SPECTRAFLOW
COLOR WORKFLOW SOLUTIONS

Kohl's Department Stores and Spectraflow

Summary

The designers at Kohl's Department Stores spend a lot of their time on color matching – making the prints on an inkjet printer match the color on a fabric standard. In addition, Kohl's spend in excess of $1 million per year on purchasing these fabric standards. Spectraflow was brought in to specify and implement an improved inkjet printing workflow that enabled 20 printers to closely match 5000 color fabric standards.

Key Results
  • 97% reduction in time spent color matching, a savings of 7000 designer-hours annually
  • $500,000 savings in purchase of fabric swatches annually

Background

Kohl's Department Stores spends a lot of time and money on color matching.
Each season designers match a seasonal palette of 50 to 100 colors on an Epson printer using a labor-intensive process that involves rounds of printing, visual color evaluation, changes and reprint-ing. With 16 different brands such as Jennifer Lopez and Croft & Barrow and 4-5 seasons per year, this adds up to many designer hours spent on color matching annually.

In addition, Kohl's has a color library of approximately 5000 colors sourced from multiple service providers. In order to present accurate color during the product development process, Kohl's purchases fabric standards from these providers at an annual expense of over $1,000,000.

Challenges

Both of these substantial costs – designer hours spent color matching and purchased fabric swatches –result from inaccurate color on their internal printers. Kohl's brought in Spectraflow to address this problem.

Spectraflow was presented two fundamental challenges. First, take 20 printers - of multiple model types, driven by multiple RIPs, and located in three different cities – and make them all behave the same. And keep them this way over time. Second, make these printers match 5000 spectrally-defined color standards to within 1.5 ΔE (CMC) under store lighting.

A further challenge was presented by Kohl's two leading design applications, NedGraphics and Adobe CreativeSuite, which produced different color when fed the same RGB values. As a result, they needed to maintain two palettes of colors for each season, effectively doubling their color matching workload.

Approach

Consistency
The key tool for addressing consistency-related issue was the RIP, the software that drives the printers, along with a fast spectrophotometer. The RIP Kohl's had in place lacked sophisticated calibration capabilities and was also slow, serving as a bottleneck in the print workflow. Spectraflow therefore introduced EFI's Fiery XF, which is fast, user-friendly and has a sophisticated re-calibration tool that enables multiple printers to closely match one another. The recalibration tool also allows an operator to bring a printer back in line if it drifts over time. Spectraflow has developed a specific methodology that allows for unusually close correlation between printers. It requires many measurements for calibration, profiling and optimization, but with an automated spectrophotometer like the Isis from X-Rite (300+ measurements per minute) the work involved was not unreasonable. It required about one week of work to get the 20 printers profiled and calibrated with Fiery XF and the new workflow rolled out.

Accuracy

Getting the printers to accurately reproduce the 5000 colors in the Kohl's color library was another matter. It turns out some of the designers were working in CMYK color space, which restricts the range of colors that can be printed. So the first step was to move all designers to AdobeRGB, a large color space that incorporates all colors achievable on the printers.

Secondly, for automated color matching we employed the ColorInsight software from ArchColor. ColorInsight has the ability to take a spectrally-defined color and convert it to RGB for a particular printer under a specific viewing environment. In conjunction with an automated spectrophotometer it can then evaluate the accuracy of the printed match and suggest new RGB values as needed. Typically, three iterations with ColorInsight's Optimizer tool is sufficient for all in gamut color to match within 1.0 Δe CMC. At Kohl's, the process to match all 5000 color required a full day. To match a seasonal palette of 100-200 colors requires 1-2 hours. ColorInsight has the additional benefit of flagging out-of-gamut colors, saving designers lots of frustration trying to match colors that simply won't get there.

Results

As the image below shows, the desired results were well achieved. The prints from the Epson printers are now closely matching the fabric swatches.
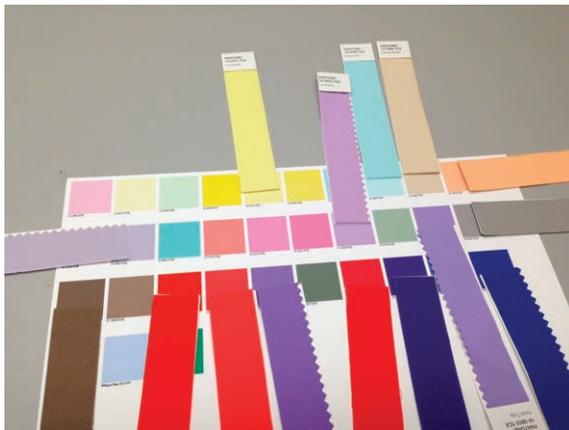
Fabric Swatch Standards vs Epson Print

In addition, we were able to get the printers matching one another closely. After doing the calibration work with the Fiery XF RIP, the average Δe between printers dropped from 2.0 to 0.7. The image below shows prints from two different printers side by side.

As a result of this work, the process of building a seasonal palette dropped from one week to one hour. Kohl's is saving approximately 7000 designer-hours per year. Furthermore, thanks to the printers' accuracy, Kohl's has been able to reduce the number of fabric swatches purchased from color standards providers by about 50% - a $500,000 savings.

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Further Work

Kohl's is tightening the tolerances on the color prints even further, with the goal of eliminating the purchase of all color swatches. This would require using better quality paper on the chosen printer, a paper that makes the printed chips less sensitive to changes in viewing environment. The chosen printer would also require a built-in spectrophotometer to allow daily automated quality control. The potential savings – an additional $500,000 per year.

Prints from two different printers