

## Developments in flexo plate making

Carlos Anguita  
Plant Manager Janoschka Barcelona  
Business Unit Flexo

## Content

1. Sites / Products / Markets / Figures
2. Flexo technologies and trends
3. How technologies affect color
4. Multicolor (EGP)

## Janoschka Flexo Sites

6 Flexo production sites in 4 countries:

- Germany: Munich, Frankfurt, Frankenberg
- Spain: Barcelona
- Portugal: Lisbon
- Argentina: Buenos Aires



## Products

- Photopolymer Printing Plates
- Thin Plates (Foil)
- Thick plates (Corrugated)
- Lacquer Plates (Offset finishing)
- Elastomer Sleeves and Rollers



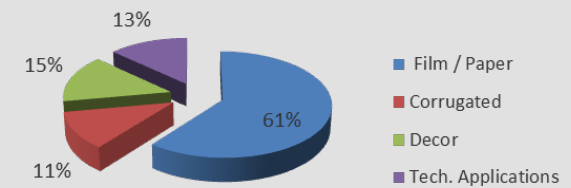
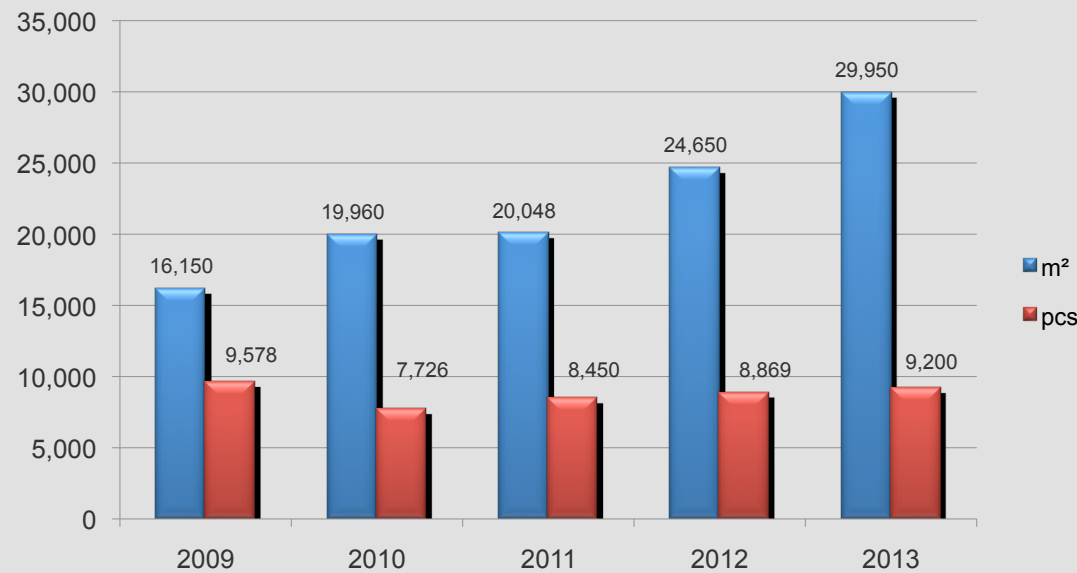


## Markets

- Flexible Packaging
- Hygiene (diaper)
- Tobacco
- Dairy Cups (Cups, Lid Foil)
- Labels (Beverage)
- Corrugated (PrePrint & Postprint)
- Bags
- Decorative (gift wraps, servicing, tissue, wallpaper)
- Writing pads

## Figures

### Janoschka Flexo - Printing Forms



## Flexo Technologies and Trends



## Confusing Terms and Technologies

- FlexCell NX
- Round Top Dots
- Flat Top Dots
- HD
- Full HD
- DigiCap
- Stochastic
- MicroCell
- Pixel+
- Oxygen inhibition
- DigiFlow
- NeXT
- Lamination
- Etc...

## Confusing Terms and Technologies

- Flat or Round Top Dots?
- HD Flexo / Full HD Flexo / DigiFlow / NExT / LUX / Flexcell NX?
- How can we improve SID?
- What about dot gain?

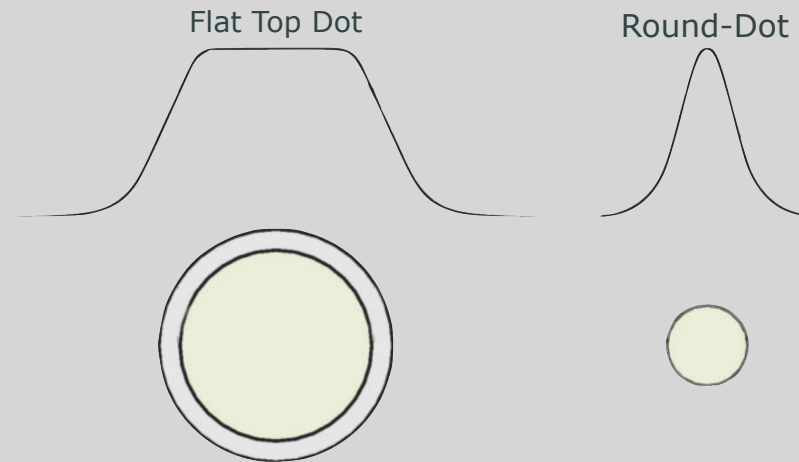
What can we do to take flexo to a new level of quality?

