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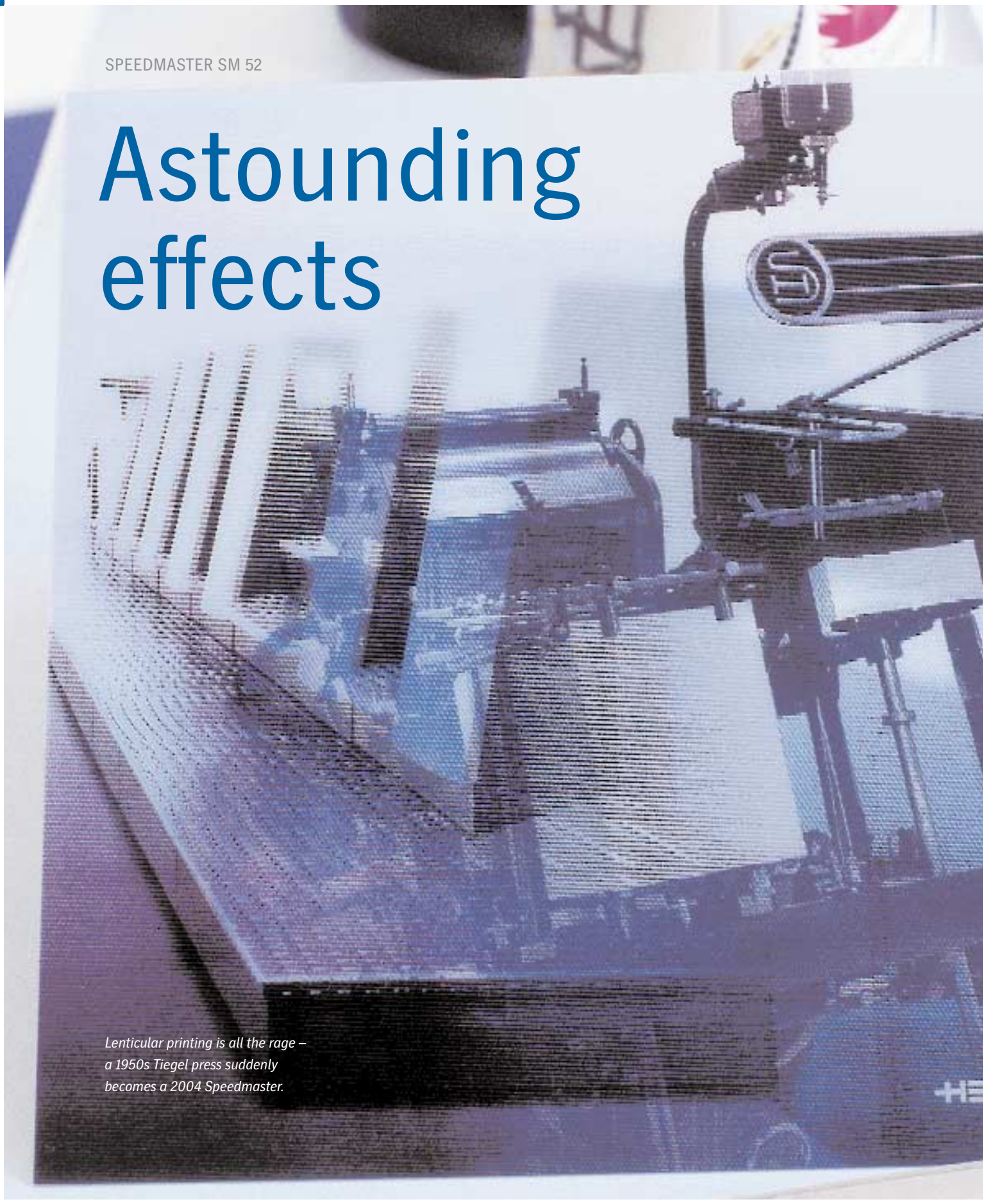
SPEEDMASTER SM 52

Astounding effects



Lenticular printing is all the rage – a 1950s Tiegel press suddenly becomes a 2004 Speedmaster.

Druckerei Klenke from Dissen in Lower Saxony, Germany, is a pioneer in the field of lenticular printing. A five-color Speedmaster SM 52 with coating unit and UV equipment helps the company make products that feature astounding effects.

Within a fraction of a second a Heidelberg Tiegel press is transformed into a Speedmaster CD 74. The two presses are separated by around 50 years of research and development. It's hard to imagine a better visual illustration of cutting-edge technology, quality and tradition for a printing press manufacturer like Heidelberg. The procedure is not rendered in a TV advert or a film, but printed on paper. This has been made possible by lenticular printing technology. Using special production methods and the right lenticular film, such scenes can be conjured up on almost any printing stock. UV equipment also enables direct printing onto the reverse of the film, which not only saves time, but also enhances product quality. Lenticular printing offers the advertising industry a fresh source of innovative ideas, and represents a further creative application for UV-equipped presses.

Thanks to improved production methods, lenticular images, also known as auto animated images or auto stereo images, are being used in a host of new areas. Up to now, only a few printshops have been proficient in this printing technique. One of them is Klenke Druck. It all started in 1977 when Manfred Klenke (62) made the bold move of founding his own screen printshop. Today Klenke Druck has 21 staff and annual sales of around Euro 2.3 million (approx. 2.8 million U.S. Dollars). More than 80 percent of its customers are multi-regional companies and agencies.

"I earned my first money printing furniture facings," says Manfred Klenke proudly, "then we received some initial orders for screen-printed plastic stickers from an offset printshop. Then we just continued to grow into the graphics sector." Three years after founding the company, he was joined by his partner Joachim Hartmann (55), a trained master craftsman in letterpress and offset printing. "We were interested mainly in film printing from the outset, and had screen-printing and film printing with offset presses for printing on plastic," explains Joachim Hartmann.

