Expanded Color Gamut (ECG) with Rotogravure Printing

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Rotogravure printing, a form of intaglio printing, is a high-speed printing process widely used for flexible packaging, labels, specialty products such as decorative laminates, wall coverings, and security applications. The global market for gravure printing is experiencing consistent growth, and a projected significant demand for both gravure cylinders and inks in the coming years.

One innovation in the field of rotogravure is the implementation of Expanded Color Gamut (ECG) technology. Unlike traditional printing which relies on custom spot colors, ECG utilizes a fixed ink palette (CMYKOGV) to achieve a wide range of colors and more vibrant results. ECG enables accurate reproduction of spot colors, as well as boosting the colorfulness of images using wider gamut for eye-catching packages on the supermarket shelves.

The adoption of the ECG improves efficiency by reducing waste, minimizing downtime between jobs, and maintaining consistent colors. It also allows for multiple designs to be printed in one press run, which saves energy by reducing the need for drying and solvent use. This boosts productivity, maintains color consistency, and reduces the carbon footprint for greater sustainability.

Implementation of ECG Printing

Successful ECG implementation for gravure printing production broadly requires below steps mentioned in this table:

Process Steps	**Details**
Defining scope	Artworks: design portfolio (new vs. existing), product families (SKUs / Stock Keeping Units), customers; Print process: press, substrates, inks, engraving parameters, press speeds, ink sequence, etc.
Availability of equipment	ECG profiling & color separation software, spectrophotometers, Quality control software, gravure cylinder QC tools, auto registration controls on press,
Checking the press stability	Press maintenance, registration accuracy, doctor blade settings, impression pressure, electrostatic assist (ESA), press speed for consistent print output
Setting target values and tolerances	Solids and overprints per standards (ISO/TS 21328:2022) or customized for your ECG production stability
Optimizing gravure cylinder engraving parameters	Gamma correction curves, test cuts, proofing for desired tone reproduction
Calibration press runs	Test forms to evaluate press stability, optimize press parameters, generate press calibration curves (TVI, G7 method for CMYK, SCTV with 1:1 tone for OGV)

ECG characterization press runs	Validate tone reproduction, create ECG color profile by printing and measuring ECG profiling charts
Digital proofing	Using ECG profile to simulate press output, verify color accuracy before print production
Verification press runs	Reproduce spot colors and images converted through ECG profiles, assess color accuracy via spectrophotometric measurements (ΔE2000 values within tolerance)
Fine-tuning color separations	Improve spot color accuracy as needed

Challenges with ECG Printing

Implementing Expanded Color Gamut (ECG) printing in gravure presents several challenges, primarily related to cost, production, and training.

- Investment is needed in software for ECG profiling and color separation, equipment upgrade (if needed) such as cylinder QC tools, press quality monitoring tools etc.
- Time-Consuming Preparation: If you are going to convert your existing print jobs to ECG, then you need to create new sets of gravure cylinders, which would be time consuming and expensive. To manage this, companies can either dedicate ECG to new designs or gradually convert existing designs over time.
- Need for Strict Process Control: Maintaining consistent quality requires tight control over factors like ink viscosity and press registration. These elements must be regularly monitored to ensure color accuracy throughout the print run.
- Lack of Training and Expertise: Many companies lack the necessary expertise in color management and ECG. Proper training is crucial, especially for press operators, who need to understand that matching a spot color in ECG is different from traditional methods. Instead of adjusting individual inks, they should focus on bringing the solid process colors closer to the established target values.

- Supplier Collaboration: Effective communication and collaboration with suppliers are essential. If a supplier can't provide the right products or services, a company may need to either provide training or find a new, more experienced supplier.

Summary

To effectively implement Expanded Color Gamut (ECG) printing in gravure, several key factors must be considered. For example, ink and color management, including ECG profiling software, cylinder engraving precision and optimization, and process stability with consistent press conditions. ECG training for press operators, prepress, and QC teams is critical to understand new color management techniques, troubleshooting, and best practices in ECG printing.

While the initial investment in new software, and equipment can be high, ECG ultimately leads to significant savings. It reduces the need for multiple spot colors and minimizes ink waste and inventory, including press-return inks. The process also boosts productivity by reducing make-ready time and print waste, directly supporting the sustainability goals.