

What's all the buzz?

FPPA Annual Meeting

Orlando

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Anderson & Vreeland



Advancements in Inkjet Film

What is Gray-Balance?

Hybrid Screening & Flat-Top Dots



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Advancements in Inkjet Film



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How many people use conventional film?

How many use Digital plates?

How many use both?

How many are sheet? Liquid? Both?



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Advancements in Inkjet Film

Who still manufactures silver-halide film?

- AGFA?
- Fuji?



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Advancements in Inkjet Film

Where is the need?

- Liquid Photopolymer
 - Corrugated
 - Stamping
 - Sand Molding
- Analog-only Plate Materials
- Screen Printing
- Dry-Offset
 - Quickly turning to digital materials

Where is the need?

- Liquid Photopolymer
 - Corrugated
 - Stamping
 - Sand Molding
- No Direct-to-Liquid Exposure
- Standard Liquid Size Requirements:
 - 52x80"
 - 42x60"
 - 30x48"
 - 30x40"
 - (uncommon sizes: 44x60" & 52x110")



Avantage liquid plate made by AVStar film

2 Types of Ink

Pigment-Based

- Colorant particles are suspended in the liquid
 - » Good light-fastness – less fade than dye-based
 - » Recent advancements to increase colorfulness
- **But... not easy to clean**
 - » Can only be cleaned with lighter-fluid/butane

2 Types of Ink

Dye-Based

- Colorant particles dissolved (solution)
- Better Flow properties than Pigment inks
 - » Produce vivid color
 - » Good for high-precision printing
 - » Recent advancements in longevity
 - » Able to get more “color” into the dye
- Can be cleaned with Alcohol or Film-Cleaner

Media

Standard Clear Film Media

- Clear Film
- Initially developed for screen-printing
- Good for Flexo?
 - Can be used, but some air pocket issues

Media

Matte-Based Media

- Matte coated media has a micro-porous coating
 - Roughs up the surface
 - Allows air to escape during vacuum
 - Easier to pull draw-downs
 - » Even on Liquid Plate-making
 - Good for Conventional Sheet Plate-making
 - » Easy drawdown on sheet photopolymer

Ripping Technology

- Many RIPs are available
- Needs driver output to the specific inkjet
- All the RIPs are different
 - Ease of use
 - Integration into existing workflow
 - Handling of Spot Color angles, etc