## Flat Top Dot

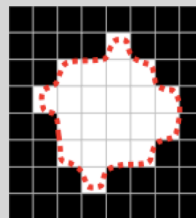
Technology	1Bit TIFF Engraving Resolution	System	Laser Microns
Kodak FlexCell NX	2.400 dpi	Lamination	10.6 $\mu$
Flint NExT (CDI) Pixel+	4.000 dpi	Diode Led	6 $\mu$
Dupont DigiFlow (CDI) Pixel+	4.000 dpi	Air Depletion (Nitrogen-Oxygen)	
MacDermid LuX (CDI) Pixel+	4.000 dpi	Lamination	
FullHD (CDI) UVI InLine 2	4.000 dpi	Diode Led	

CDI Optics at 10.000 dpi Possible for Security

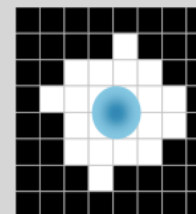
## Flat Top Dot vs Round Top Dot



Almost 1:1 copy



dot reduction



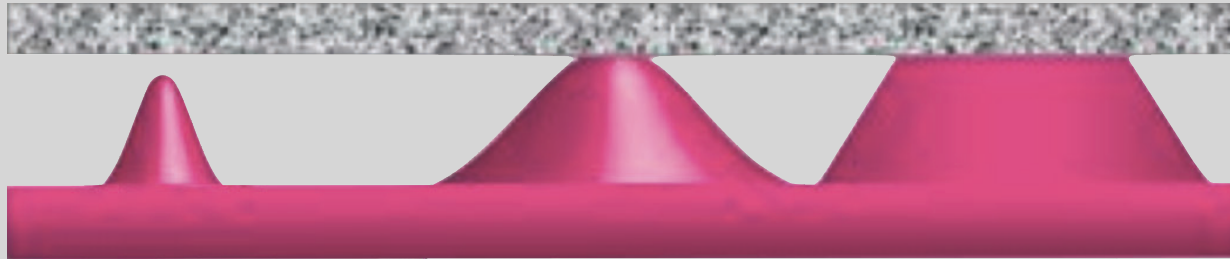
Flat dot is bigger than an equivalent round dot



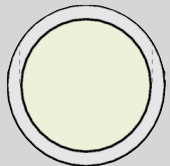
## Flat Top Dot vs Round Top Dot

The correct pressure needed on solids, the minin dot will not be affected

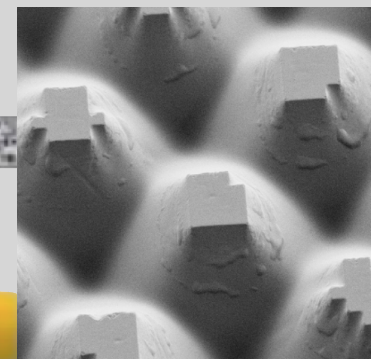
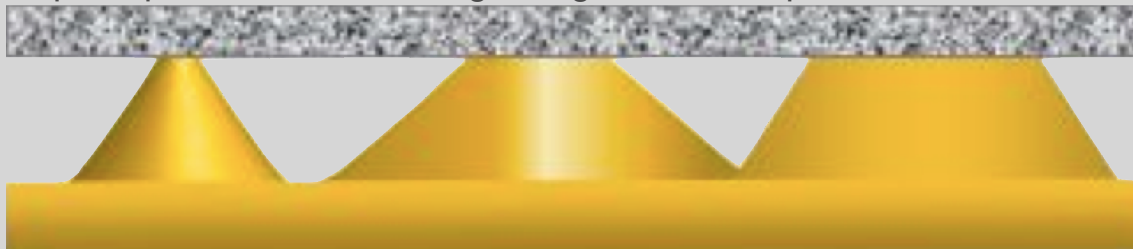
Smaller dot area



Bigger dot area



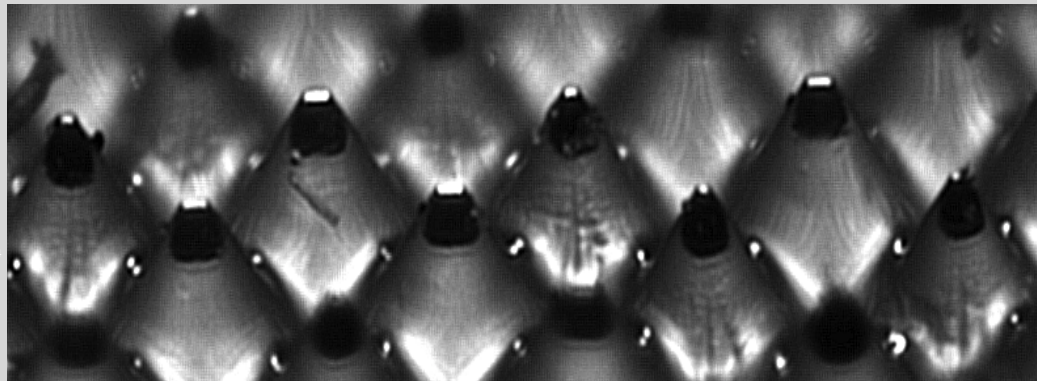
Square pixel dots have a larger edge than an equivalent round dot



