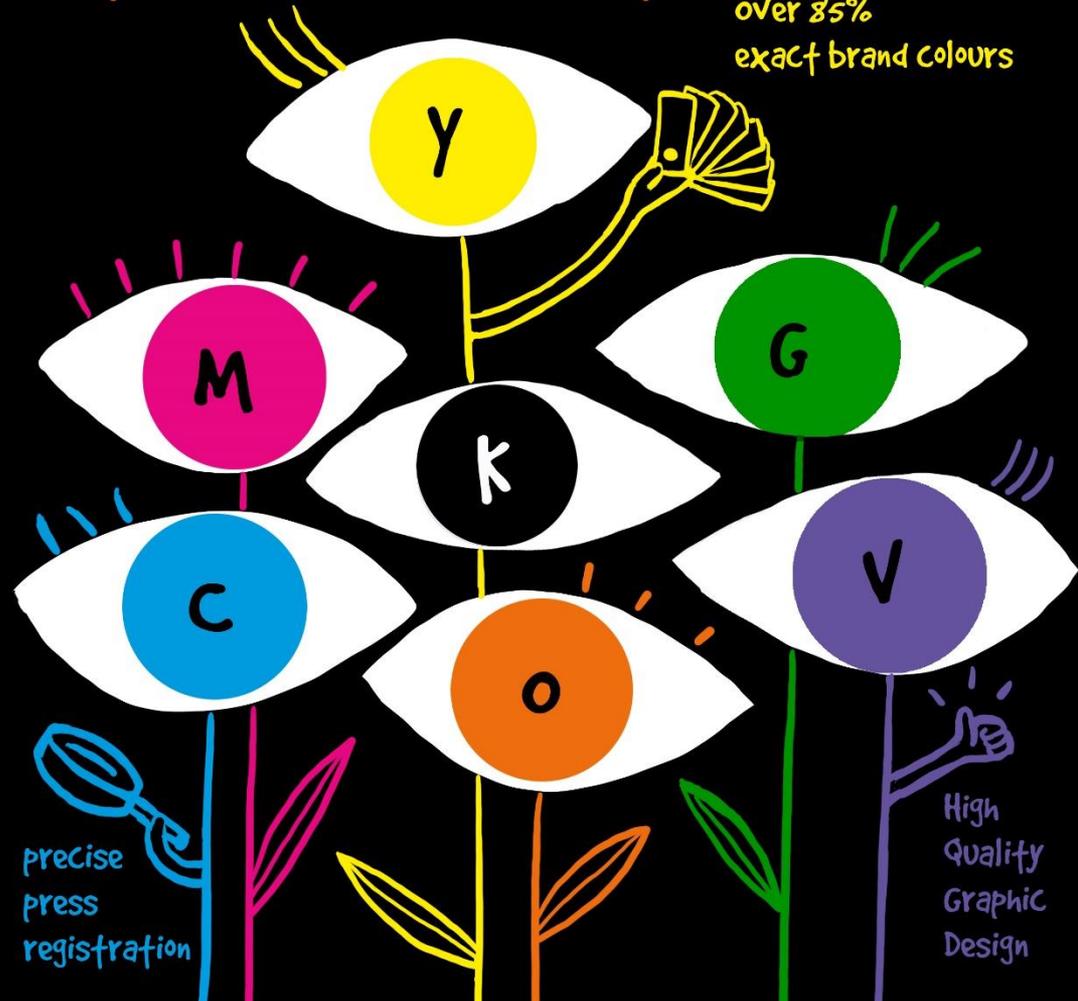


Extended Colour Gamut – Advantages and Challenges

German Paint and
Printing Ink Association (VdL)

Extended colour Gamut

over 85%
exact brand colours

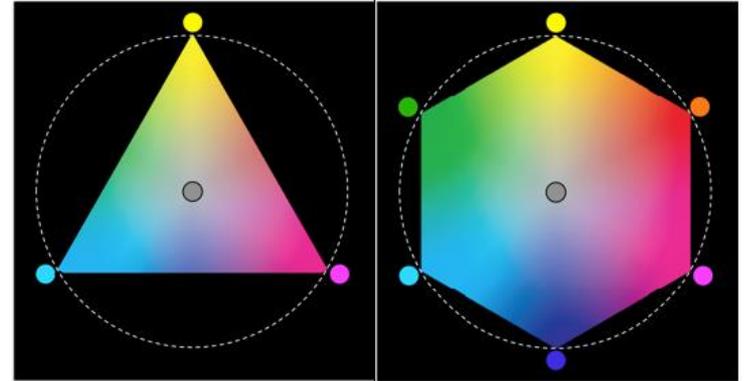


1. What is 7-Color Printing
2. Current situation / Market
3. Overview printing technology – ECG
4. Advantages
5. Challenges and Limitations of printing technique
6. Conclusion

What is ECG printing?

- Extended Colour Gamut printing is a process which uses up to 7 basic colours.
- **C**yan, **M**agenta, **Y**ellow and **K**ey will expand by **O**range, **G**reen and **V**iolet.

With ECG you expand your ink set to achieve a bigger colour gamut to match a larger percentage of Pantone Colours. Expanded ink sets are 5 and beyond, but typically 7. By adding Orange, Green and Violet, you can increase the percentage of achievable Pantone Colours to 85+%. Which reduces the use of ready mixed spot colours.



