Merlin the coating magician!

First installation of a HELL PremiumSetter S1000 at offset prepress service provider Merlin

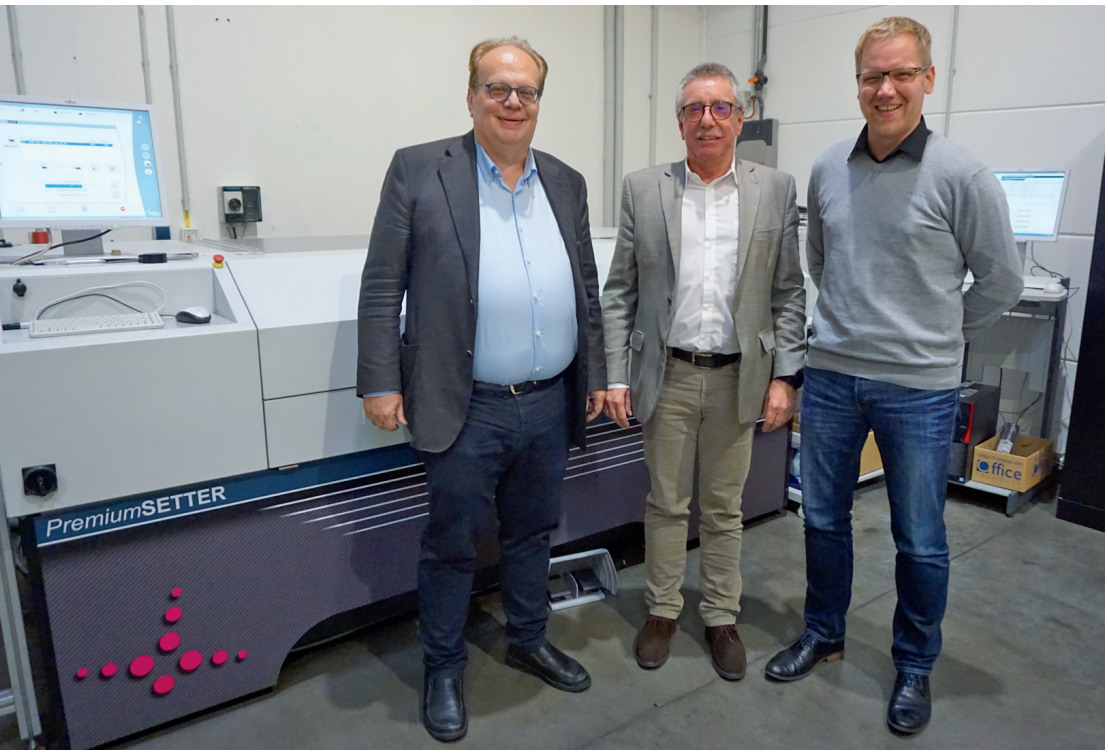
Ansgar Wessendorf

Headquartered in Essen, the Merlin Group is one of Germany's leading prepress companies for offset printing. The Group is also actively involved in publishing, producing successful newspapers and magazines for all kinds of sectors. Its wide-ranging portfolio covers everything from agency services and data processing to imaged offset printing plates. Merlin also manufactures flexographic coating plates for offset packaging printing throughout Germany. In summer 2018, the company expanded its direct imaging capacity for coating plates by installing a PremiumSetter S1000.

Merlin CtP is based in the town of Lünen, near Dortmund, and produces around 3000 m^2 of directly engraved elastomer flexographic coating plates every year, but achieving this level of success was a long process fraught with difficulties. "Despite all the limitations of photopolymer coating plates, it was a real struggle for us to challenge their market leadership, because no other technology was available back then," recalls Frank Dittmann, owner of the Merlin Group. "Over time, however, an increasing number of customers switched to directly engraved elastomer coating plates because of their impressive coating transfer and intricate depiction of even the finest motif elements. Results of this kind are hard to achieve with photopolymer coating plates. We now have customers who count on our coating plates and switch their production if in any doubt," he adds.

Involving laser imaging of the LAMS layer and a subsequent solvent-based clean-out process, the manufacture of photopolymer coating plates had always been laborious and time-consuming for Merlin. In 2014, the company therefore decided to stop investing in this type of coating plate production and focus exclusively on direct laser engraving. "We started out in the fully digitized CtP offset sector, so photopolymer processing technology was something of a step backward for us. Direct engraving isn't a 'process' in this sense, because the elastomer plates are simply cleaned with water afterwards and then go straight to the customer. We've been offering directly engraved elastomer coating plates since 2013," explains Dittmann.

