

Developments in flexo plate making

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Content

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2. Flexo technologies and trends
3. How technologies affect color
4. Multicolor

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

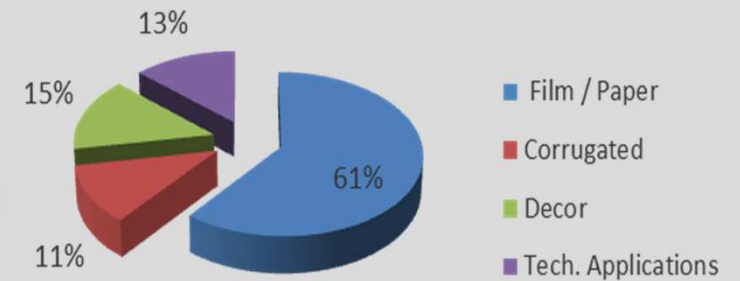
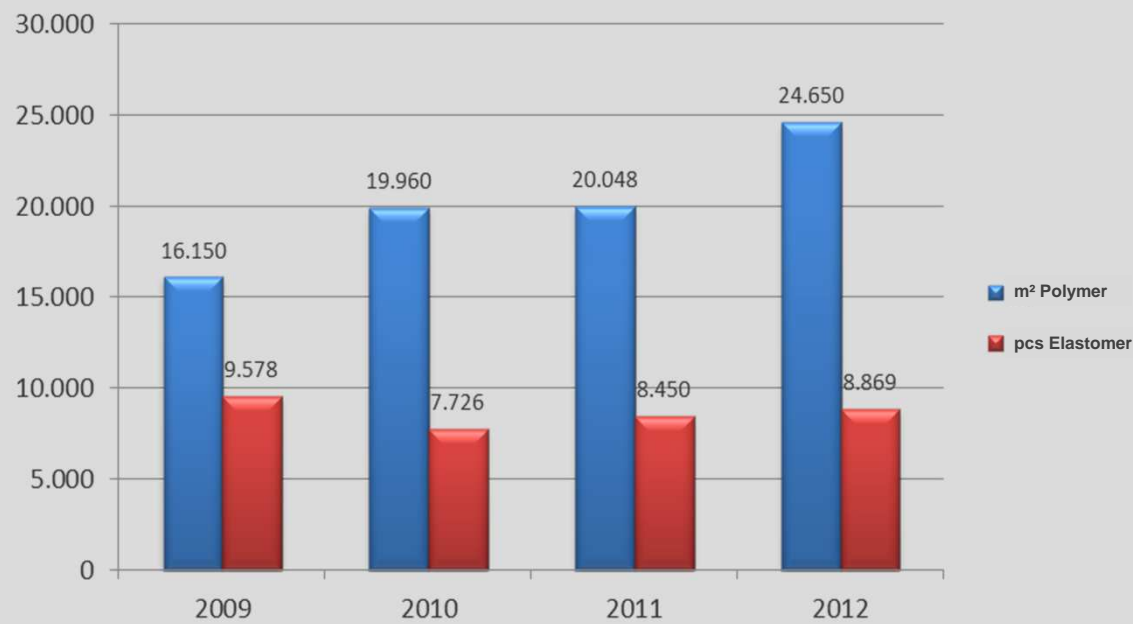


Markets

- 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
- MicroCellPixel+
- 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?

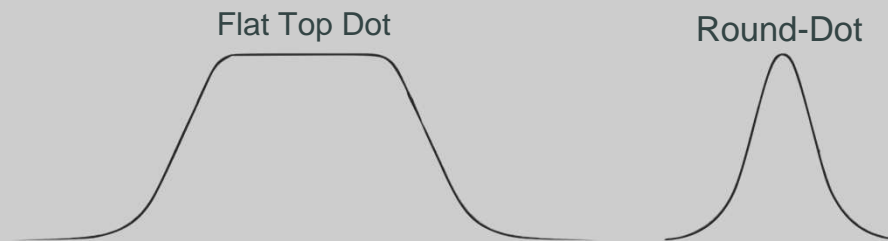
What can we do to take flexo to a new level of quality?

Flat Top Dot

Technology	1Bit TIFF Engraving Resolution	System	Laser Microns
Kodak FlexCell NX	2.400 dpi	Lamination	10.6 μ
Flint NExT (CDI) Pixel+	4.000 dpi	Diode Led	6 μ
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	

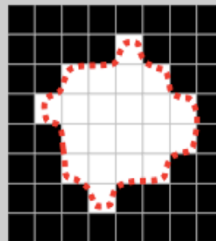
CDI Optics at 10.000 dpi Possible for Security

