HOW DYE-SUBLIMATION TECHNOLOGY WORKS FOR FABRIC AND APPAREL APPLICATIONS

Gone are the days when dye sublimation was considered a complicated method of printing onto fabrics. Today’s Epson printing technology simplifies the process, bringing with it the ability to produce high quality results on a vast range of durable polyester weights and mixes.

What is dye sublimation?

Very simply, dye sublimation is the process of using heat and pressure to fuse dye particles into a surface to ensure a long-lasting printed image. The image is printed onto transfer paper which is then applied to the surface. Using heat, the dye ink is turned into a gas and bonds to the polyester or polyester-coated textile or hard surface and, as it cools, it changes back into a solid.

All you need is:

- A computer to generate the image
- RIP software
- An Epson SureColor SC-F7100 or SC-F6000 inkjet printer
- Epson UltraChrome DS inks
- Sublimation transfer paper
- A flat-bed or rotary heat press (depends on the surface being sublimated)
- A polyester or polyester-coated textile or substrate

Before you print

Images are created using a proprietary program, before the design is sent to the printer’s RIP to optimise the raster and vector formats and manage the colour for accurate results. In addition, the RIP can handle other useful functions for optimising fabric use and coverage and minimising waste.

Epson’s SureColor SC-F7100 is available with ErgoSoft’s Professional Sublimation Edition RIP – designed specifically for Epson – in EMEAR. This RIP incorporates all the features necessary for the faultless production of textile applications. It makes it easy for users to create high-quality apparel, sign and display applications, as it has more than 200 ICC profiles for colour accuracy on different types of materials. Offering step-and-repeat, nesting, tiling, scaling and shrinkage correction capabilities, this RIP also helps optimise ink use, with a costing and estimation feature that calculates ink, material and printer costs per job. While the SC-F6000 itself doesn’t come with a RIP, it is compatible with packages from the main developers, such as those from Caldera, ErgoSoft or Wasatch.

Print with confidence

The SureColor SC-F printer outputs the file to be printed as a mirror-image onto the sublimation transfer media, a specially coated, heat-resistant paper. A good quality coated paper is optimised to hold the image printed onto it and ensures a high amount of dye transfers onto the substrate during the sublimation process. Note that it’s not easy to tell the final colours when the print is on the transfer paper; the image will only achieve its final colour once it has been bonded to the substrate using the heat press.

Because Epson’s Variable Size Droplet Technology (VSDT) adjusts the amount of ink fired from the printhead to a very fine tolerance level, it can generate droplets as small as 5.3 picolitres. In conjunction with the Micro Piezo TFP printhead, it can produce prints at up to 720 x 1440dpi, delivering high-quality images that feature rich gradations with no visible grain.

All aspects tailor-made to work together

The quality of the final sublimated print is totally reliant on the output device’s capabilities, and this is where Epson scores highly with its SureColor SC-F7100 and SC-F6000 printers. Unlike most engines, particularly in this sector, every element in the system, from printhead to ink, has been designed and manufactured by the same company. This ensures absolute compatibility, with no compromise on any part of the machine’s chassis, technology or accessories, leading to consistent and reliable operation from start to finish.
Epson has developed its UltraChrome DS ink specifically for use with these printers. The CMYK ink set produces vibrant colours, sharp contours and smooth gradations to deliver the best quality images on a range of materials. Important for use on signage and clothing, these inks are also durable with excellent light- and wash-fastness. Resistance to a significant amount of abrasion, as well as alkaline and acid perspiration means signage and apparel maintain their impact without fading.

The technology incorporated in Epson’s two new dye sublimation printers includes the company’s latest Micro Piezo printheads and inks, taking away the traditional hit-and-miss element of printing onto textiles. Part of this success is down to Epson’s UltraChrome DS aqueous-based inks, which generate the vibrant colours that are essential for solid prints and graduated tints. They are complemented by Epson’s precision TFP (thin-film piezo) inkjet printhead, which provides high production speeds and superb-quality output.

The heat transfer process

The sublimation process takes place at a high temperature – typically between 180 and 210 degrees Celsius. And this, combined with pressure from the heat press, changes the dye on the carrier paper into a gas. At this point, it impregnates the polyester-based fabric, bonding permanently with the surface before changing back into a solid ink. Because the inks penetrate the actual fibres, results are very durable and hard-wearing and, the higher the polyester content, the greater the degree of permanence.

Making dye sublimation simple

For the print company wanting to reap the benefits of printing to textiles for the soft sign, display, décor and garment markets, dye sublimation is the best technological and practical route to market. Epson’s SureColor SC-F6000 and SC-F7100 printers simplify the dye sublimation process, making them a valuable addition to the services offered by sign-makers and display producers.

The heat press is an integral part of the dye sublimation process, and models are available that can be operated manually, semi-automatically or automatically, featuring digital controls for heat, timing and pressure levels. Typically, these units have a platen, swing-away or clamshell design. For larger pieces of material and rolls, a calender uses pressure rollers and heat to transfer graphics onto the final textile.

The end-to-end setup is key

The quality of the end sublimation is dependent on several factors, starting with the print device used and the technological advances it contains. The use of small, variable droplets by the Epson TFP printhead creates the fine quality skin tones and gradients as well as strong solid colours. These are fired through the nozzles to produce highly accurate ink coverage on the carrier paper, guaranteeing precision results when transferred onto the final fabric.

For more information visit www.epson.co.uk/dye-sub

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