Super Light Fast Sublimation Inks:

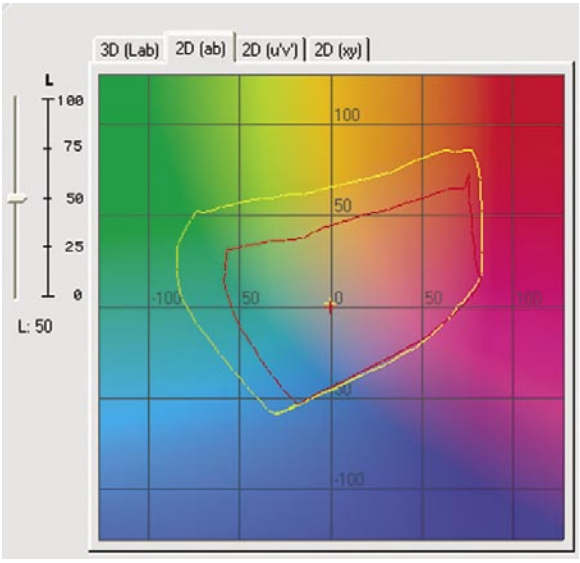
Do They Really Provide Better UV Resistance?

Right up front…..I admit it….I'm a light fastness / UV durability fanatic. I always notice faded highway signs, faded labels at the drive-thru window, and the art prints at our local Denny's that have turned blue. I'm haunted by memories of inkjet photos and sublimated tiles made in the '90s that faded in less than a year indoors with just a little sunlight coming through the window.

Our company, JBL Graphics, strives to make full-color sublimated photo and art reproductions that will last for generations indoors. In addition, we would like to provide sublimated signs and banners for limited outdoor use. We have spent years testing both sublimation inks and coated substrates, in a quest to find the most durable combinations.

During the last five weeks we tested four colors (CMYK) of a new sublimation ink from Westar Systems in Colorado Springs. The ink is called SLF (Super Light Fast) and is available in 1 kilo bottles as well as Epson, Mimaki, Mutoh and Roland cartridges. Due to licensing limitations, it is currently available for wide-format printers only.

We obtained summary light fastness reports from the manufacturer for fabric durability. In addition, we ran our own Xenon exposure lab testing for hard substrate durability. We ran the same test procedure that we have used for the last five years on hundreds of samples. This allowed us to make a direct comparison with other well-known desktop and wide-format inks. We also evaluated the color gamut and balance of the ink set.



COLOR GAMUT: *The SLF inks (yellow plot) possess a wider, more balanced color gamut than a well-known desktop ink (red plot) that was tested.*

EXPOSED SAMPLE: *This chart displays before and after color measurements. The left half of each square shows the color before UV exposure. The right half portrays the color after exposure. No visual changes in the !00% CMYK squares are apparent. The 50% CMYK squares exhibit a small amount of Cyan and Magenta fade. Overall performance was excellent.*

Manufacturer's Fabric Light Fastness Results

The manufacturer claims an impressive L7 rating for the inks transferred to polyester fabrics. They also claim even, gradual fading of all four colors. This is very important, as the overall color gamut will remain constant over a long period. The blue wool scale ranges from L2 (lowest) to L9 (highest). A L7 rating is equivalent to 160 AATCC fading units. Without getting too technical, here are some minimum fading unit industry standards:

Quality women and children's outerwear 40 AFU
Men's wear 40 AFU
Interior Upholstery Fabrics 40 AFU
Drapery Fabrics 60-80 AFU
Outdoor Furniture/ Hotel Awnings/ Flags can be as high as 500 AFUs.

Always remember other factors (humidity, ozone, pollutants, high temps) will also affect outdoor durability. Also note that the 160 rating is based on full (100%) coverage. A lighter coating of ink will result in somewhat lower ratings.

The rating of 160 AFU for the SLF ink is consistent for all 4 (cyan, magenta, yellow, black) colors. This is very impressive as other sublimation magenta and cyan inks fall into the 40-80 AFU range.

JBL Ceramic Tile Testing

We were most interested in the ink's UV durability on ceramic tile. We chose Bison Coating's Matte Hard Coat tile as it has performed consistently well in our previous ink tile tests. We transferred a test pattern of CMYK squares and 50% coverage CMYK squares to the tile.

The tile was exposed in a Xenon source weathering chamber for an equivalent of 5 months constant Miami sun. This is a very strenuous test for printed materials. We were most interested in specific changes in each color, rather than a less specific fade rating.

To determine color changes after Xenon irradiance we employed Delta E and Delta E (CIE94) measurements for each of the 8 colors. The Delta E(94) standard more accurately measures how are human eye sees color.

The testing results were excellent. The SLF inks performed better on the matte tile than any other ink we had previously tested. The average Delta E(94) was 3.74 and the Delta E was 7.43. For comparison purposes a Delta E of up to 4 is considered a color match in the printing industry.

Visually, no one could discern any color changes on the four exposed 100% coverage CMYK squares. A small amount of Cyan and Magenta was observed on the four 50% coverage squares. The Delta E (94) measurements for CMYK were 4.25, 4.05, 0.98 and 2.22, not quite as linear as the manufacturer's fabric testing, but still very, very good.

Color Gamut

The color gamut of the ink is very good. We graphed the lab colors of the ink and compared them with well-known desktop ink. The SLF inks demonstrated a wider and better balanced gamut within the RGB (1998) color space.

Conclusions

The answer is yes. The inks do appear to perform better than others. They should be ideal for indoor tile murals and art panels, and architectural elements. In addition, the inks are worth considering for outdoor banner use. Outdoor life on hard substrates could be greatly expanded using a UV inhibitor/blocker overcoat. We will be performing further testing on other substrates as well as tests with a UV overcoat.

INDOOR LIFE: *The SLF should extend the indoor life of heirloom photos printed on Unisub panels and tiles.*

For more information, contact Westar Systems at 719-339-4151 or www.westarsystems.com

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