Flat Top Dot vs Round Top Dot

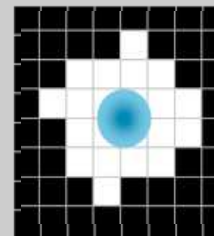


It is like we were doing a compensation curve
in highlights

Almost 1:1 copy

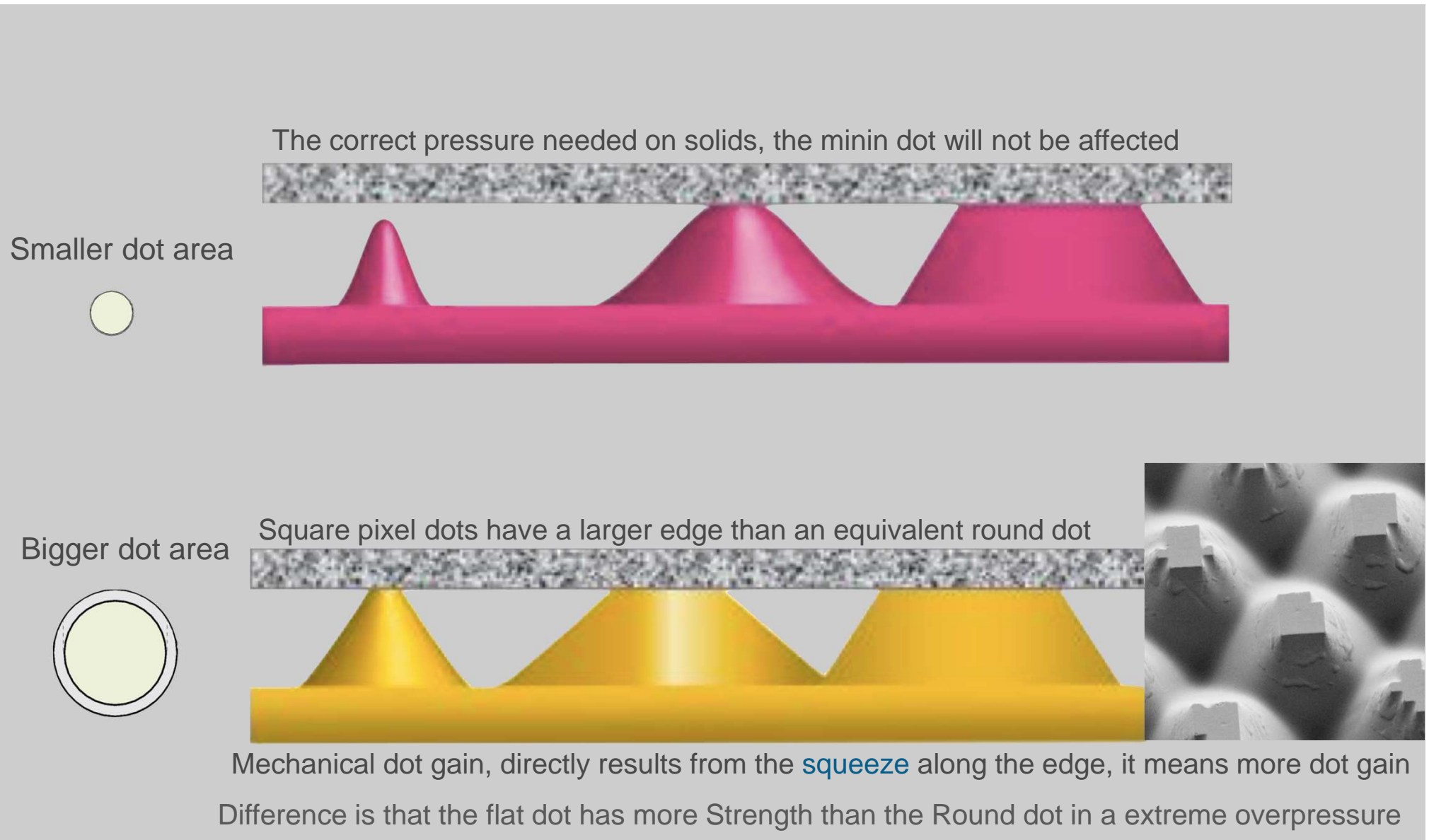


dot reduction



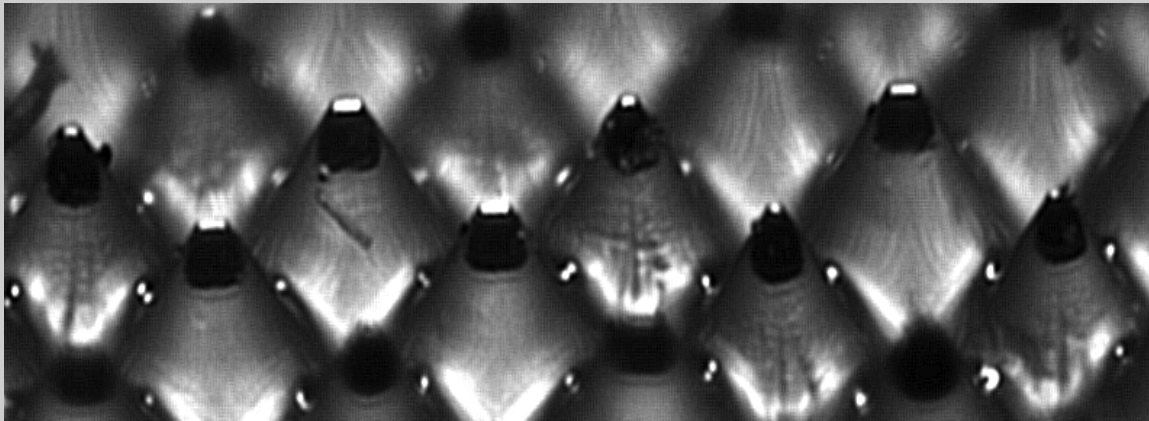
Flat dot is bigger than an equivalent round dot

Flat Top Dot vs Round Top Dot

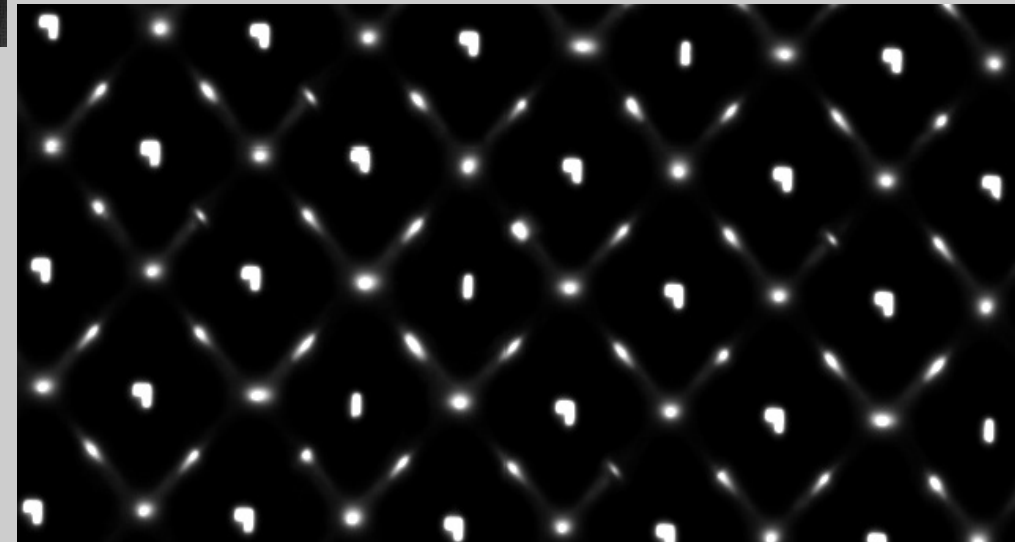
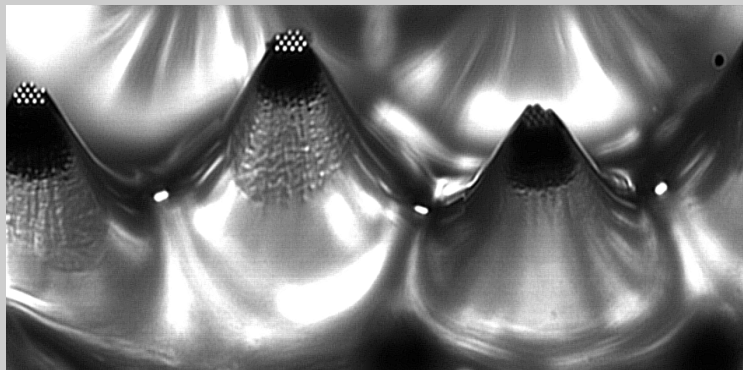
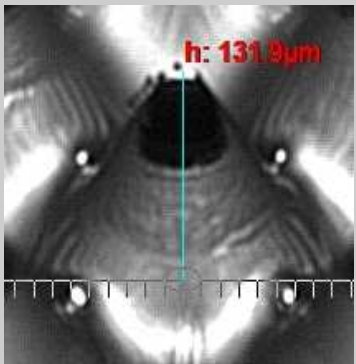
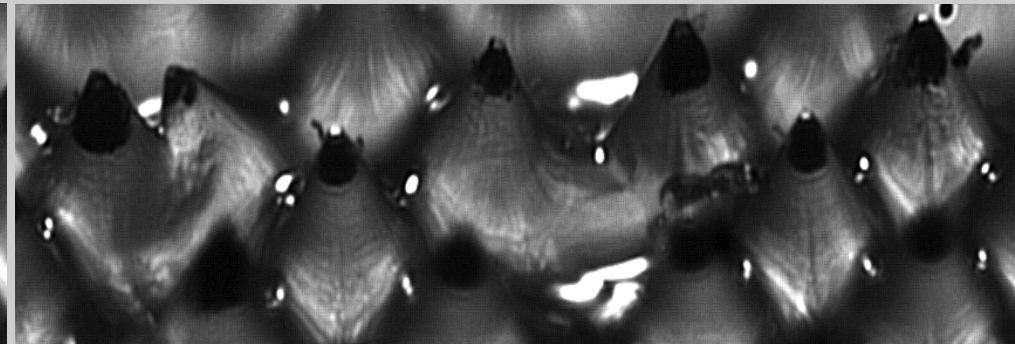