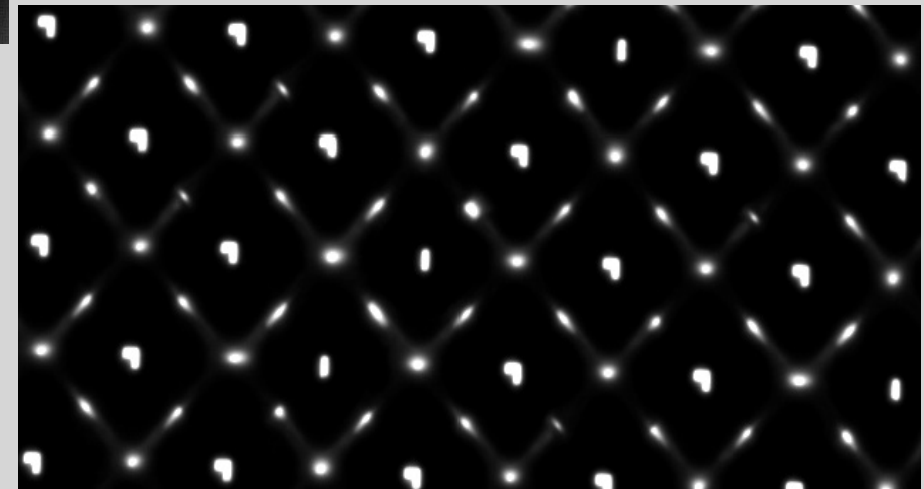
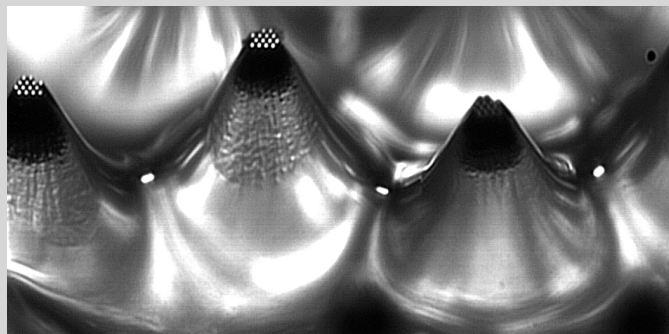
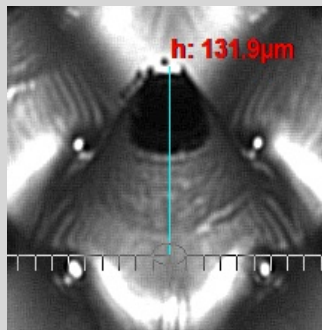
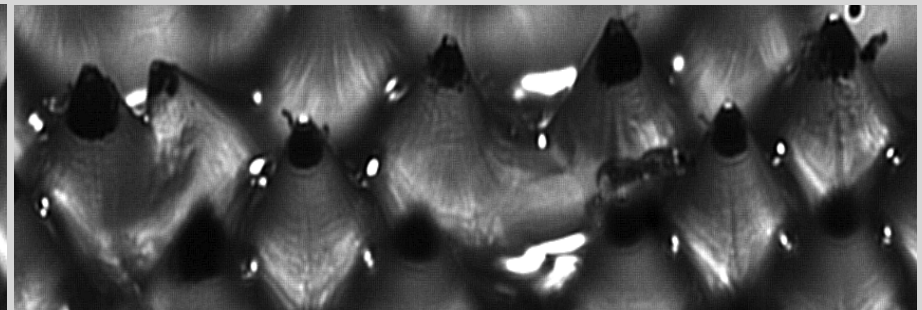
Mechanical dot gain, directly results from the [squeeze](#) along the edge, it means more dot gain  
Difference is that the flat dot has more Strength than the Round dot in a extreme overpressure

