



Controlling Color Incrementally Developing a Quality Control Process

By Bob Byrnes and Barbara McGowan

"STEPPING STONES" OF COLOR PROCESS CONTROL

- Focus where color control has the greatest impact
- Approach color process control as a team
- First identify how customers communicate their color requirements
- Understand the challenges of the color of paper

As brand awareness increases profits, consumer brand companies are becoming more and more color conscious. Coca Cola has become a leader in this field by creating very stringent color requirements for its package printing suppliers. At the 2011 Color Management Conference in Phoenix, AZ, Axel Kling, senior packaging graphics quality manager of The Coca-Cola Co., addressed the importance of color consistency for all consumer product companies. He also discussed how Coca-Cola communicates its brand message company-wide as well as the crucial

role color management plays in ensuring the company's long-term, sustainable growth and market share.

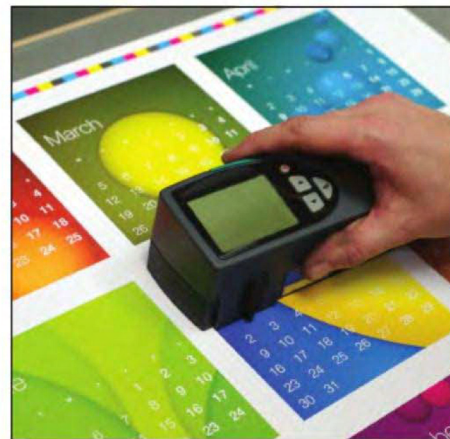
As brand owners raise the color bar, how do packaging printers respond? Is it possible to create a comprehensive color control process across one—let alone multiple—print sites overnight? Or is it more likely to succeed by controlling color quality incrementally. Here is one strategy for breaking down the color quality control process in four color-manageable "stepping stones".

COLOR'S IMPACT

Where can a company start a color control process and how can it find the biggest paybacks? Typically the further downstream a color control issue develops, the more expensive it is to fix in terms of press downtime, wasted ink and paper and failed customer expectation.

Consider this typical scenario: During a pressrun, mid-tones are unattainable (50 percent). The first option is to make multiple density adjustments, change inks, fountain solution, make blanket adjustments (over/underpacking), and slow the press speed. Even after one has burned through hundreds, maybe even thousands, of sheets with no solution in sight. Nothing seems to work. What is causing this problem? Excessive non-mechanical dot gain caused by printing plates that are not linear or that were not processed with the right correction curve.

This requires the press to stop, application of corrections, processing new plates, mounting them on the press and start print production from the beginning. This translates to substantial costs in lost production time, wasted paper and ink and negatively impacts customer expectations on the promised delivery. How could this have been avoided upstream? By using a printing plate measurement device to determine if the plates were processed with the correct values



Spectrophotometers measure the color being printed and compare it against customer-approved color specifications and tolerances. Photos: Techkon USA.

Rely on us.™

rotec® nyloflex® nyloprint® nylosolv®

Automation & Standardization

Benefit from automation and

- Increase your productivity
- Minimize process tolerances
- Improve plate and print quality
- Enhance workflow efficiency and consistency



Highest automation in flexo for
standardized flexo form processing

nyloflex® Automated Plate Processor

- Fully automated processing line for flexo plates, including washer with digital layer separation, dryer and light finisher for excellent results with nyloflex® printing plates

nyloflex® In-The-Round Technology

- For the perfect In-The-Round processing: nyloflex® ITR Equipment – ideal in combination with nyloflex® ITR Thin & Classic Photopolymer Sleeves and rotec® H/C Adapters

Also interested in packaging inks?

Benefit from our broad product portfolio – worldwide.

Flint Group
Flexographic Products
T +1 704 504 2626
info.flexo@flintgrp.com

FlintGroup
Flexographic Products

before putting them on press—making sure that the 50 percent dot area is not really 75 percent.

This is just one example of catching a problem early and upstream in the process by the simple expediency of utilizing a plate reader (often called a digital microscope) as a reality check before going to press.