Kodak Plate Highlights

Kodak 2%



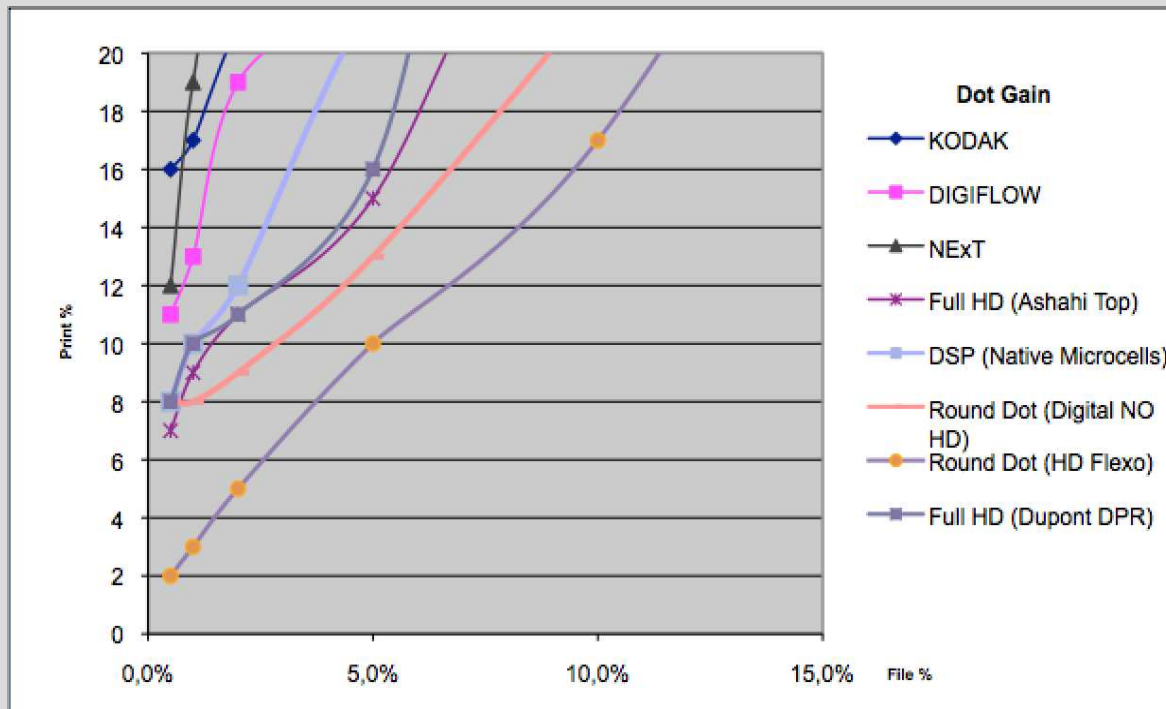
Kodak 0.8%



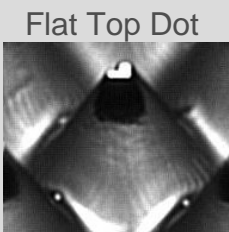
2.400 dpi

Case Study

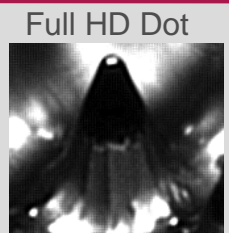
LPI	Tape	Anilox	Inks	Viscosity	Substrate
149 lpi 174 lpi (HDFlexo)	Medium Soft	420 l/cm Volume 3.7cm3	Huber	20s	OPP/ Reverse Printing



**KODAK
DIGIFLOW
NExT**



**Full HD (Dupont DPR)
Full HD (Ashahi Top)**

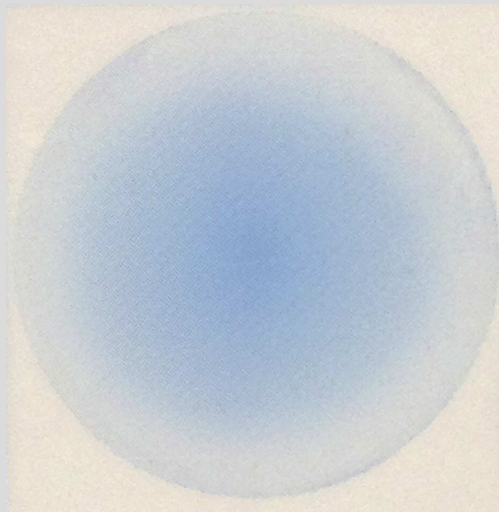


**Round Dot (Digital NO HD)
Round Dot (HD Flexo)
DSP (Native Microcells)**

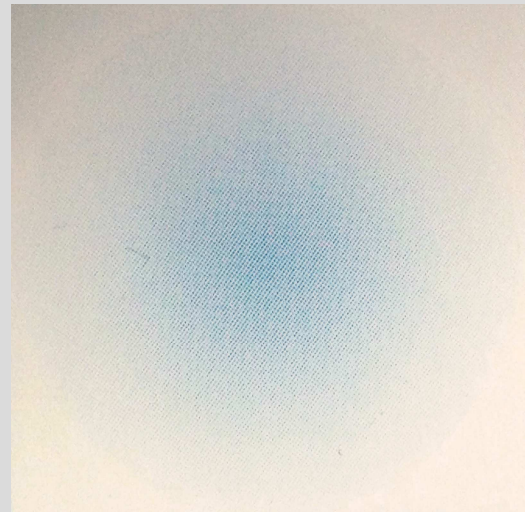


Flat Top Dot vs Round Top Dot

- Flat Top Dots creates 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



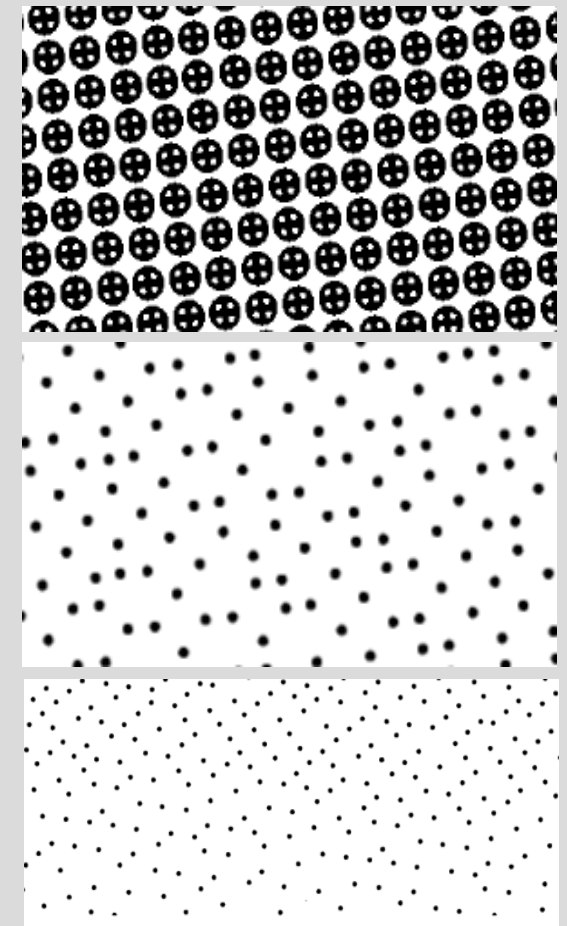
Round Dot (HD Flexo)

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...