## Kodak Flat Top Dot Plate Highlights

2%



0.8%

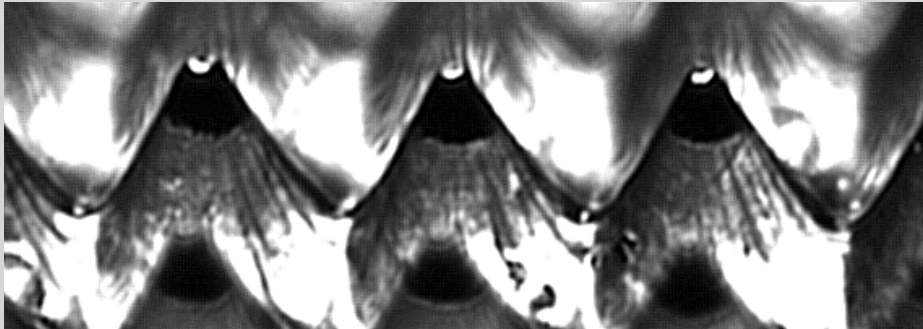


Exact 1:1 copy

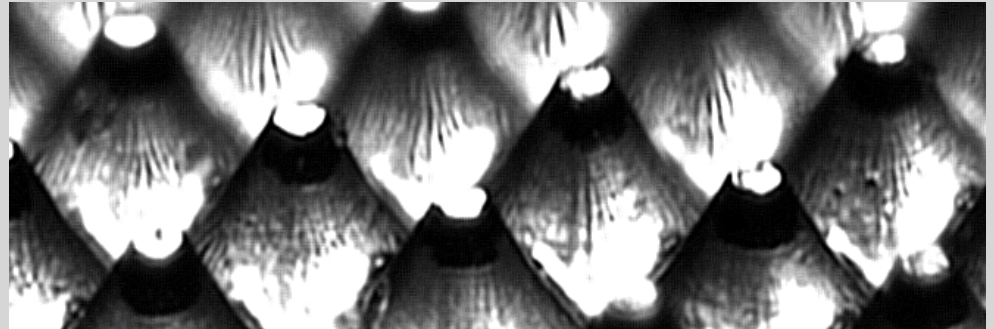
2.400 dpi

## Flat Top Dot Plate

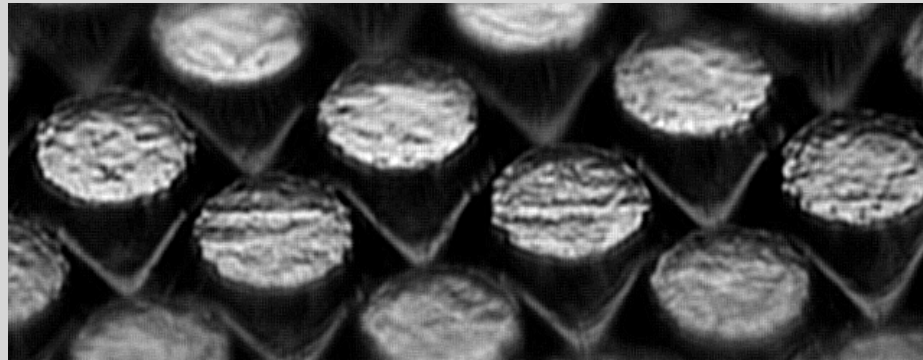
1%



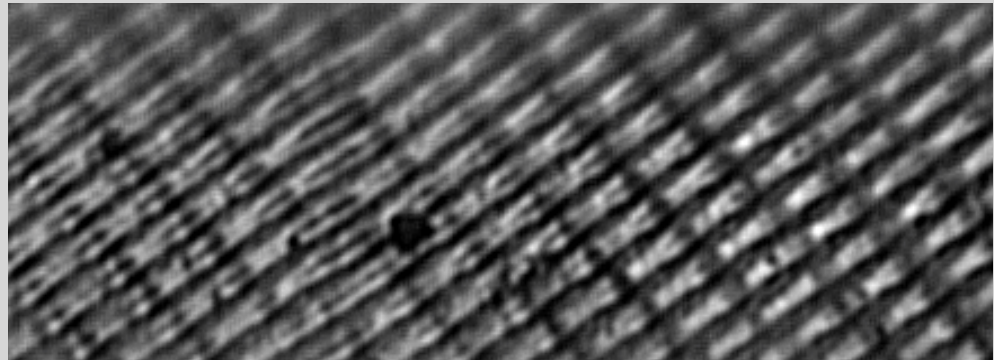
5 %



50%



Solid Pixel+



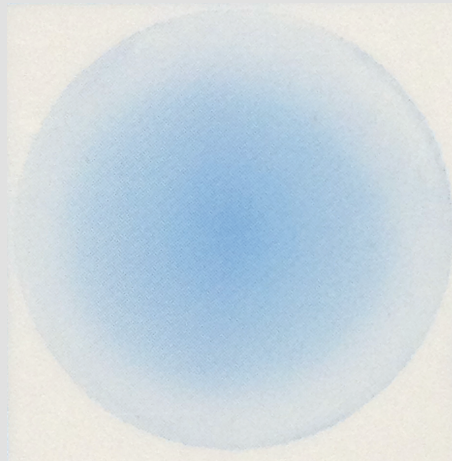
Almost 1:1 copy

4.000 dpi

Images taken by Janoschka

## Flat Top Dot vs Round Top Dot

- Flat Top Dots create an ugly grain effect in highlights especially in flexible wide web (to avoid that, anilox with very low cell volume is needed)



Flat Top Dot



Round Dot (HD Flexo)

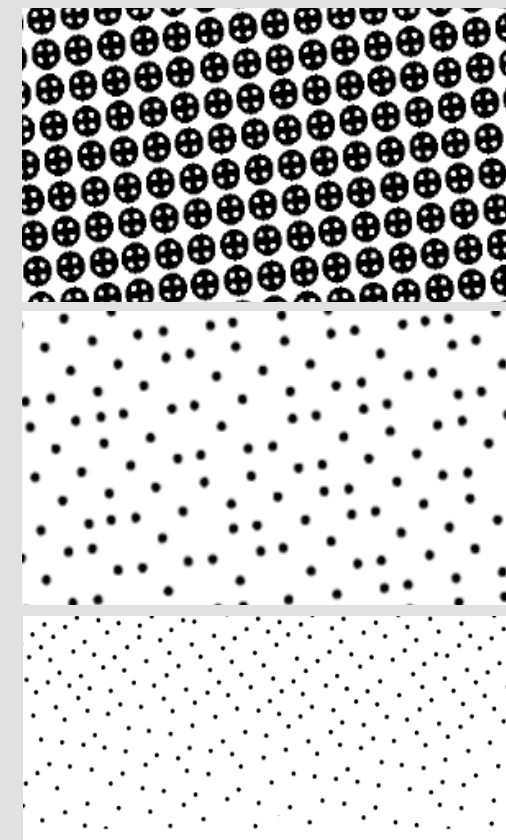


## HD Flexo

- Combination:
  - High Resolution
  - Set of screenings adapted to printing conditions
- The standard resolution is 2.400/2.540dpi
- Imaging resolution at 4.000 dpi is a big advance
- Needs skilled people to implement the correct HDFlexo parameters



Technology	Resolution	New Screening Set
Digital	2.540 dpi	✗
High Resolution (HR)	4.000 dpi	✗
HD Flexo (HR+New Screenings)	4.000 dpi	✓



## Know-How

### HD Flexo

- Needs to be adapted to:
  - Plates
  - Printing conditions
  - Anilox rollers
  - Inks
  - Substrates
  - Etc...
- Different HD Flexo parameters could be required for the same printer