A TEAM EFFORT

Often, questions such as, "Are inks the right colors?," or "Are substrates up to spec?," are asked with no specific answer. When tackling color process control for an entire plant (let alone a multi-site printing operation) begin

thinking in terms of the benefits to be reaped by controlling color "locally," one area at a time. Taking a tiered implementation approach, starting with the most problematic areas, is not only more practical but more realistic.

The following are some practical suggestions to help get the ball rolling:

- Assign an individual who is responsible for identifying areas that have the greatest need for a quality color control process, and can work with various departments within the plant to objectively isolate color control issues. If not viable, engage a consultant (budget permitting)

- Ask the question, "Where do most of our troublesome color control issues come from, and how do they manifest themselves?" Effectively trace the path of a "bounced" job to determine where the color problem originated
- If problems originate in ink formulation, focus your efforts on implementing a process that determines whether the ink you or your vendors are formulating is within customer specification
- If problems center on substrate, determine acceptable tolerances preferably using a *FIRST* (Flexographic Image Reproduction Specifications and Tolerances), ISO, Gracol or SWOP industry standard and use a spectrophotometer to measure incoming materials to qualify and quantify if they fall within acceptable tolerances

CUSTOMER COMMUNICATION

It is helpful when customer colors are clearly defined and by what method. There are various methods a customer will use to communicate the colors they want to see on press, many of which offer unique and sometimes substantial challenges. A customer may provide a digital proof, a press sheet from a previously printed job, business cards, company letterhead, industry standard color guides (swatch books), or may even have L*a*b* color values obtained from either the industry standard color guides or colors from a previous pressrun. Establish what the customer views as acceptable color tolerances. Learn the challenges of working with what they supply for color match. The following are a few suggestions on how to overcome those challenges.

Industry-accepted color guides can (and will) have vast color differences from each other. A color guide printed in 2009 will visually and measurably be different from the color guide printed in 2011. Even color guides printed in the same year or on the same pressrun can demonstrate vast color differences.

If the customer is using a color guide to visually define the color they want to use on the pressrun, then it is important that specific guide becomes the "Bible"

to base all color decisions throughout the print job. Use a spectrophotometer to take multiple measurements in different areas of the designated color swatch in the color guide, and average the measured results into one value. This becomes the color reference when choosing or formulating ink and checking color throughout the printing process.

Why take multiple measurements in different locations on one color swatch? Color guides not only have color variance between different guides, but also can substantially vary within the color swatch itself. By averaging the measurements you are minimizing the impact of color swatches that have inconsistent color. That specific color guide should accompany the job throughout the print production process.

Lastly, a customer may provide L*a*b* color values accompanied by a proof. While the L*a*b* color value offers an empirical method for checking color, it does not guarantee that what is coming off the press will visually match the proof or meet the customer's expectation. Remember, customers cannot "see" an L*a*b* value, only a printed representation in the form of a proof. There are many factors that influence the visual match of proof to press. One of the main influencing factors is paper, and is covered in the section that follows.

COLOR OF PAPER

The color of paper influences how we perceive color. It is commonly understood in our printing industry that paper is the fifth color. The "color" of paper heavily influences how our eyes visually perceive color. Often, inkjet proofs will contain optical brighteners to increase the whiteness of the paper to make the paper look "less yellow." Adding chemicals to the paper, causing invisible ultraviolet light to re-emit more toward the blue end of the spectrum so that the human eye perceives the paper to be whiter, even though in actuality it is bluer, does this.

In addition, optical brighteners show large color shifts when viewed under different lighting conditions, such as Tungsten, fluorescent, D5000 (normal day light). So the press sheet will appear

more yellow than the proof, adversely affecting the visual match seen by the human eye. The surface texture and coating differences between the proof and press papers will also contribute to visual color differences.

If the proof is from a previous job, exposed to both open air and light, it will lose a certain amount of color fidelity and no longer accurately represent the customer-defined L*a*b* color values. The "blueing" effect of optical bright-

eners will fade over time causing the paper to yellow, and not only lose the visual accuracy, but also the empirical measureable accuracy as well.

