

TECHGUIDE SERIES:

Demystification of In-Line Automated Color Monitoring and Control for Digital Presses – Part 3

Part 3: Value Proposition for the Print Service Provider from Automated In-Line Color Control

by Hapet Berberian

The business environment for print service providers requires an on going awareness of the need for quality, productivity, and customer service to remain competitive.

Automation is an important part of this process since it can increase throughput and free press operators from subjective print quality decisions in order that they are able to concentrate on workflow optimization. With the main objective of printing an increased number of high quality jobs and pages per shift, a key element to a successful business operation is a hands-free, fully automated color characterization and calibration system to ensure color stability and replicate offset color quality with a digital press. More specifically, a viable solution path is the implementation of an automated, in-line, closed loop, color measurement and correction system.

An in-line high-speed spectrophotometer, along with a companion software application for quality assurance and print color performance monitoring, will provide the following technical advantages and value drivers for print service providers. These characteristics translate directly into improved quality, increased throughput, and exemplary customer service.

- excellent color reproduction quality throughout an entire print run by means of on-the-fly automated measurement and feedback to correct drift in color densities and variations in colorants and paper stock
- consistent color reproduction for multiple independent runs of the same printed product from week to week or year to year
- consistent color reproduction quality from job to job, operator to operator, and press to press
- automated on-the-fly color correction without press interruption
- on press generation of ICC color profiles
- minimization of time and material waste to calibrate press during make ready period
- measurement and reporting of uniformity of colorant densities across the width of the printer
- spot color and process color monitoring in the work
- generation of a print run color quality verification report for the print buyer from the print service provider

Color Quality and Productivity

At the beginning of a print production run, the closed loop system will measure color bar values and command modified values to meet prescribed densities. This will provide for a shortened make-ready period for color calibration with minimum paper and ink waste. All of this will take place on press without stopping the press to pull a single sheet.

During the print run as colorant densities tend to drift, the closed loop system will send correction data from the on-board computer to the printer to maintain prescribed error tolerances without stopping or in any way interrupting the press operation. If there are significant changes to color reproduction due to colorant or media changes, a spectrophotometer which has horizontal motion control across the width of the press and an on board processor will be able to measure a rectangular array of color patches (profile target) and generate a full ICC compatible device color profile on press. These are the capabilities that will ensure consistent color reproduction independent of job, operator, and press.

Horizontal motion control will make it possible to measure and ensure the uniformity of color densities across the width of the printer. This is especially important in identifying print head non-uniformities.

An additional significant benefit of horizontal motion control of the spectrophotometer is that the operator can periodically measure, monitor, and, if necessary, correct spot colors and special process colors (logos, etc.) in the work. It would be compatible with on-press inspection system cameras to allow a press operator to place a cursor on critical color locations to be monitored in the work within the camera field of view. This would identify the exact locations where the spectrophotometer would make measurements and report and enable required corrections.

Customer Service

A critical component of this automated system is the quality control software application that monitors, displays, and records production run color data for the operator, quality control personnel, the pressroom manager, and the print buyer. A report can be provided either as a stand-alone document to show customers the quality history of their jobs or via the Internet or company intranet. At a minimum this software should be capable of providing

- **Single Sheet Snap Shot** – up-to-the-minute reporting of print job performance – either via the Internet or company Intranet. Report includes delta E, density and dot gain derivation from the tolerance values
- **Statistical Reporting** – detailed reports for a single press run, or multiple press runs of a job
- **Trending** – an analytic tool allowing users to run in-depth trend analysis of specific colors in print jobs that are printed on multiple presses, across different facilities and that are printed on a recurring basis

- **Exporting** – reports printed or exported to PDF or Excel CSV format

Each of these characteristics of improved color quality, increased throughput, and excellent customer service will serve to drive repeat business for the print service provider.