### Repro

- Needs to be adapted to:
  - Printer specifications
  - Printing conditions
  - Substrates
  - Press color profile

janoschka



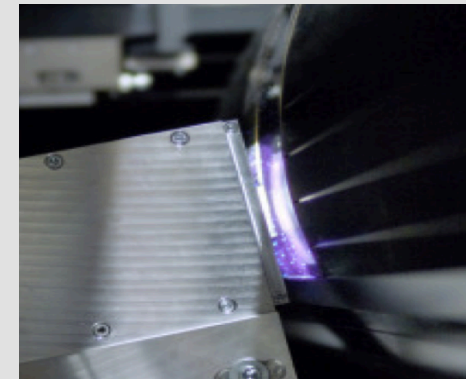
4.000 dpi



2.400 dpi

## Full HD Flexo

- Uses an integrated LED light source inside of the CDI, exposing the plate right after engraving
- Uses a controlled drum speed + UV Intensity
- The dot is in between a round and a flat top dot
  - suitable for highlights
- HighFrequency Microcells (thanks to Oxygen Inhibition)
  - appropriate for solids
- Thanks to the high frequency microcells it can achieve good lay down and good SID -above standard values-





## Solids - Key Points

- The combination of MicroCells/DigiCap with a Medium / Hard Tape helps to improve ink Lay Down and SID drastically
  - Oxygen inhibition like FullHD, DigiFlow, NExT, etc.. helps to create some kind of grainy structures (HighFrequency Microcells) on solids for improving density
  - Higher SID uses more ink:
    - As the ink film doubles, the reflectance is halved, and the density increases by 0.3 points due to the base 10 logarithmic function employed
- Density =  $\log_{10} (1/\text{Reflectance factor})$
- Reflectance factor is calculated by the function:  $R = I_r/I_s$
- $I_r$  = Intensity of the reflectance light
- $I_s$  = intensity of the light source
- Every +0.1D there is 25% more ink usage on press
  - Every +0.3D doubles ink usage

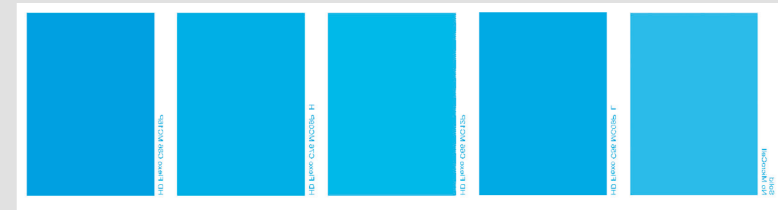
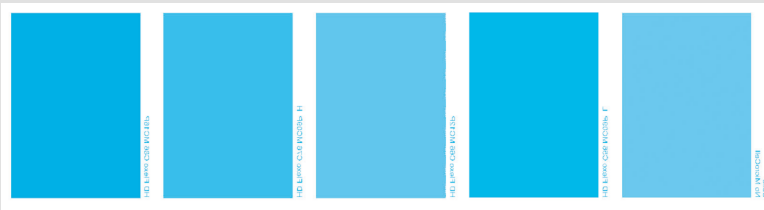
# How technologies affect color

## Key Points

- There is not a standard for density
- Density could be different depending on the printing conditions and substrate
- You need to find the best balance between density and  $L^*a^*b^*c^*h^*$  values

## Mounting tapes

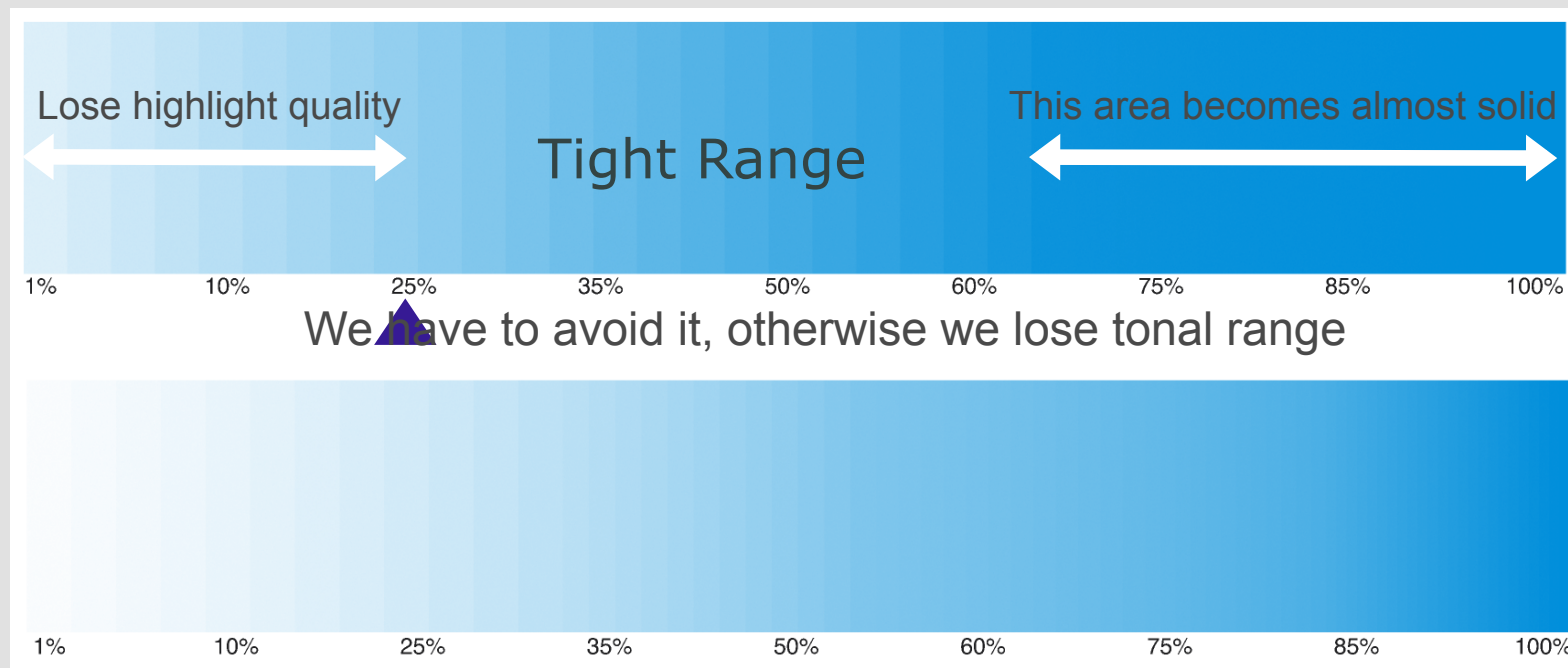
Mounting Tape	Best Density	Technology	Screen Ruling	Viscosity	Anilox	Substrate
Medium Soft	1.39	HD FLEXO - 149lpi		21s Ford 4 Cup	420 l/cm 3.7 Volume	OPP Reverse Printing
Hard	1.88					