In order to determine whether the customer-supplied proof contains any optical brighteners, use a spectrophotometer to take an L*a*b* measurement of the non-printed area of the proofing paper. Remember, in general, if the b* value is greater than -3, there are optical brighteners in the paper.



New Pharmaflex Signature UV Ink
All great labels should have a Signature .

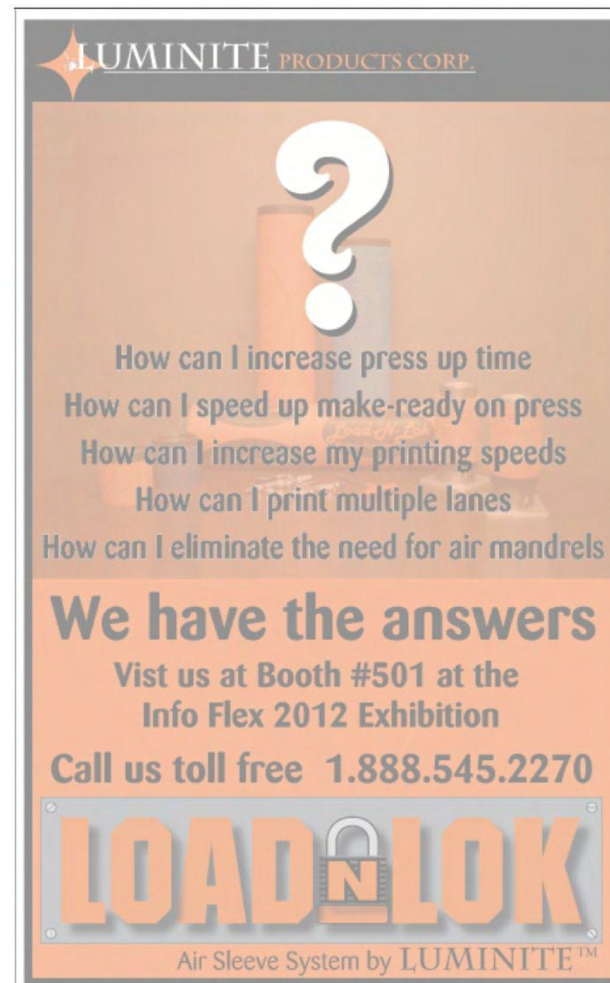
A UV ink system that delivers increased productivity and graphic quality.

- Plate Safe
- Faster Cure
- Better Flow

ACTEGA WIT 125 Technology Drive Lincolnton, NC 28092 USA
800-426-4657 www.actega.com

ACTEGA
Coatings & Sealants

A member of **ALTANA**



LUMINITE PRODUCTS CORP.

How can I increase press up time
How can I speed up make-ready on press
How can I increase my printing speeds
How can I print multiple lanes
How can I eliminate the need for air mandrels

We have the answers
Visit us at Booth #501 at the
Info Flex 2012 Exhibition
Call us toll free 1.888.545.2270

LOAD-LOK
Air Sleeve System by LUMINITE™

The larger the difference in the b^* value (-3, -4, -5, -6), the more optical brighteners there are in the paper. Or, the other option is to turn off the lights and using a black light illuminate the customer's proof and the press sheet. The white, non-printed area of the proof will shine bright white, while the white area of the press sheet will be muted by several levels of magnitude when compared to the proof.