From left to right: Frank Dittmann (owner of the Merlin Group), Udo Theus (Product Manager at HELL Gravure Systems), and Achim Stührenberg (Managing Director of Merlin CtP)



Source: Ansgar Wessendorf

More than a lucky coincidence

Merlin installed its first direct laser engraving system – Kodak's FLEXCEL Direct System – at the beginning of 2013. "We had a close, long-standing working relationship with Kodak because we used its platesetters for our offset printing plates," reveals Merlin CtP's Managing Director Achim Stührenberg. In 2018, however, Kodak announced it was stopping production of the diode laser. One of the reasons for this was probably that the company never succeeded in commercializing an effective direct engraving material.

"To reflect the growing demand for coating plates in our production technology, we were already desperately seeking another suitable manufacturer of laser systems for the direct engraving of elastomer flexographic coating plates. We finally got lucky at the ProFlex exhibition organized by the DFTA – the German-speaking specialist association for flexographic printing – in Stuttgart in March 2018. At the HELL stand, we chanced upon a poster showing the prototype of the new PremiumSetter S1000. After the event, we went to take a look at the laser system being assembled at the HELL plant in Kiel and quickly realized it was exactly what we were looking for – the perfect engraving machine for our coating plate production," says Dittmann. Merlin ultimately ordered the PremiumSetter S1000 in June 2018 and the beta test phase ended at the beginning of 2019. The machine was fully integrated into production

Source: Ansgar Wessendorf

Merlin CtP in Lünen operates a PremiumSetter S1000 for the direct laser engraving of elastomer flexographic printing plates

operations as early as 2018. "In 2018, we were on the lookout for a suitable prepress service provider for the beta test of our new PremiumSetter S1000. It was a stroke of luck that we ended up deciding on Merlin. Following the six-month beta test, we were able to hand over the S1000 to the company on schedule," says Udo Theus, Sales Manager Europe at HELL Gravure Systems. The laser system for the direct laser engraving of flexographic printing plates was put through its paces during this period.

"From the outset, the machine was fully integrated into our production workflow and subject to exactly the same capacity utilization as the existing Kodak laser system. In other words, it really was a tough beta test," says Stührenberg, describing the conditions during the test phase. "Over the course of the six months, a number of machine parameters were optimized to adapt them to our requirements," he adds.

"The technical support we received from HELL – especially during the beta test phase – was exceptional. We were always able to contact someone immediately and the engineers providing project support came out several times. All our requests were met to our full satisfaction during the test phase," continues Stührenberg, full of praise.

Win-win situation

Both HELL and Merlin benefited from this collaboration. In close consultation with Merlin, HELL made the requested technical optimizations to the S1000 to adapt it to the special features of the company's workflow within the agreed deadlines. For example, it redefined the zero point so that the S1000 can be used properly in the workflow. "That was a vital adjustment HELL made for us so we can standardize data processing work. It makes our production highly flexible, because we only need to decide at the last minute which of the two laser systems we use to image the relevant coating plate," underlines Stührenberg. "So at the end of the day, the S1000 was more like a custom product. Right from the outset, we had absolutely no complaints about the laser imaging," adds Dittmann.

The laser systems from HELL (fiber laser) and Kodak (diode laser) also had to be aligned to ensure they both produced the same imaging results. This involved adapting the profiles used on the PremiumSetter S1000 accordingly to replicate the results of the Kodak laser 1:1. Due to its spread, the letterpress plate is distorted compared to offset. This distortion factor is calculated and factored into the engraving process so that the coating plate matches the offset printing process exactly. The HELL laser was initially not identical to the Kodak system in this regard. Merlin first had to ascertain the relevant values to achieve an absolutely identical (1:1) result on the two laser systems.

Packaging printing is increasingly important

Headquartered in Essen, the Merlin Group has a total of 70 employees and is made up of 12 separate companies involved in offset prepress and publishing activities. Merlin used to be nothing more than a service provider for commercial printing. That all changed 14 years ago when the Group started taking over an offset packaging printer's prepress operations to coincide with its move into the production of coating plates.