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- **Flexo**

- Tests with printers and press manufacturers
- Some use additional orange or violet occasionally
- Only few printers regularly use 7color print
- Common in North America and Latin America
- Some Brand Owners started with 7color in Europe

- **Gravure**

- Not common for gravure
- One printer in UK known

- **Offset**

- Some printers already work with 7 colour print

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Offset printing:

- High Quality Standards already implemented
 - Stable and fine printing technology
 - ISO 12647-2 / Graycol 7
 - Perfect in repro and ink standards
- More than 4 printing units not usual
 - Investments for O - G - V print desks maybe necessary

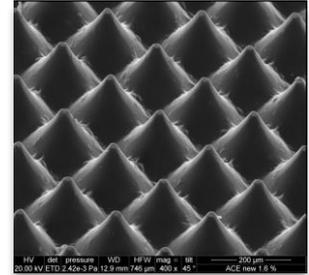


Digital printing:

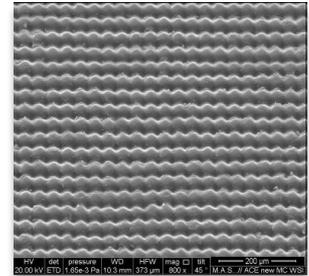
- 4C; 6C or 7C (CMYK+OGV) normal business
 - Often limited in speed by using more than 4 C
 - Cost sensitive

Flexographic printing:

- High Quality Flexo (HQ) necessary to reach high colour densities and finest tonal values and colour spreading with
 - Round Top Dot (RTD) or Flat Top Dot (FTD) technologies
 - Microcell screening technology for solid tone areas
- Fix printing sequence (lamination / surface print)
 - (surface white) Y -> M -> C -> B -> O -> G -> V (reverse white)
 - no rewetting (film layer against each other)
 - slow drying speed for best print quality → no dot gain
- In the packaging market
 - machines with more than 7 colour decks standard
 - central impression press → high register stability



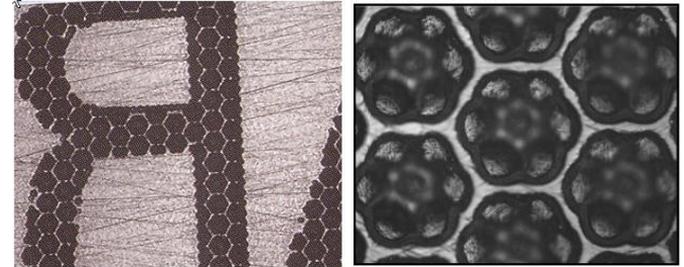
Flat Top Dot Technology



Solid tone area with screening

Rotogravure printing:

- Best quality in register precision needed
 - spot colours built up with 7 inks (fine text and line elements like barcodes are limited)
 - Cylinder engraving technology (benefits with laser technology → no ‘saw tooth’ in lines)
 - Dependent on substrate (OPP/PET film/ paper quality) and drying technology
- Direct printing technology with following benefits
 - High colour strength → deep cell volume possible
 - finest motives and gradients (70 l/cm standard)
- In the packaging market
 - machines with more than 7 printing units standard
 - Fix printing sequence same topic as Flexo



Laser engraving technology

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- Short make ready time
 - Press can run with same ink every day
 - Save time and material
- Less anilox rollers required
 - Press should run with same anilox rollers
- Allow multiple jobs on one sheet
 - Different subjects on the same sheet

- No complex ink mixing
 - The colour is created by overprinting
- Save storage space and money for press return ink
 - Spot inks are simulated with CMYKOGV

Why has it not become a new standard yet?

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- Special effect inks (metallic, pearlescent, luminescence, interference, hologram...) are not included
- Security inks (e.g. ink for DPG logo) also not included
- Some limited colour space (about 85% + of Pantone colour spectrum)
- Different applications need different fastness of pigments
e.g. outdoor application/weathering
 - for standard use too cost-intensive / costly to use in general



Metallic



Interference



Pearlescent



Hologram

- Acceptance of brand owners is needed – managing expectations
- For converters where average CMYK printing is enough ECG may mean extra cost and complexity
- Currently no international standard for ECG (work in progress – ISO/PWI 21328)
- Sequence of inks in the press differs in frontal and reverse printing → influence on setup time
- Unintended colour shifts:
 - Solid and tint overprint: different sequence leads to different colour
 - Variation between units is naturally greater than a single spot colour → dE value can be higher
 - Minimum print dot - if calculated with 1% and 3% is minimal dot → different colour

Requirements:

- The graphic design needs to be designed for it – repro is fundamental
 - colour management know-how for data optimization and proofing for extended gamut printing required
- Very precise registration on press is needed – in particular challenging in gravure printing
- Successful multicolour printing needs a process highly under control:
 - viscosity, speed, temperature, well maintained equipment (state of the anilox, doctor blade,...)
- Comprehensive implementation, testing and validation required

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- While expanded gamut can improve the press room, it adds complexity to the press operations and increases the work required in prepress
- ECG printing needs careful analysis of business case with thorough implementation, testing and validation before roll-out



So decide on your own...

Is your press room ready for deriving the full benefit of ECG-printing?

Thank you for your attention!



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