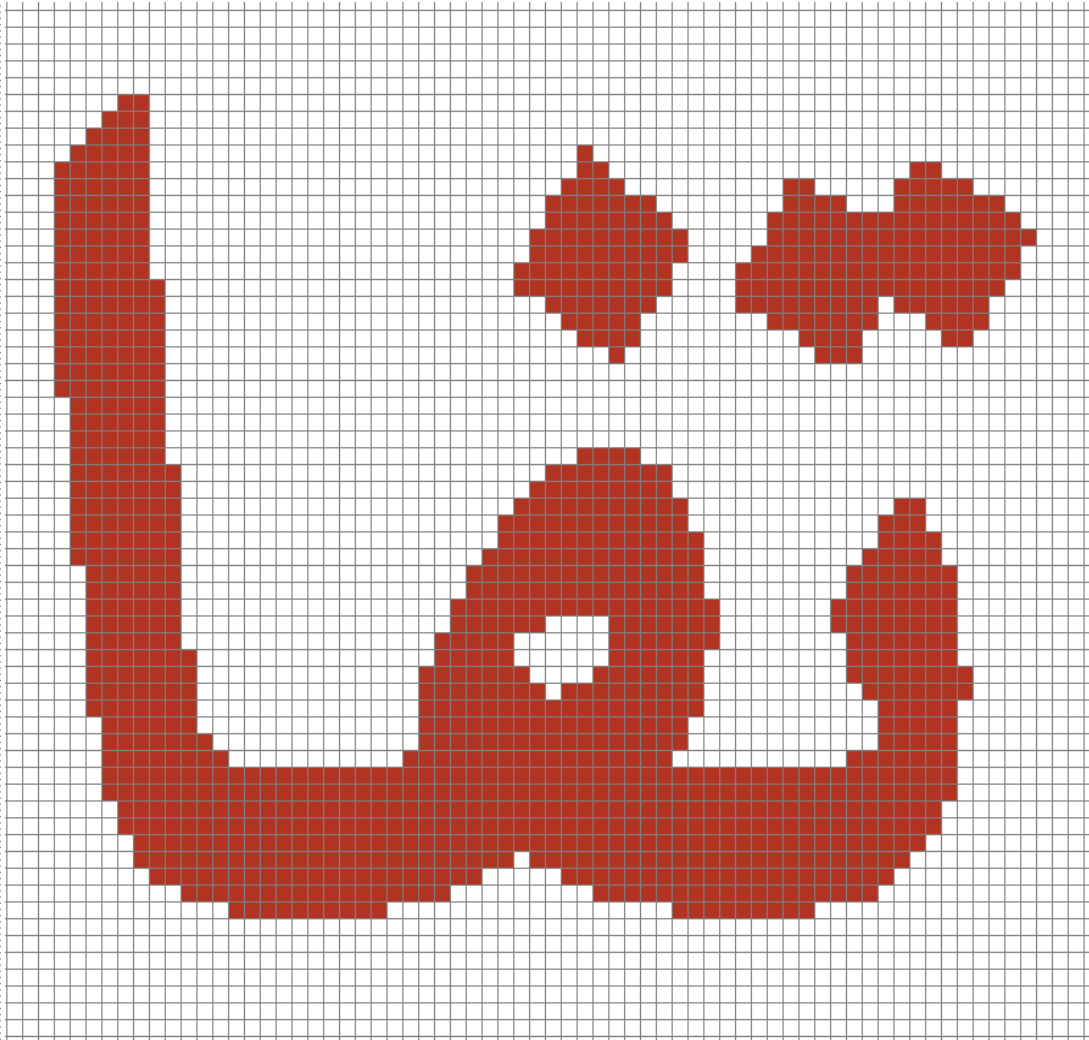
- Different HD Flexo parameters could be required for the same printer