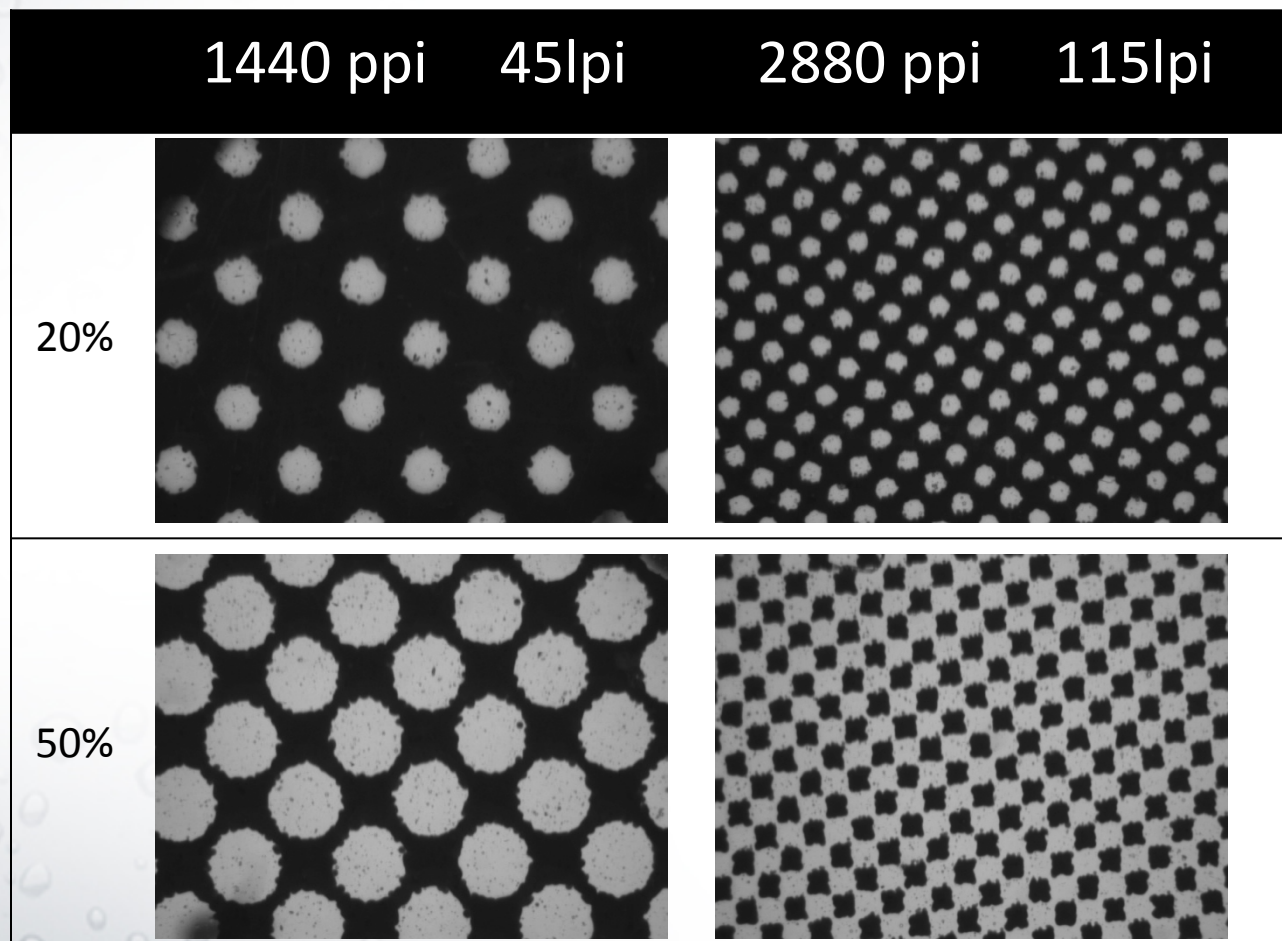
Resolutions/Linescreens

Resolution will depend on the printer. In the case of Epson devices, the output is generally a multiple of 720 ppi

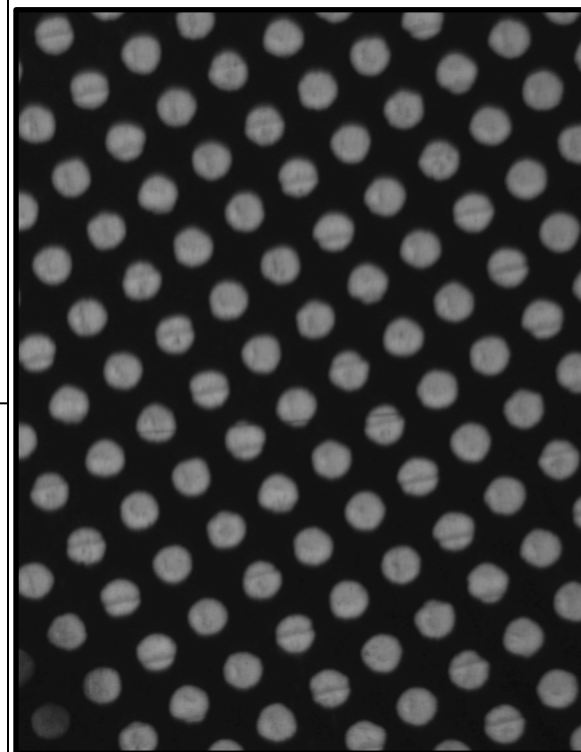
- **1440 ppi**
 - Linescreens available from **45-85 lpi**
- **2880 ppi**
 - Linescreens available from **85-120 lpi**

Speed/Quality

Resolution	1440 ppi	2880 ppi
Linescreens:	20 – 85lpi	85 – 120lpi
Min San Serif Text:	6pt	6pt
Speed (44x60"):	20 min	40 min
Dmax Ortho:	3.0 – 3.2	3.6 – 4.0