The portfolio currently ranges from the development of packaging and data processing to finished offset and coating plates. In addition to folding carton printers, the growing customer base now also includes companies printing corrugated board and specializing in dry offset printing.

Commercial offset printing is still important to Merlin, but packaging is clearly the more vital segment when it comes to further business development. It is therefore currently working hard to establish how much further growth potential the flexographic printing market offers the company. Merlin now generates around half its earnings as a prepress service provider in offset packaging printing, which includes the manufacture of offset and coating plates.

"Customers are now unable to tell which laser machine was used to produce their coating plates," says Stührenberg, not without pride at having overcome this challenge in collaboration with HELL.

When it came to imaging the flexographic coating plates for the surface finishing of folding cartons during offset printing on the PremiumSetter S1000, absolute register accuracy was a key criterion for Merlin. The coating plate must therefore be compatible with the relevant plate-punching systems for offset printing plates. "Together with HELL, we found a perfect solution to this challenge," says Stührenberg. Register pins that support flexible alignment are embedded in the drum. A specially made punching table is used to punch the Bacher register into the coating plate along with other holes for mounting on the engraving drum. This ensures the direct engraving of the elastomer plates exactly matches the Bacher perforation familiar from offset CtP.

Focus on folding cartons

"We normally deliver items to customers the day after they place their orders, and our two laser systems ensure we can meet these tight deadlines. It takes an average of one hour to make a coating plate, and we produce around 15 to 20 plates each day in flexible two-shift operation. We supply companies throughout Germany and also in other European countries. Our main customers are offset printers producing folding cartons. Our elastomer plates are also used in a number of niche sectors, such as printing cans, and we make blankets for dry offset printing, too," says Dittmann.

The printing and surface finishing of folding cartons is still a preserve of offset printing. To cut down on the number of steps and thus on costs – and also for quality reasons – inline coating on offset presses mainly takes place using the flexographic printing process. "Our customers have up to three coating units installed in their presses. Offset presses are often configured with an upstream flexographic coating unit for tasks such as applying opaque white or silver backgrounds in advance. That's followed by the offset motif, which is printed using 10 to 12 inking units. Spot and full-area UV or acrylic coatings are applied in two downstream flexographic coating units to produce special effects. There's a clear trend toward large folding carton producers investing in offset presses that produce the finished folding carton blanks in a single processing operation," explains Stührenberg. The coating plates used must be coordinated with this complex inline process. The majority of the directly engraved elastomer coating plates manufactured by Merlin are used for the surface finishing of folding cartons for the pharmaceutical, confectionery, tobacco, and food industries.

Source: Ansgar Wessendorf

Clamping an elastomer coating plate in place ready for direct engraving

Direct engraving – a whole host of benefits

Direct laser engraving with the HELL PremiumSetter ensures full-resolution screen dot surfaces, including their edges, which means the laser's engraving depth can be controlled with high precision.

Source: Ansgar Wessendorf

An engraved elastomer coating plate

From surface to full relief depth, fine areas benefit from extra-strong support to ensure the fine surface dot remains stable and does not "break off" during the production run. Direct engraving also supports extremely steep engraving of edges. This creates a clean finish, which significantly reduces problems with the halo effect in print. Due to the production process, this is not possible in the same way with photopolymer coating plates.

The maximum imaging format of the PremiumSetter S1000 is 1066 mm (drum width) × 1350 mm (drum circumference). Depending on the machine's final format, the standard plate formats are around 800 × 1050 mm. The longer side is clamped in the circumferential direction of the drum. This means

the fiber laser unit only has to cover the shorter side, which significantly reduces the engraving time.

Compared with the photopolymer processing workflow, direct engraving substantially shortens the production chain, which consists of direct engraving, cleaning, collating/packaging, and delivery to the customer. It takes an hour to manufacture a coating plate in the standard offset format 700 × 1000 mm, but large-format plates measuring 1200 × 1450 mm are also produced. Flexographic coating plates are used in a large number of sheetfed offset presses, such as a Speedmaster XL 106 from Heidelberg, but also in sheetfed digital presses such as the Primefire – also from Heidelberg – or the Landa S10. Strictly speaking, these are all hybrid presses because they are equipped with one or more flexographic printing units to apply coatings.