Repro

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



4.000 dpi

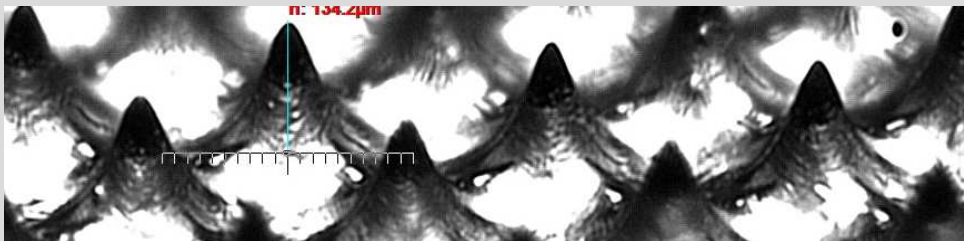


2.400 dpi

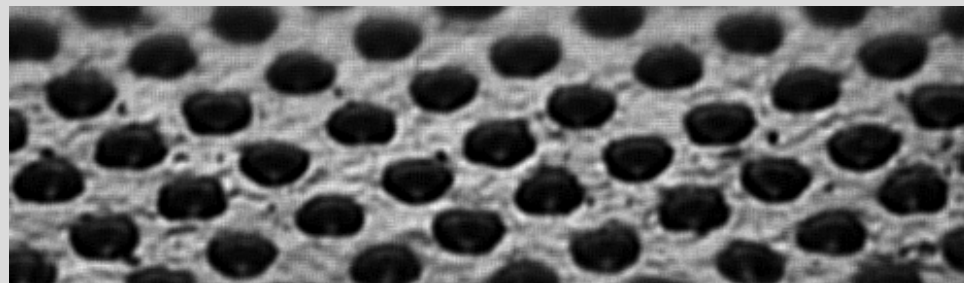
HD Flexo Plate

Microcells

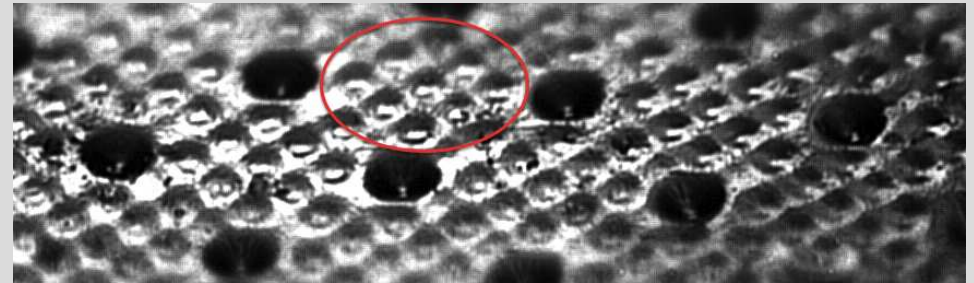
0.5% Highlights



50%



Solid



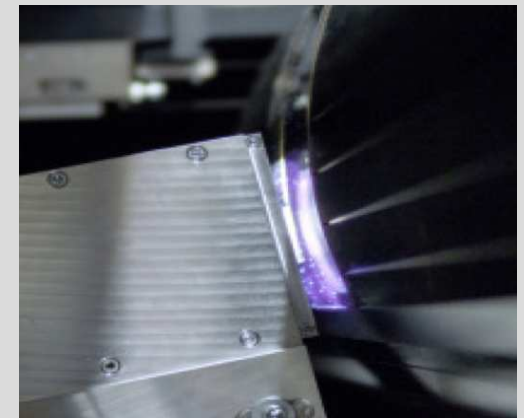
95%

Solids - Key Points

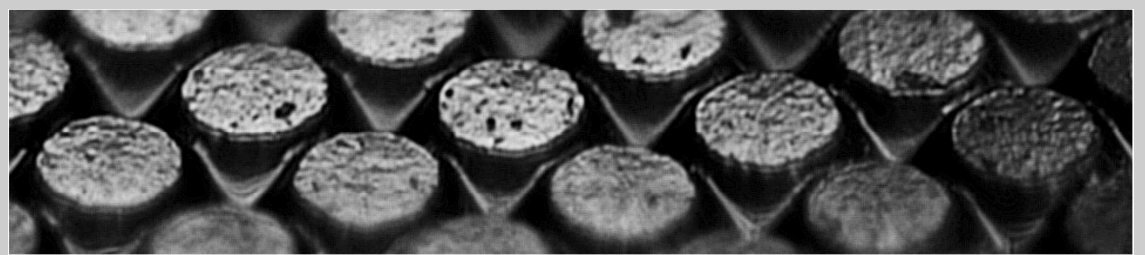
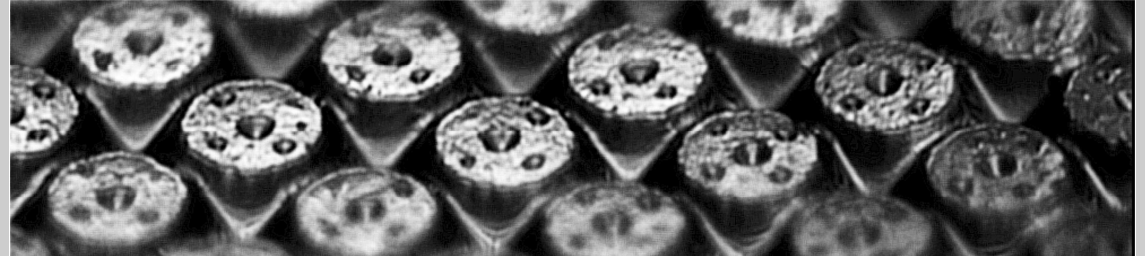
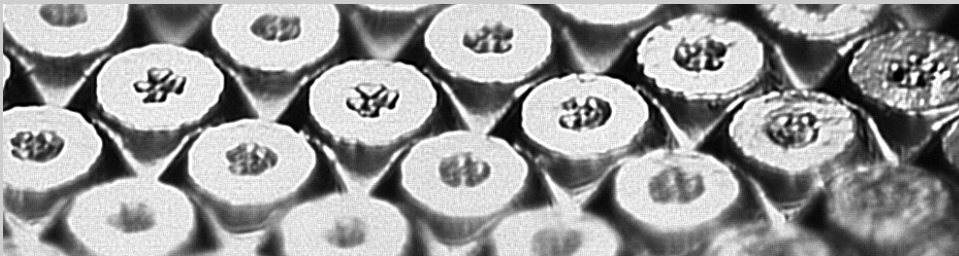
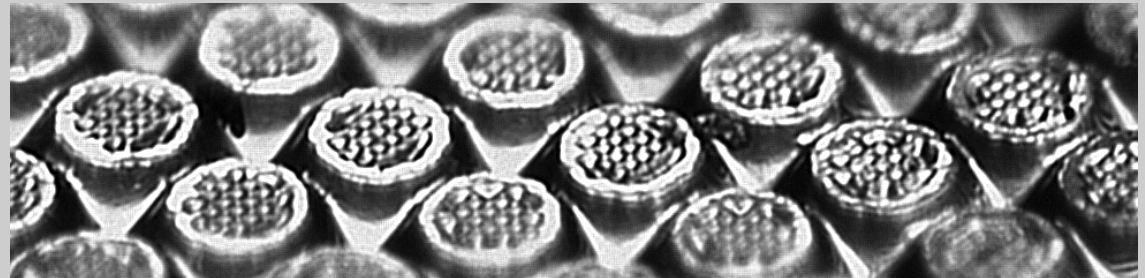
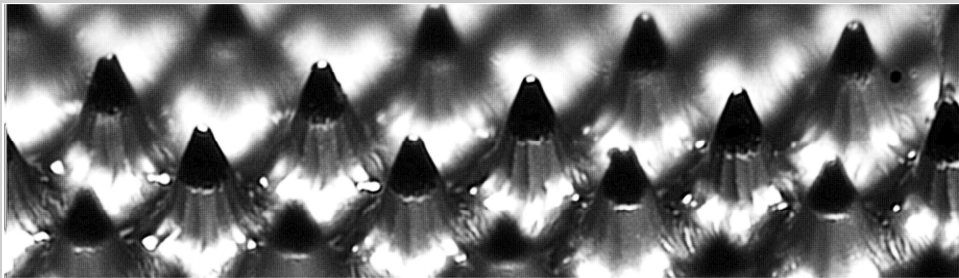
- The combination of MicroCells/DigiCap with a Medium / Hard Tape helps to improve ink Lay Down and SID drastically
- Oxygen inhibition like FullHD, DigiFlow, NExT, etc.. helps to create some kind of grainy structures (HighFrequency Microcells) on solids for improving density
- Higher SID uses more ink:
 - Every +0.1D there is 25% more ink usage on press
 - Every +0.3D doubles ink usage

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-

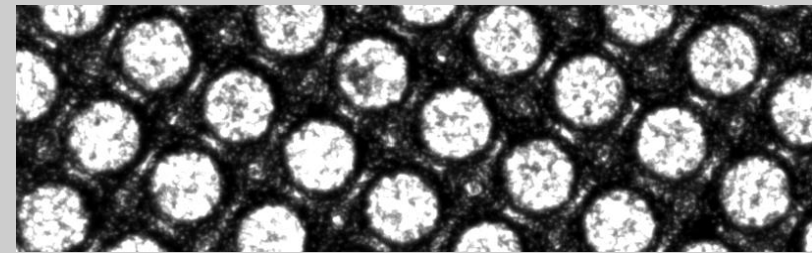


Full HD Flexo Patterns

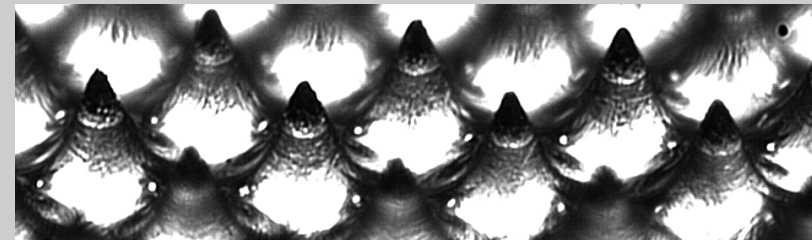


Trends

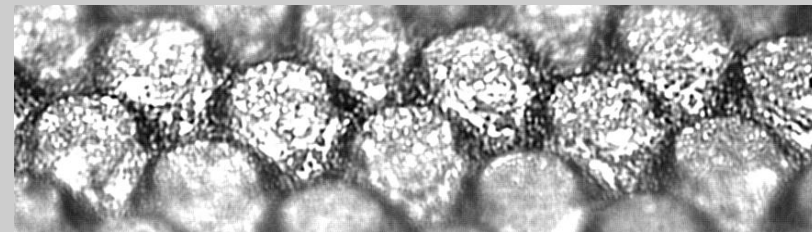
- The last trend is the use of plates with pre-fabricated HighFrequency Microcells
- It allows us to have the best of both worlds. Round Dot + HighFrequency Microcells in all dot ranges