<b>SID</b>	1,39	1,32	1,25	1,35	1,21
------------	------	------	------	------	------

<b>SID</b>	1,88	1,79	1,68	1,82	1,59
------------	------	------	------	------	------

## Mounting tapes



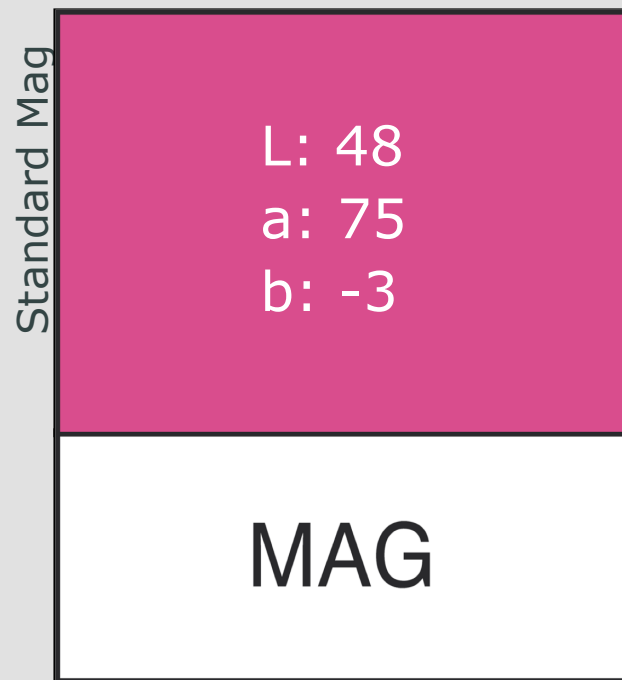
Hard Tape

**1.88**

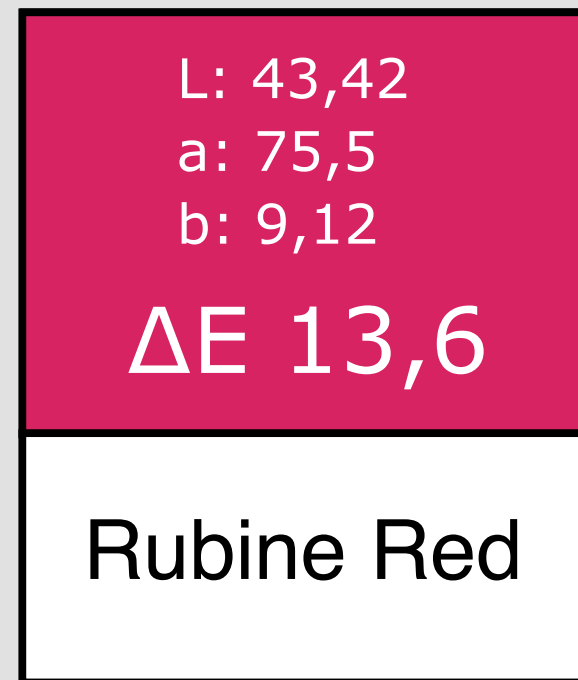
Medium Soft Tape

**1.39**

## Solid Ink Density?



SID 1.35



SID 1.78

## Gamut - Pain Points

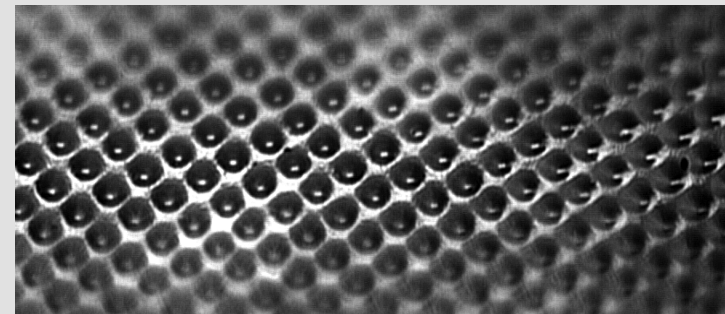
- Very high SID density and high DotGain in CMYK do not create standard values
- Images lose contrast, chroma, gamut
- Images seem saturated with limited tonal range