Depending on the elastomer material, the PremiumSetter S1000 with its two fiber lasers is able to engrave with a depth of up to 1 mm in a single pass. The maximum engraving depth of the Kodak diode laser, on the other hand, is just 0.550 mm. A further advantage of the HELL laser is that the production time remains the same when changing the resolution from 2540 to 5080 dpi and maintaining the same engraving depth, because the drum with the elastomer plate clamped onto it rotates faster. The maintenance and adjustment of fiber lasers is also quicker and easier than with diode lasers. One standout feature of the PremiumSetter S1000 is the undercut for special applications. This tool is used when intricately structured areas need to be combined on a single plate, applying an undercut to the fine elements.

The laser cuts off two microns, so these areas lie slightly below the surface level. On the one hand, this takes the pressure off the fine elements during the production run, which ensures they don't get crushed or broken and keeps the dot gain low. On the other, sufficient printing pressure can be applied to the solid elements to obtain a smooth, homogeneous printout.

The defined surface roughness (in the µm range) is another impressive feature provided by the elastomer itself that is highly beneficial when transferring UV coatings in particular. The surface roughness also ensures that an elastomer plate can remove more coating from the screen roller than a photopolymer coating plate, which tends to have a smoother surface. "It goes without saying that a defined surface structuring of the screen dots as well as the line and solid elements can also be applied to the elastomer coating plate," explains Stührenberg. Elastomer coating plates are far more resistant to chemical and mechanical influences than their photopolymer equivalents, which results in excellent run stability. "What's more, imaging is a completely digital process. We don't use any solvents and have no energy-intensive drying process, which means direct engraving makes a real contribution to eco-friendly production," says Dittmann.

Exclusively from ContiTech

Merlin obtains all its directly engravable elastomer flexographic printing plates from ContiTech. A total of seven different material compositions are used, with two main ContiTech materials being utilized for inline offset surface finishing in the flexographic printing unit (chambered blade printing unit) – the Laserline CAL (= Conti Alu Lack) coating plate with an aluminum substrate, which Merlin sells under its brand name Flexcel ALU, and Laserline CSL (= Conti Standard Lack), which has a foil substrate and which Merlin calls Flexcel PET. These materials are available in widths of 1.15 and 1.35 mm, which precisely meets customer requirements. One special application offered by Merlin is the use of elastomer materials for printing on cups, cans, and tubes. In this segment, direct laser engraving is used both for processing printing plates with metal substrates and for self-adhesive ink transfer blankets.

"We offer our customers laser-engraved printing plates with metal substrates in the required formats with engraving profiles tailored specifically to the press. High-resolution engraving and fine screenings achieve exceptional results in dry offset, that is to say indirect letterpress printing. We can improve these results further still by also engraving ink transfer blankets to personalize products in these special presses," explains Stührenberg. The elastomer material with metal substrate from ContiTech that is used for this purpose is available in thicknesses of 0.73 to 0.95 mm. The self-adhesive printing blankets are normally 1.98 mm thick. ContiTech's product portfolio also includes elastomer flexographic printing plates 1.14 to 2.84 mm thick (with or without an additionally compressible layer).

Merlin already supplies these printing plates to processing companies with very unusual production lines.

The baby brother – versatile direct laser for printing plates

The PremiumSetter S1000 from HELL Gravure Systems is an engraving system for the direct laser engraving of elastomer printing plates (with a polyester or metal substrate) for dry offset, letterpress, and flexographic printing, coating plates, and the imaging of digital photopolymer printing plates (LAMS). The S1000 is the "baby brother" of the PremiumSetter models S1300, S1700, and S3000.

Two 600-watt fiber lasers are used in Merlin's S1000. An integrated loading table incorporating stops, a vacuum drum with pneumatic clamping bar, and footswitch control results in user-friendly plate loading and unloading.

The S1000 works with a resolution of up to 5080 dpi and can engrave plates with a maximum format size of 1350 × 1066 mm.

Customers use these directly engraved flexographic printing plates for the customized printing of everything from sealing membranes and adhesive tapes for tradesmen and DIY stores to sugar cones for ice-cream parlors and bakeries.

What's next?

"We've also made a few forays into 'pure' flexographic printing, as elastomer materials offer many benefits here, too. We're currently considering a more permanent move into this attractive market and may invest in a further direct laser system from HELL for this purpose," reveals Dittmann.

At the moment, we're looking for a packaging printer to make this move in partnership with us," he adds, describing how he envisages Merlin's further development. [12168]