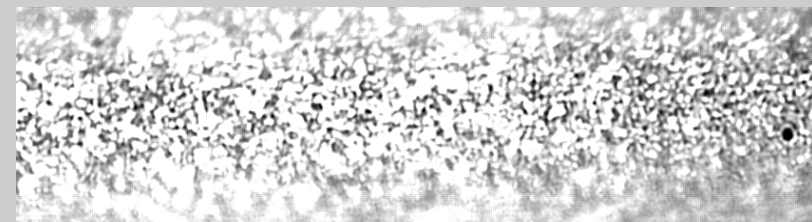
50%



1%



50%



100%

Dupont DSP

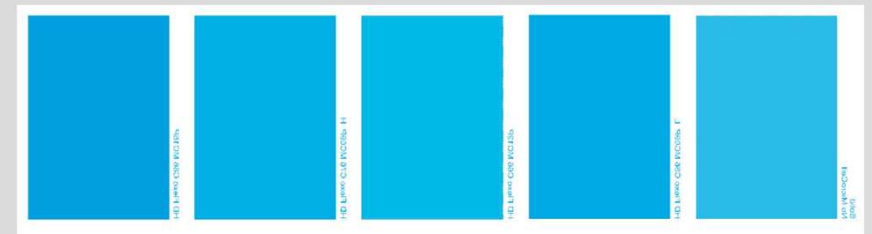
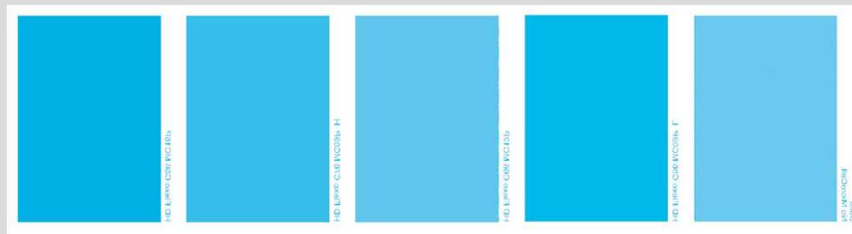
How technologies affect color

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

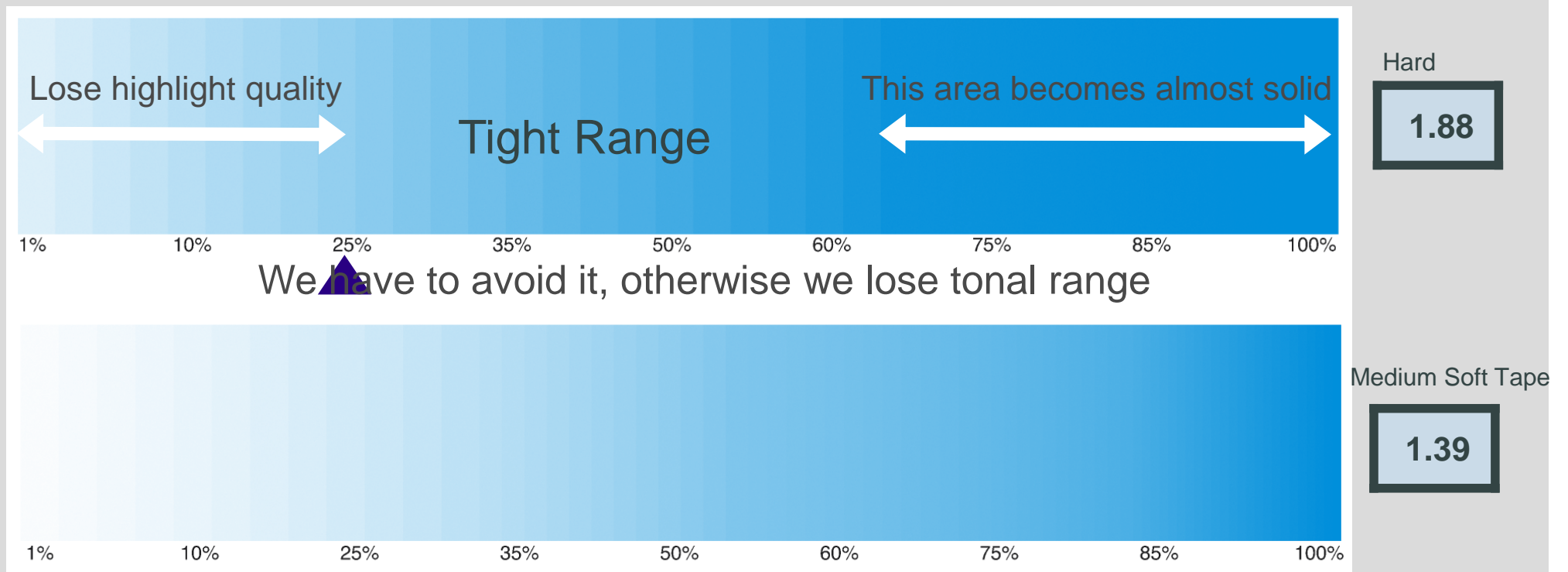
Mounting Tape	Best Density	Technology	Screen Ruling	Viscosity	Anilox	Substrate
Medium Soft	1.39	HD FLEXO - 149lpi		21s Ford 4 Cup	420 l/cm 3.7 Volume	OPP Reverse Printing
Hard	1.88					



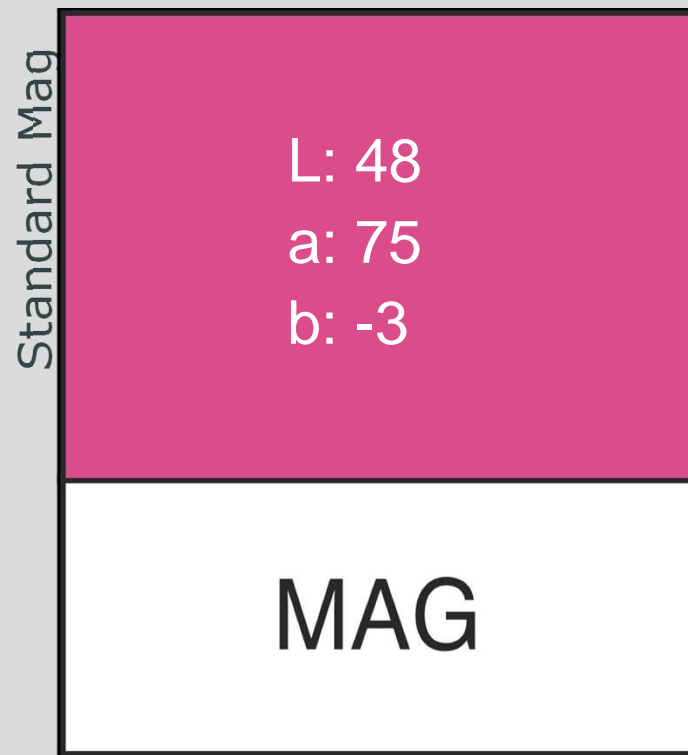
SID	1,39	1,32	1,25	1,35	1,21
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SID	1,88	1,79	1,68	1,82	1,59
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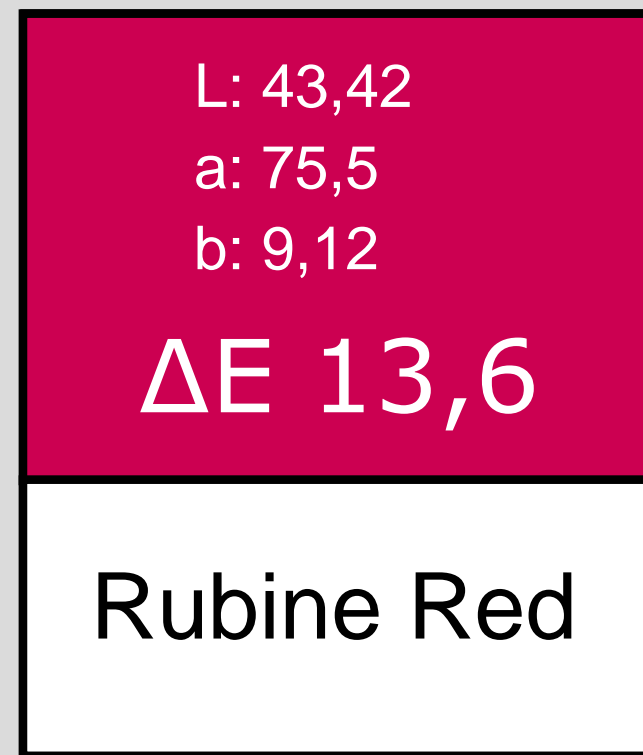
Mounting tapes



Solid Ink Density?