Flat Dot



Round Dot



MicroCells

## Gamut - Key Points

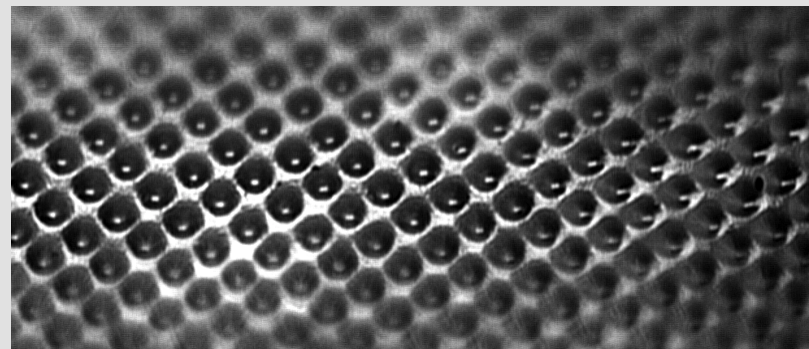
- Smooth solids and good highlights both extend the color space
- Microcells aid in distribution and dispersion of the ink from the plate to the substrate
- Lower highlights are more important than a higher ink density
- The greater the density, the more evident are the Dot Gain in highlights



Flat Dot



Round Dot



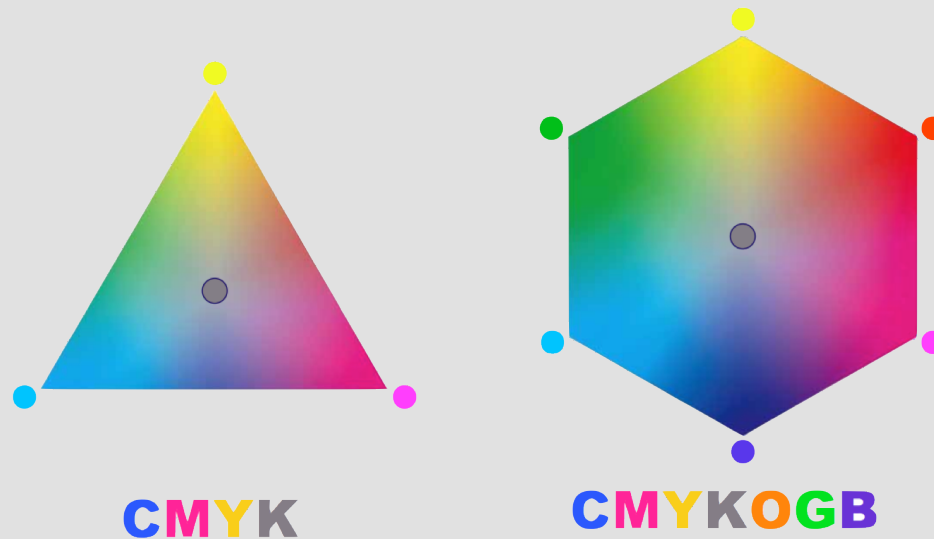
MicroCells



# Multicolor Management

## Gamut

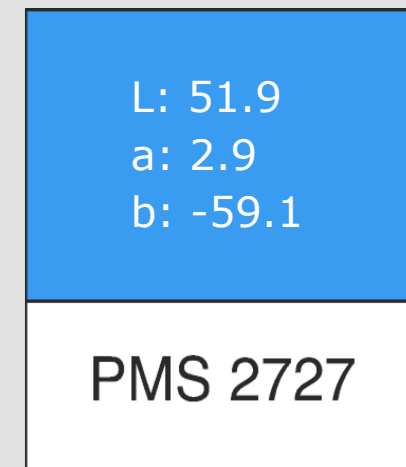
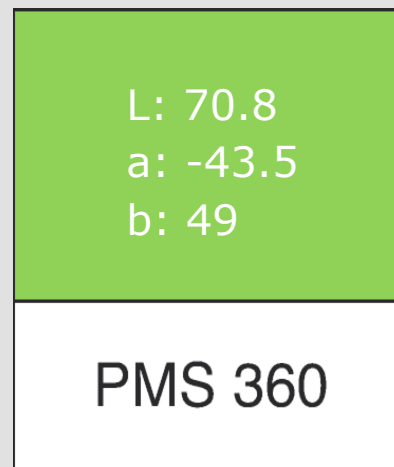
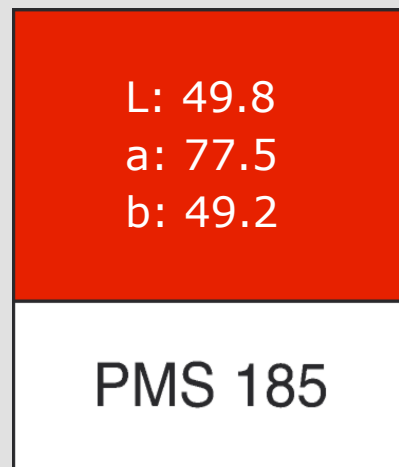
- The 7-colors process technology is suitable for high-quality flexo printing
- The standard four-colors process setup limits the range of possible colors in the visible spectrum