Here are three solutions for compensating for optical brighteners:

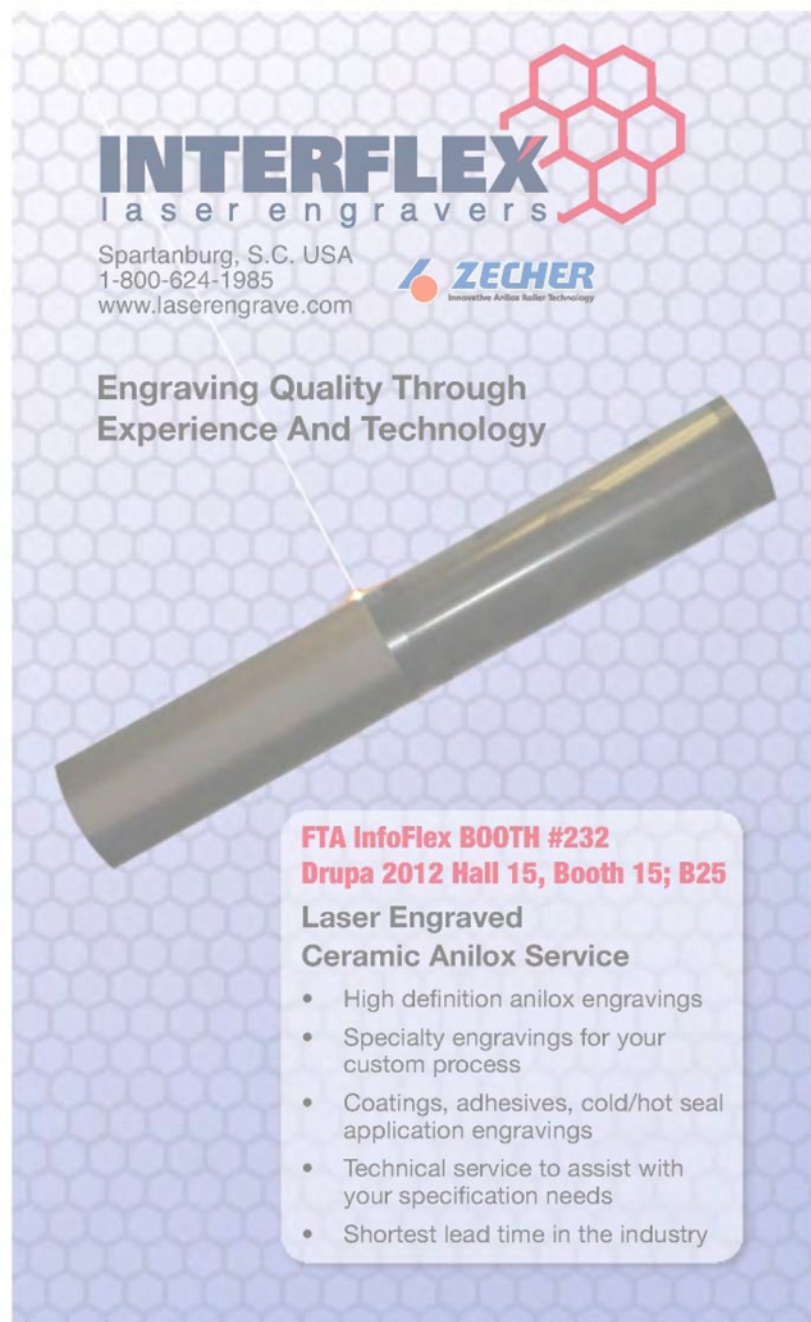
- Install UV blocking filters. If the proof is being viewed in a light booth, you can install UV blocking filters over the D5000 bulbs so when comparing the proof to press color match, these filters will help your eye ignore the optical brighteners in the paper
- "Accept and ignore" the fact that there are optical brighteners in the

paper and use a spectrodensitometer to measure the color in the proof, and in a D5000 light booth, visually match the proof to press as close as possible. This requires that you educate the customer on optical brighteners and the inherent issues in matching the proof to the press. Bring the customer to the light booth, show them the visual differences and make sure they acknowledge their understanding for the visual differences

- Create a proof using *FIRST*, *ISO*, *Gracol*, *SWOP*, etc. industry standard compliant materials. This proof will better visually match what will be printed on press. You may question why proofs cannot be printed on the actual material that is going to be used on press. While this is possible, it is not practical. Inkjet inks require a receptive coating be applied to properly bond to the press paper

Printing on translucent materials is also very common in package printing and offers some very unique challenges. The color of the backdrop, or the surface behind the proof or press sheet, can substantially influence both the visual and measured colors between the proof and/or press sheet. For example, when you view a printed piece of translucent material placed on a dark colored viewing surface, the color will look vastly different than when it is placed on a light colored viewing surface or when held up to an illuminated backlit surface. Taking measurements with a spectrodensitometer on all three different surfaces can validate the values. The measured $L^*a^*b^*$ values will be different when measured over the three different surfaces.