SID 1.35



SID 1.78

Gamut - Pain Points

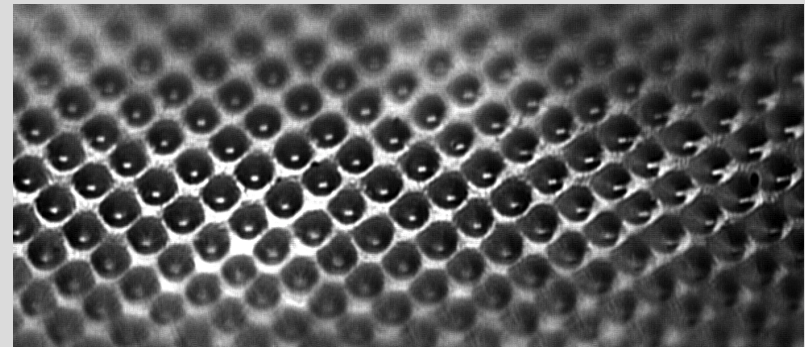
- Very high SID density and high DotGain in CMYK do not create standard values
- Images lose contrast, chroma, gamut
- Images seem saturated with limited tonal range



Flat Dot



Round Dot



MicroCells

Gamut - Key Points

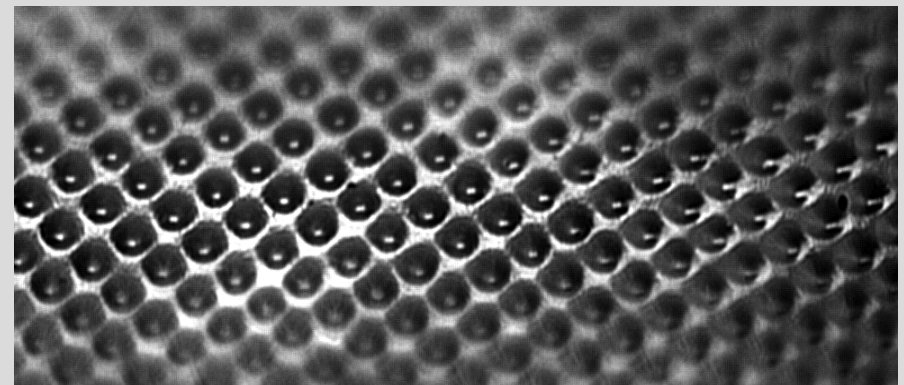
- Smooth solids and good highlights both extend the color space
- Microcells aids in distribution and dispersion of the ink from the plate to the substrate
- Lower highlights are more important than a higher ink density
- The greater the density, the more evident are the Dot Gain in highlights