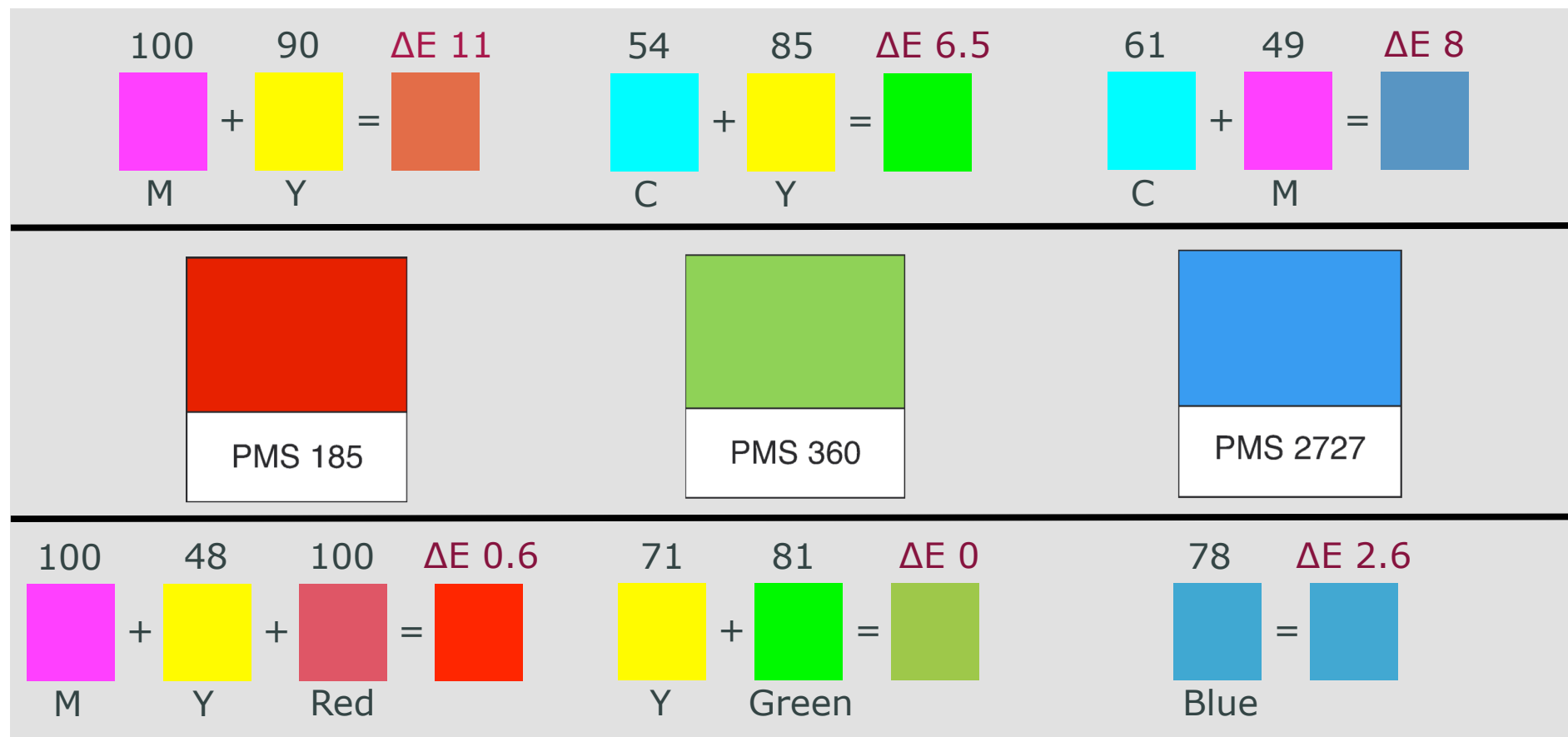
## Extended Gamut

- The print image may be improved by higher resolution, but **color** comes from the **inks**.
- 5-color printing gives a significant gamut enhancement in one direction (i.e. blue/violet/purple).
- The 7-color process printing offers a significantly larger gamut than the conventional CMYK printing process, especially in three critical directions (blue/violet/purple, green/yellow-green and orange/red).
- For 5, 6 or 7 color printing, the number of different angles is always 4. This avoids the Moiré

## CMYK is not accurate enough



## CMYK is not accurate enough

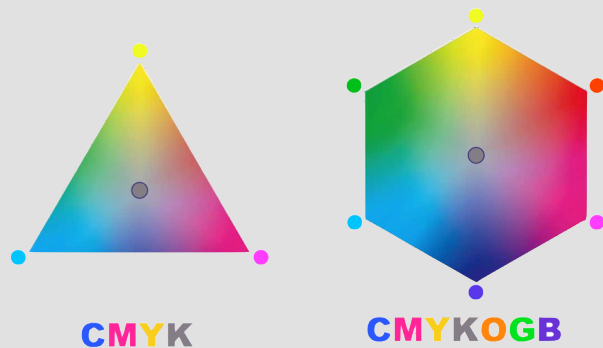


## EGP

- Good Pantone color emulation
- High extended gamut
- Boost and extend gamut of images and backgrounds
- Bright colors
- Multiple jobs on the same print run and same set of inks
- Make-ready reduction times
- It enables long run cost efficiencies to short runs

## Multicolor

- Color Management - CMYK + 3 extra inks (Expanded Gamut)



### Customized Inks - Adaptability....



- Information in advance regarding if the design / print sample is achievable - out of gamut
  - Knowing in advance the DeltaE difference, based on the press color profile
  - We advise the printer if an extra color needs to be added to reach the target

Flexo gravure-like printing is now a reality



Thank you for your attention

– Copyright Janoschka  
All contents of this presentation are subject to Janoschka's copyright.  
All rights reserved. Information in this presentation, including but not limited to wordings, pictures and audio material explicitly require the written approval of Janoschka for duplication, transmission, distribution or saving.