiderer first presented its product at its in-house "Innovation Days" event back in February, and again at the Interzum trade fair in May. Incidentally, one focus of Pfleiderer's production will be on "compact boards" with melamine surfaces qualified for outdoor use. The respective standard requirements have been fulfilled, thus opening up a challenging new market sector. These are yet more examples of the versatility and quality of "HotCoating" applications. All the products shown at KLEIBERIT's stand at the LIGNA were made in Barsinghausen, providing a foretaste of possible future series productions.

Embossing with a short-cycle press – guaranteed security of supply

The roll-to-roll coating method, also demonstrated at the LIGNA in Hanover, provided another glimpse through the looking-glass. As mentioned, this method can be used to create embossed structures with a maximum depth of 150 µm. In practice, 80-100 µm embossings will likely be more common. The method was introduced in 2015 as "HotCoating Impress Touch" and includes an application stage with a very high layer thickness. Due to the moisture-curing principle, this layer can be embossed inline with the aid of an embossing calender or a short-cycle press, both popular methods in the wood products and flooring industries. To cater for the demand in luxury vinyl tiles (LVT), flooring manufacturers are calling for materials that are printable in widths up to 2.10 metres and that have very abrasion-proof coating, a super matt finish, and can be re-



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activated in a short-cycle press. Such "HotCoating"-based papers provide a 'soft touch' finish with excellent acoustic properties and that can even be embossed with deep structures. On-demand generation of high-gloss and/or super-matt [surfaces] with a short-cycle press is certainly conceivable in future.

As "HotCoating" continued to gain market ground, KLEIBERIT simultaneously secured the raw materials supply for all production facilities. Because it is basically a 'closed system' that uses only carefully matched PUR KLEIBERIT products, the company can provide a guarantee for the full functionality of the different "HotCoating" methods, and has total control of the complex processes. Raw material production is being massively extended in Weingarten, corresponding to the rise in demand. Capacities are due to be doubled by 2018/19, along with a multi-million euro investment.

Two different types of varnish are on offer: unpigmented for decor/veneer surfaces, and pigmented for pre-dyed monochrome surfaces. In the meantime, a multitude of shades of white are available for the latter, as well as a range of pale greys, depending on the pigmentation. 'Deeper' colours such as dark grey (currently still) require the use of pre-coloured paper. "HotCoating" surfacing requires a base material of between 80 and 140 g/m², depending on the intended use and material properties. Here again, the range has been considerably extended as a result of the increasing scope

of applications.

It is also a fact that the consumables are below those of classic casting plants which, for process-related reasons, need around 120 g/m² for the top coat (for an overall 200-250 g/m²), to achieve comparable 3D effects, for instance. In a direct comparison, KLEIBERIT expects "HotCoating" to bring an economic (i.e. cost) benefit of around 30%.

Equally important is the practically non-existent reject rate on account of there being no danger of stress whitening when drilling or milling. Very low machine set-up times (one-touch changeovers from matt to high-gloss) are another key argument.

As such, many factors speak in favour of the continuation and promotion of the "HotCoating" success story...

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