InkJet Film Sample



LaserPointII sample
2540/133lpi



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Advancements in Inkjet Film

Limitations

- **Why can't we go to 200 lpi?**
 - Inkjet head technology can only make a droplet size so small
 - » Image-setters use a light or laser to expose in resolution, not liquid ink.
 - » Liquid ink flows before drying, so at higher resolutions, spread is an issue.
- **Where is the wide-format device?**
 - Wide format devices are available, but the speed is quite prohibitive.
 - » 44"x60" piece at 1440 ppi on a 60" machine: Approx. 1 hour

Questions:

- How many of you have an image-setter larger than 44" wide?
- What is the percentage of your work that is larger than 44" wide?
 - 100%
 - 75%
 - 50%
 - 25%
 - 5%

Does the speed advantage of the 44" device, offset the need for a wider machine?
(piece together jobs)

What is Gray-Balance?



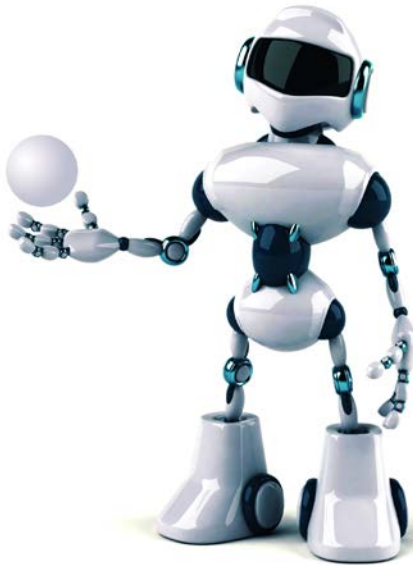
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What is Gray-Balance?

The FIRST definition:

“The proper combination of cyan, magenta, and yellow ink dot area, hue/density, trap, transparency, and register on a specific substrate under normal printing conditions that reproduce as a neutral gray.”

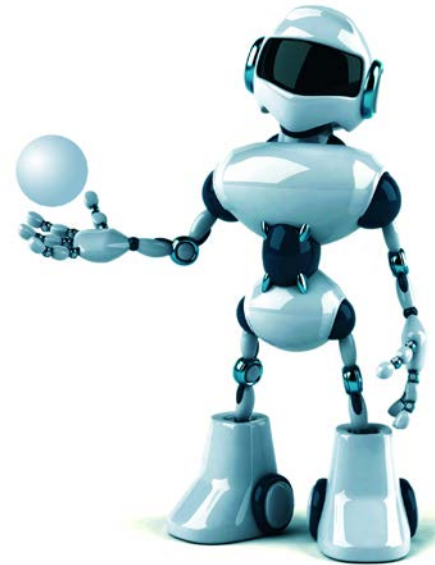
Gray-Balance – C + M + Y builds



Too 'warm'



Just Right



Too 'cool'



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What is Gray-Balance?

Neutral Gray

- The end result of C,M, & Y ink over-printing
 - Generate a color without HUE







G7 (GRACoL 7)

- Originated in the offset market
- “Near-Neutral Calibration Process”
- Takes into account C M Y channels
 - Measures in overprint mode to generate dot-gain curves
 - » Uses Xrite i1iO or similar
 - Converts $L^*a^*b^*$ values to dot percentages

G7 Recommendations

- Single Pigment Ink
- Meet targeted $L^*a^*b^*$ values for CMYK
 - FIRST recommends within a Delta E of <5
 - Industry experts suggest Hue is more important

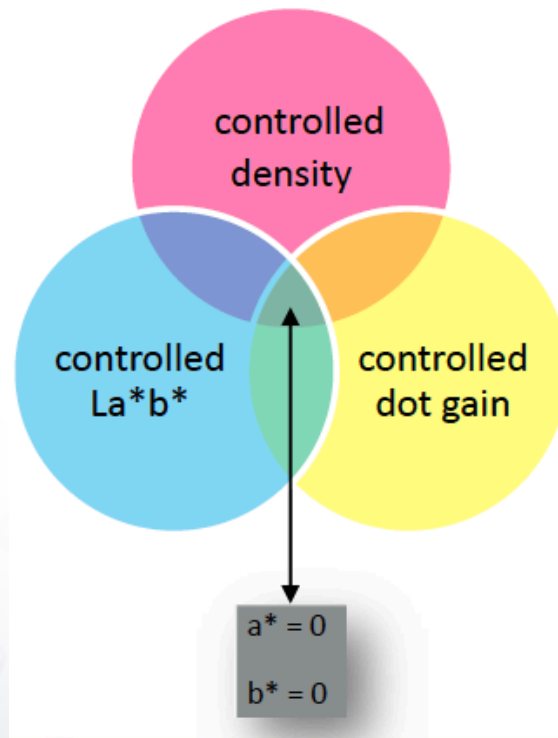
Ink -> $L^*a^*b^*$ Target:	L^*	a^*	b^*
	55	-37	-50
	48	74	-3
	89	-5	93
	16	0	0