Top quality thanks to small format. Klenke has specialized in small sheets and has invested in a customized five-color Speedmaster SM 52 with coating unit and UV equipment. A major benefit that was instrumental in Klenke's decision to buy the press is the fact that the plates can be adjusted diagonally, allowing the press to be set for optimum registration. Opaque white is mainly deployed as the fifth color.

Before it enters the press, however, the printing data must be processed in the prepress stage. A "simple" lenticular image is composed of picture one and picture two.

"The smallest inaccuracy between printing units is all it takes to make a lenticular image unusable." Manfred Klenke

Basically, both pictures are divided into strips using a special software. One strip of one picture then comes behind the left side of the lens and the corresponding strip of the second picture is placed on the other side of the same lens. If the finished image is moved from side to side, first picture 1, then picture 2 appears. 3D images have a similar design.

Another factor that prompted the company to focus on printing small formats was the exact registration on the Speedmaster SM 52. "If the images that are divided into strips and then re-assembled slip or move out of register even the tiniest fraction, I am left with an unusable product, since the effects of this are felt across the whole film width," says Manfred Klenke. "The problem is the tolerances. Cylinders operate differently from press to press and from printing unit to printing unit. While these deviations are negligible, and are completely irrelevant in normal printing, they are very important in lenticular printing." In addition, mechanical stress causes the printing stock to heat up and become distorted. These deviations have a knock-on effect. In normal printing these inaccuracies can hardly be noticed by the naked eye. "That's the difference compared with the lenticular method, where a shift in printing of just a few pixels immediately causes a corresponding color shift in the image," explains Mr. Klenke. The smallest inaccuracy between printing units is all it takes to make a lenticular image unusable. If for example magenta is placed even slightly ahead of the other colors, it will be the first color seen when the image changes. "In an image of a human face, magenta would be seen first before the other colors 'caught up'. Therefore extreme precision is necessary. A small format press goes a long way towards satisfying these requirements. Of course it does mean that costings for longer runs do end up higher. The small format makes for cleaner printing, more accurate reproduction and a better end product," states Manfred Klenke.

128 l/cm screen and higher. "Experience" of UV printing is a prerequisite for lenticular printing. A special software has to be used to prepare the data. Printing is significantly slower, since production conditions and minute differences in register have serious effects on the end product and soon lead to high waste. Even experienced printers should consider lenticular printing takes twice as long as normal printing. The ambient and storage environments are also more important than in conventional offset printing, since thermoplastic films exhibit considerable expansion and contraction. "We work with 128 l/cm screens and higher, depending on the job, at 75 Lenses Per Inch," explains Mr. Klenke. "Lenticular and 3D ▸

UV professionals at work – Joachim Hartmann and Manfred Klenke (from left to right).

Lenticular – here's how it works

The lenticular technique involves placing identical lens strips tightly side by side on a special film. Images that have been divided into strips on a PC and re-assembled (interlaced) using special software are then placed behind this film with between two and 25 image sections/strips under each lens strip depending on the desired effect. Different films and plates with an appropriate number of lenses per centimeter can also be used to create special effects. The size and type of lenses used depends on what effect is intended, but the price often dictates compromises.

In a standard image, 3.15 lenses per millimeter of image are used at 80 lpi (31 lcm). A lens strip, which must contain all the phases required for the desired effect, is only about 0.32 mm (0.01 in) wide. Lenticular printing can be used to bring even the most unusual design ideas to life. These include:

■ Morphing (transformation effects)
Transforming one picture (A) into another picture (B). Up to twelve phases are possible. No depth effect can be achieved, the transformation effect is in the foreground.
■ 3D effects
This basically involves our two eyes looking at the same object from different angles. Five to ten source pictures from shifted perspectives or from three to four layers (foreground, picture layer, background) are used.
■ Zoom effects
Based on the same principle as morphing. The difference is that the object represented does not appear transformed, but closer or further away depending on the angle from which it is looked at.
■ 2/3 flip (animation or stereo effects)
Changing the angle at which the object is looked at changes its content – the ugly frog becomes a handsome prince.
■ Animation/motion (movement effects)
A small event occurs on the object. A change in perspective creates the impression that movements are being made – a car's folding roof opens and closes.

Many of the effects described can be combined with one another, depending on the originals available, the size of the pictures used and the lenses deployed.

images contain large amounts of information. This must be broken down carefully and precisely and converted into screen rulings. The more information, the higher resolution required."

The limits of what's technically possible. "The file sizes generated by systems in lenticular technology are vast," confirms Harald Lutsch, Managing Director of 3D-Images from Eppingen, Germany. "Particularly when producing three-dimensional or animation effects, when up to twelve or more single pictures have to be processed into a single data record and printed behind each lenticular lens." The company is a full service provider in the lenticular technology sector. Harald Lutsch believes that screen resolutions with up to 200 to 240 lines per cm (508 to 609.6 lines per inch) are necessary to produce spectacular effects such as video animations with more than 18 single images. "Only this type of fine screen allows the individual image phases to be printed as distinct patterns of lines behind every cylindrical lens," he reports. "A special screen angle that fits the motif and lens alignment is also crucial, in order to prevent moiré." The dot shape and minimum dot size of 20µm and smaller are further aspects. Not every filmsetter, platesetter, or printing stock can cope with these requirements. Lutsch is convinced that "the requirements necessary for lenticular printing nudge the very limits of what's technically possible. But this is the only way of ensuring high quality lenticular production." ■

Further information on the company is available from: www.klenke-druck.de