Flat Dot



Round Dot

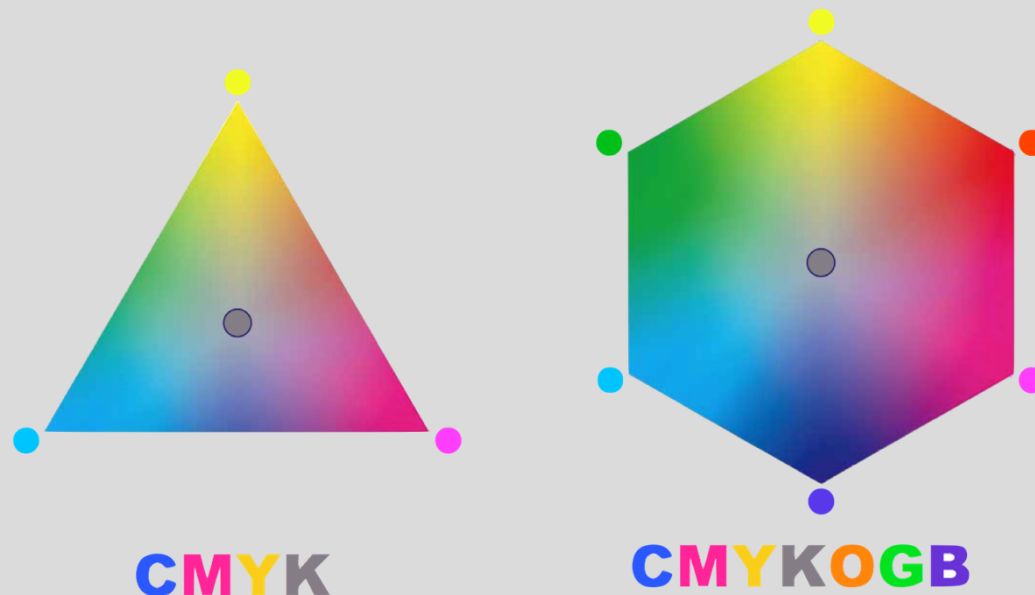


MicroCells

Multicolor Management

Gamut

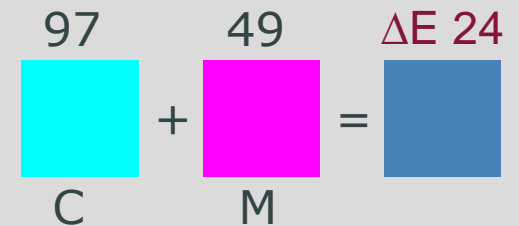
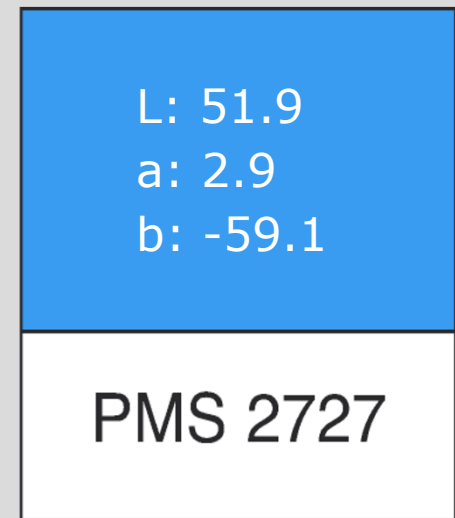
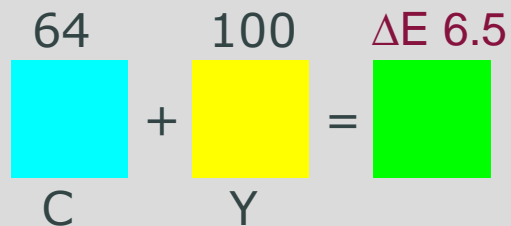
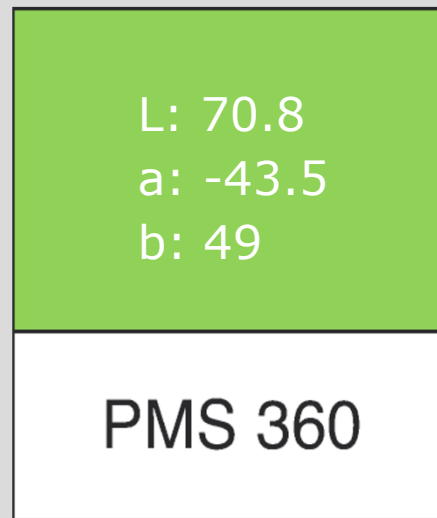
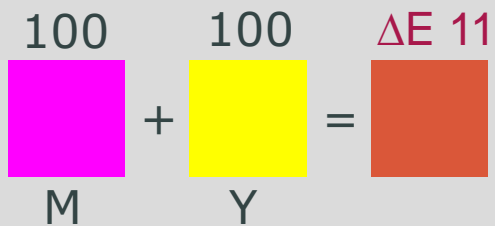
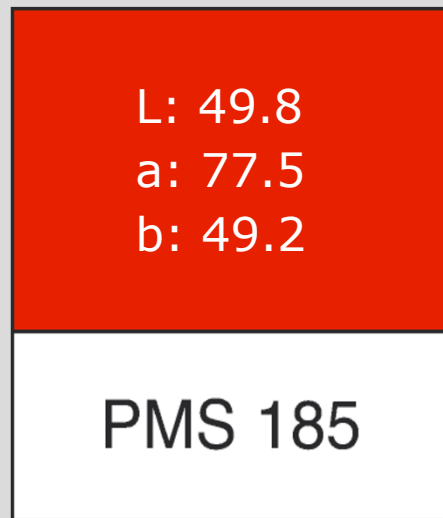
- The Heptachrome technology is suitable for high-quality flexo printing
- The standard four-color process setup limits the range of possible colors in the visible spectrum



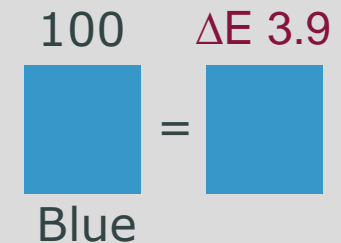
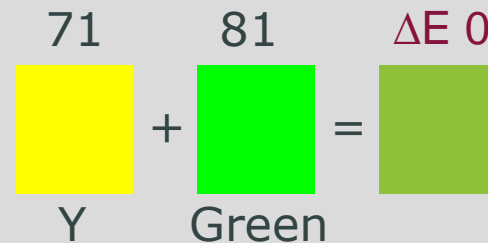
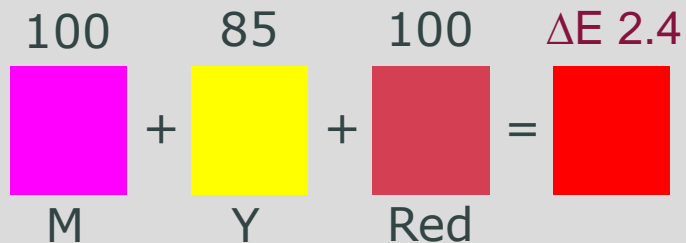
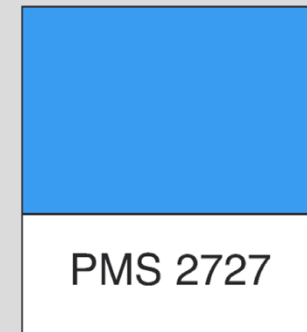
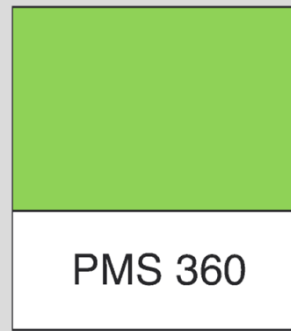
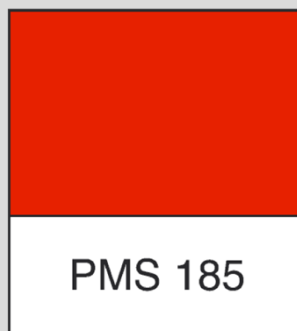
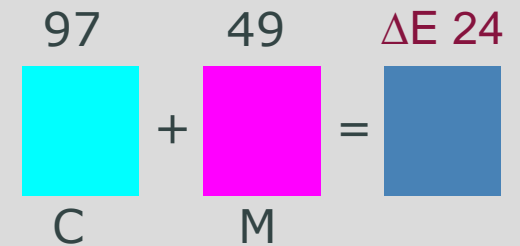
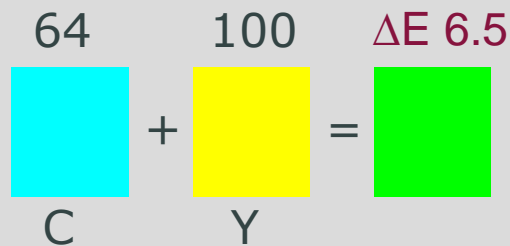
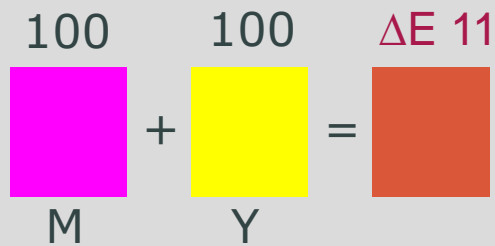
Multicolor

- The color gamut is increased only by adding extra color. 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 Heptachrome (7-color) 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



Multicolor

- Good Pantone color match
- 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

Extended Gamut

To achieve what is not possible with CMYK

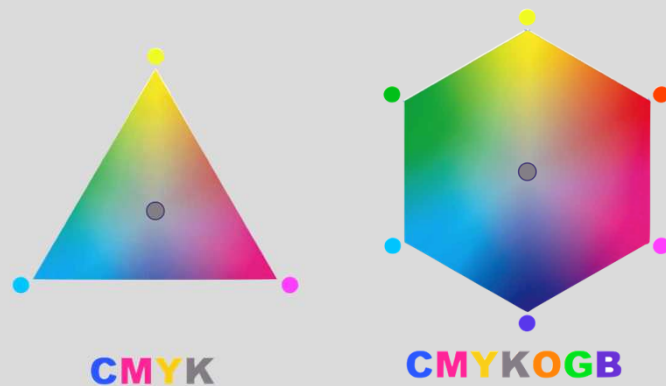


Multicolor (CMYK-Red) + Brown Text

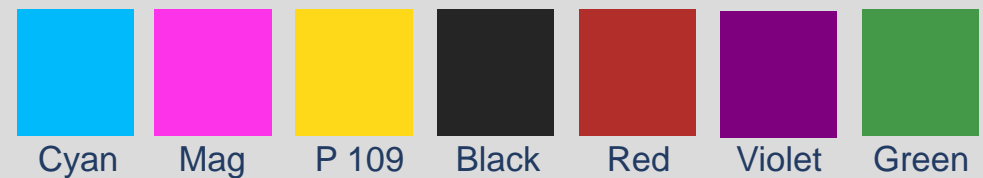


Multicolor

- Advanced color Management - CMYK + 3 extra inks (Multicolor)



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
 - Pantone or CMYK conversion to multicolor, based on the press color profile
 - We advise the printer if an extra color needs to be added to reach the target

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