G7 Requires Consistency in:

- Ink
 - L*a*b* values
 - Viscosity
 - Type/brand
- Anilox
- Solid ink Density
- Sticky-back/ Plate Package Build-up
- Impression/Operator Adjustments
- Press Curves
- Plate-making
- Finishing Components
 - Lamination
 - Varnish

Measuring Neutral Gray

- Using Spectrophotometer
- Similar to measuring spot colors



Our final goal is near-neutral density:

$$(a^* = \text{ZERO}, b^* = \text{ZERO})$$

The best way to get to this neutral density is to control and repeat measureable points such as density, dot gain, and La^*b^* . If these three points remain consistent, the neutral gray will remain consistent.

Challenges of Implementing G7 in Flexo

- Consistency run-to-run
 - In plate-making
 - In press setup
 - In multiple presses throughout a plant
 - In finishing operations
- The diversity of specialty materials & ink

**Is there a place where Flexo can begin to
Focus on Gray-Balance?**



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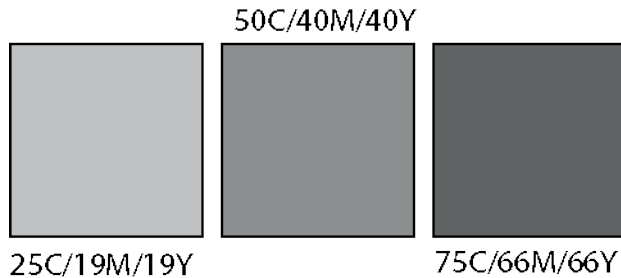
What is Gray-Balance?

Utilizing Gray-Balance in Flexo

- Add CONTROL STRIPS
 - **DIGITAL FILE**
 - » To be read in 1-bit TIF/LEN Viewer
 - » Verifies press-curve info
 - **Film/Digital Mask**
 - » Measured with transmission densitometer
 - **PLATE**
 - » To be measured by plate QC device
 - » Verifies plate-room equipment is working properly
 - **PRESS**
 - » Includes a 3-color Gray-Balance Target
 - » Made of 3 blocks

Control-Strip – PRESS

- How can it be measured?

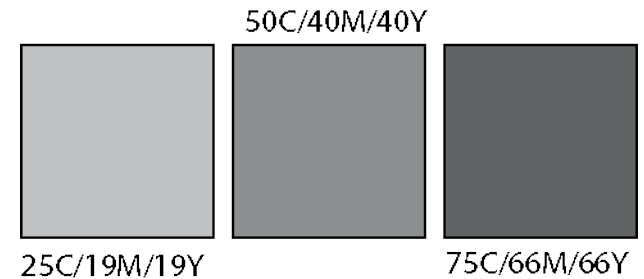


L^* value = variable
 a^* value = 0
 b^* value = 0

Substrate will play
an important role in
achieving the
values above.

Control-Strip – PRESS

- **What does this show?**
 - Press is consistent
 - Quickly shows impact of:
 - » improper impression
 - » Improper press configuration (anilox)
 - **VALIDATION**
 - » If color issue in the job; but control strip reads properly: problem lies somewhere other than press



G7 & Gray-Balance in Flexo

- G7 is based off the concept of Gray-Balance
 - Focused in the offset arena
- Components of G7 can be applied to Flexo
 - Start with Process Control
- Gray-Balance can be a key indicator in helping troubleshoot print issues
 - If check-points are implemented in the process

Hybrid Screening & Flat-Top Dots



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Flat-Top Dot Systems

- Flint NExT
- Toyobo Cosmolight (kind-of)
- Under-Water Exposure Unit
- Esko Inline UV2
- Dupont DigiFlow
- MacDermid LUX
- Kodak NX



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Hybrid Screening & Flat Top Dots

How to make a Flat-top dot?