By using an industry standard white, black or neutral colored background in a controlled viewing environment to both visually check and measure the colors using a spectrodensitometer, you can compensate for the translucent properties. Print standard ISO 12647-2 specifies the surface color value ranges for measuring materials with a spectrodensitometer, which in turn offers you consistency and predictability when measuring translucent materials.



INTERFLEX
laser engravers

Spartanburg, S.C. USA
1-800-624-1985
www.laserengrave.com

ZECHER
Innovative Anilox Roller Technology

Engraving Quality Through Experience And Technology

FTA InfoFlex BOOTH #232
Drupa 2012 Hall 15, Booth 15; B25

Laser Engraved Ceramic Anilox Service

- High definition anilox engravings
- Specialty engravings for your custom process
- Coatings, adhesives, cold/hot seal application engravings
- Technical service to assist with your specification needs
- Shortest lead time in the industry



Make sure each shift, press and print facility is using the same customer-approved color specifications and tolerances to check the color against.



Standardized color control trending software will track the performance of a specific job and indicate how well the pressrun performed across shifts, presses and different facilities.

Take the customer-supplied proof, place it on the surface that is within the ISO 12647-2 specification and take measurements with a spectrophotometer. The subsequent measurement becomes the reference color to use when checking color on press. You must remember that when checking color on press, measurements must be taken on the identical surface and lighting environment that the reference color was obtained.

If a customer had a 1.5ΔE tolerance on a previous pressrun utilizing a high quality coated stock, but is specifying newsprint quality paper for this pressrun, maintaining the same 1.5ΔE tolerance consistently on press is unrealistic, and should be classified as an unrealistic tolerance. Adjust your customer's expectations accordingly.

BOTTOM LINE

Whether you build your color control process in one all-encompassing leap or one "stepping stone" at a time, consistent color measurement is the core component to any successful strategy. You may use a simple handheld spectrophotometer or more sophisticated inline device. The

difference is measured only in time and efficiency. Highly accurate color measurement devices, operators skilled in the practice of using them and clear-cut guidelines to follow provide a sound foundation to build upon your color quality control process, even one "stepping stone" at a time. ■

About the Authors: Bob Byrnes, director, technical services, TECHKON USA, focuses on color measurement systems for corporate accounts in the package printing industry. Bob has played an integral role in implementing color measuring strategies for packaging printers large and small, and helping to configure color measurement/quality assurance systems for both printers and their brand managers. He welcomes your questions and comments at bbyrnes@techkonusa.com.

Barbara McGowan is an industry marketing consultant specializing in print automation and color control. With a focus on communication design, she produces multimedia content for print, web and video and can be contacted at b2marketing.barb@gmail.com.

ENTER THE 2011 ROLAND CREATIVE AWARDS
www.rolandcreativeawards.com
 for a chance to win a Roland product of your choice

The proofs are in your hands.

VersaUV. Rapid Package Prototyping[™] made easy.
 Today, more customers are looking for Proof of Concept before they go into production. The VersaUV is a revolutionary device that allows you to create stunning prototypes from start to finish on a vast range of substrates for shrink film, bags, labels and folding cartons. The VersaUV prints vibrant CMYK plus White plus Clear Coat, and automatically contour cuts virtually any dieline with absolute precision. It's the one affordable package that can handle all of your prototyping needs.

See a video demo or order a free sample produced with your file at www.rolanddga.com/lec

VersaUV LEC Series
 UV printer/cutters
 30" and 54" models starting at \$44,995 US

Imagine. **Roland**
CERTIFIED ISO 9001:2008