DYE SUBLIMATION TRANSFER PRINT FOR THE FASHION AND TEXTILE INDUSTRY

Roger Leber outlines the opportunities for new small production runs

For the dying or printing of polyester or polyester mix fabrics, the textile industry has long been using sublimation printing. Recently digital ink-jet printing has opened completely new possibilities as well as competitive advantages. How does sublimation transfer work, which special features does it offer and how does Sihl set standards in this sector with its Sublicolor product series, with the current ten specialised papers?

Sublimation printing is an indirect printing process. Using sublimation ink-jet inks the image is printed on a special transfer paper and, with heat, the image is transferred to the fabric. The term sublimation describes the direct transition from a solid to a gaseous state – this happens without the usual in-between liquid state. When heat is used for this process, one refers to thermo-sublimation. This is a process that has been used for a long time in the textile industry. The actual process starts with the printing of a preferably cheap, special paper. Until recently this was done using traditional gravure printing – simple transfer papers printed with standard printing patterns and graphical elements.

Due to the significant set up costs, this was only worth implementing with large production runs. Therefore this technique was mostly found in the mass production of products, for example the manufacturing of decorative fabrics. At the beginning of the nineties wide-format digital systems, using dye sublimation colours, were being used to produce sample prints and small production runs. Initially this was implemented with the help of electrostatic process, with a change to the newer ink-jet technique later. However, due to the long printing times, this process was only used for sample prints and short runs. This has fundamentally changed in recent years because modern ink-jet printers are much quicker and have become more efficient, offering a very interesting, high quality alternative to gravure printing.

The wide product collection of special transfer papers in the Sihl Sublicolor series – optimised for dye sublimation to various fabrics and hard substrates – accelerates the market penetration of this modern technology.

THE VALUE OF THE TRANSFER MEDIA DETERMINES THE QUALITY

Patterns, decorations and graphical elements are mirror-printed on to the transfer media, such as paper. For this purpose, base papers and similar papers with different coatings ranging from 70 to 140gsm are typically used.

The final print quality of the image on the fabric depends mostly on the coating and features of the specialised papers, whereby the thicker papers generally absorb more colour. Important for smooth printing production is the excellent flatness and reduced wet cockling of the printing media. The optimal flatness is achieved on the one hand through a barrier in the Sihl papers, which hinders wet cockling – the ink penetration of the base paper is inhibited. While, on the other hand, the back coating guarantees the superb flatness. This generally counteracts the tendency the paper has to curl at the edges, therefore avoiding the chance of the print-heads touching the paper. Another important factor is the high optical density of the printed image.

Originally one would use cheap CAD papers which, although they are print compatible, tend to retain a lot of the ink on the transfer paper during the sublimation process. This led to only a small amount of colour on the fabric, leading to faint, hazy looking prints. Similarly, standard transfer papers absorb a large amount of the ink during the sublimation process in the hot calender – the transfer press equipment with temperatures around 170 to 200 degrees C.
– which also leads to dull, blurred print results.

Today, these simple, matt papers have been made redundant due to the high requirements of customers and the increasing competition. The innovative Sihl papers, from the Diatec Group, have been optimised in exactly this area and offer outstanding print quality with excellent contour definition and a wide colour gamut. Thanks to the pigmented porous coating on a special, low porosity base paper, they are particularly efficient. In addition to this, these papers are compatible with all standard printing systems and allow short printing times.

**WIDE PRODUCT PORTFOLIO FOR VARIOUS APPLICATIONS**

With these innovative Sihl Subicolor papers, the customer has the pick of different printing products for various requirements. Currently the media collection includes ten papers with differentiating individual product features. These are divided into five product categories of Premium, Universal, Sports, Superdry and Envogue. They are characterised by their versatile, individual possibilities for fast and demanding production and delivery of printed fabrics with manageable costs.

Thanks to the special coating, optimised to meet the needs of sublimation printing and the outstanding processing properties, all the Sihl Subicolor products provide a good solution for standard dye sublimation printers and inks. Thus, increasing, not only the productivity but, at the same time, the print quality during the printing process is significantly increased. The user not only profits from the benefits of the Sihl Subicolor but they also gain the competitive advantage on an expanding market. Sihl, as a solution partner for the dye sublimation transfer printing segment, has years of extensive experience, expertise and competence and, thanks to a strong network with great customer proximity, can offer fast and efficient delivery.

**OUTSTANDING PERFORMANCE**

The Sihl Subicolor product family represents the perfect solution for the implementation of ideas and applications in industrial, fashion and sports sectors. Easy handling, high transfer rates and quick processing contribute to the performance of these specialised products. The high optical density coupled with the razor-sharp detailed reproduction of lines and graphical elements allow for excellent print results, as well as high colour intensity and brilliance. The smooth, reliable production is ensured by the excellent flatness of the paper. These properties lead to users seeing an enormous increase in performance with dye sublimation printing.

**PRINT MEDIA FOR DIVERSE INDIVIDUAL SOLUTIONS**

Depending on print media the Sihl Subicolor series offers various solutions for dye sublimation to polyester or polyester-mix fabrics. The Premium group, or the so-called entry-level, includes sublimation papers for transfer printing in standard conditions. Examples for the transfer to polyester materials include flags, banners, cups, promotional items and related products. These papers can be printed using standard aqueous based sublimation inks (Sihl SubiColor Premium Paper 65 matt, 85 matt and 105 matt papers). The all-rounder papers with excellent drying times and extremely high colour transfer rates can be found in the group Universal with Sihl Subicolor Universal Paper 70 matt and 90 matt. The structure of these papers allows more ink to be transferred to the fabric, thus making better ink utilisation possible, reducing costs. The papers are characterised by their easy handling and excellent performance and are particularly suited to applications such as interior design, advertising aids, soft signage, and for hard substrates. The reduced wet cockling ensures excellent flatness.

The Sports sublimation papers are specifically for the printing of elastic fabrics (stretch) found in sportswear. They offer a specially developed heat-activated adhesive. The image sticks accurately and securely to the fabric during the transfer process reducing the chance of undesired effects like ghosting or blurred lines. In a flat-bed press it is often the case that the transfer media can slip upon opening the unit and, because the paper is still hot, the sublimation of the ink is still in process which leads to the smudging or ghosting of the image. And as the transfer paper is attached to the fabric, stabilising it, shrinkage is kept to a low.

With the Sihl Subicolor Sports Paper 70 matt and 90 matt papers the waste rates are reduced to an absolute minimum. For the current high speed industrial printers from Reggiani, MS-Italy, Durst or Mimaki, which print using Kyocera or Ricoh print-heads with inks that contain high glycol percentages, Sihl offers the latest generation of Superdry papers for dye sublimation. The coating has to be able to immobilise the glycol found in the ink to avoid smudging and offset of the colour pigments – namely the transfer of the inks to the reverse of the paper – because the glycol is hydroscopic and has a high boiling point. The Superdry coating ensures an optimal fixation of the ink.

The Sihl Subicolor SuperDry Paper 75 matt and 95 matt are distinguished with their very quick ink absorption and fixation, as well as their excellent contour definition, reduced wet cockling and excellent flatness. Still in the development stage is the ultra-light Sublicolor Envogue Paper light 39 matt, particularly suited to use in industrial high-speed printers. Despite its low weight it is quick drying and immobilises the ink after printing, which is imperative during high speed printing and roll to roll processing to prevent the deposition of ink onto the reverse of the fabric. The coating guarantees an excellent run through the printers and later during transfer. Despite its light-weight the base paper is high strength with a high stiffness. The ink transfer is also very fast with this paper.

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