

Three-Layer White Ink

White ink technology is a new capability available today in many UV printers. The implementations of white ink, however, vary greatly from one vendor to the next, resulting in very different capabilities and applications available. This brief explains some of the basics of this technology and the unique white ink implementation on EFI-VUTEK printers.

Many printers today include white ink as an additional color enabling a new range of applications. When buying a printer with white ink, it is important to understand the capabilities and limitations of the implementation. Many printers enable white ink as a pre- or post- color only. This means that white ink can only be laid down in pre-flood and spot or post- flood and spot modes and are limited to two layers in a single pass. So the resulting range of applications can be limited in these cases.

VUTEK printers' ink architecture is unique and enables the user to print up to 3 independent image layers including white ink - in a single pass. This approach, delivered through a combination of hardware and software, results in perfect 3-layer registration in one pass. This capability is critical in enabling creative applications and precision not available with other white ink implementations.

It is possible to use white ink in a variety of useful and creative ways—it can be printed as a solid area or applied as a tint or gradation. While some intended uses require no prepress intervention, some preparation is necessary for spot and shape white applications. The prepress procedures are not complicated, but they do need to be done in a specific way to ensure success at the printer.

“White over” as a post-coat when printing on clear material is ideal for backlit printing. The white ink acts as a diffuser, spreading the light evenly for brighter, more evenly illuminated back-lit displays.

Shape white printing as a pre- or post-coat gives colors extra pop while allowing metallic or mirrored substrates to show through for striking results. Shape white on a top, bottom or middle layer is a truly unique capability of VUTEK printers. Shape white enables the ability to utilize a greatly extended range of creative materials and substrates.



In Spot White mode, white ink prints as a 7th color. In this example, the dress detail is printed in white ink on the metallic substrate.

White areas in the file (0% CMYK) allow the metallic substrate to show through.



An all-white ink only print shows the detail capability of the white ink jets.

Spot white prints in line with CMYK and acts as a diffusion layer behind the middle layer of a 3 layer image which enables true "tuning" (as illustrated in the Red Girl / MaxColor 3-layer example on the next page). Alternatively, a "white under" shape layer behind CMYK gives an image "pop" in specific areas. The contrast on both black and white and full color images becomes much more dramatic and full bodied resulting in a High Definition Print and superior detail that is not available with other printers.

“White under” can be used as a pre-coat on colored substrate. White undercoats allow use of a broader range of colored and creative substrates.



This example uses white ink in the middle layer as a mask, as well as a diffuser. The snowflake shapes are cut away, allowing more light to come through. The final result is an enhanced "glow" around the snowflakes.



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With VUTEK, creating a complex 3 layer High Definition print that stands out is straightforward. First, an image is printed on clear substrate. Next, a second CMYK file with a spot white channel adds to the black's richness while the color bump adds impact. Then, a third CMYK file with a spot white channel adds another layer of density while the white ink diffuses the color bump areas.



First image against the clear substrate is the original file.

Second image is a CMYK file with a spot white channel. This file backs the first image with white ink, adds a hit of rich black and "double strikes" the color areas for more impact.

Third image is a CMYK file with a spot white channel. This file completes the day/night print with the last layer of 6-color and white ink.

The resulting 3-layer enhanced day / night backlit has a much greater visual impact, compared to standard backlit.



Standard backlit

3-layer Enhanced Day/Night Backlit

3 layers of rich, opaque black
2 layers of color enhance lips, nails and lipcolor
White ink acts as a diffuser

Printers that are not capable of true 3-layer inline simply cannot produce the perfect registration delivered with a single pass through the printer. Alternative work-arounds for printers that do not support "native" three-layer capabilities include running the media through the machine a second or third time to enable a three-layer lay-down. These approaches lead to alignment and registration issues not acceptable on high quality output and also increase production time impacting productivity.



A 3-layer print on neon green substrate. White ink is used under the CMYK as a base and white ink shapes add creative detail.

VUTEK's unique white ink technology is enabled through a combination of hardware design and software that provide for highly specialized – and profitable – work. Day/night backlit displays become easy because the three layers print in perfect in-line registration with no pre-press required. Images are brought to life, with multi-dimensional, highly visual impact with the creative use of spot white and spot color to "bump" specific parts of an image. Backlit day/night prints surpass customer expectations when images are selectively enhanced by utilizing white ink on one or more layers, creating opaque blacks, bright color bumps, or both.



This example shows the 3 files used in the final MaxColor 3-layer print. The simple pre-press technique incorporates 3 layers of color for maximum visual impact. White ink also acts as a diffuser; the pastel appearance of the last layer is a result of CMYK and 100% white ink printing simultaneously.

Three-layer white ink technology from EFI is available on VUTEK QS and GS series superwide, UV digital inkjet printers. It allows the user to print up to 3 layers of data simultaneously. By including white ink as standard in-line channel, these VUTEK printers have the unique capability to print three independent image layers of data, in perfect registration, in one pass, enabling overprint, underprint, spot, underspot, fill and overspot with amazing results. Be sure to understand the true capability of a printer with white ink *before* making a critical purchase.