Remove Oxygen from the surface of the plate

- Quick Surface Polymerization
 - Flint NExT
 - Esko Inline UV2
- Barrier
 - Toyobo
 - MacDermid Lux
 - Kodak NX
- Substitution
 - Dupont DigiFlow
 - Under-Water Exposure

What's wrong with Oxygen-Inhibition?

Nothing! In most cases...

Provides:

- A naturally-occurring, smooth & consistent cutback
- A simple plate-making workflow

Facilitates:

- Sub-surface screening

Why Flat-Top?

Flat-Top dots may be able to help with:

- Solid Ink Density
 - surface screening
- Mottle on some porous paper substrates
- Fluting in Corrugated Printing

Flat-Top in Prepress

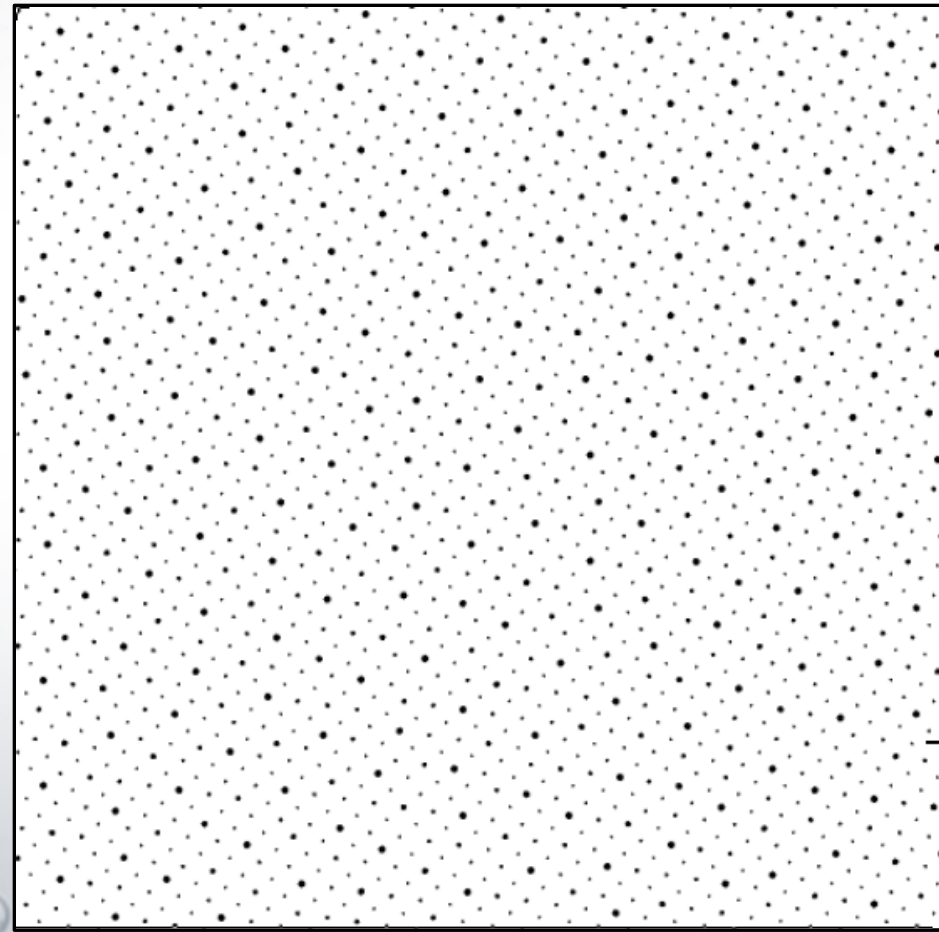
Without Oxygen-inhibition...

- There will need to be less of a bump curve
 - 1% bump may need to be required
- Will require a heavier cut-back (press dot gain) curve
 - No natural reduction
 - Tone values are 1 to 1 - like analog platemaking
- Hybrid Screens will have to be modified.

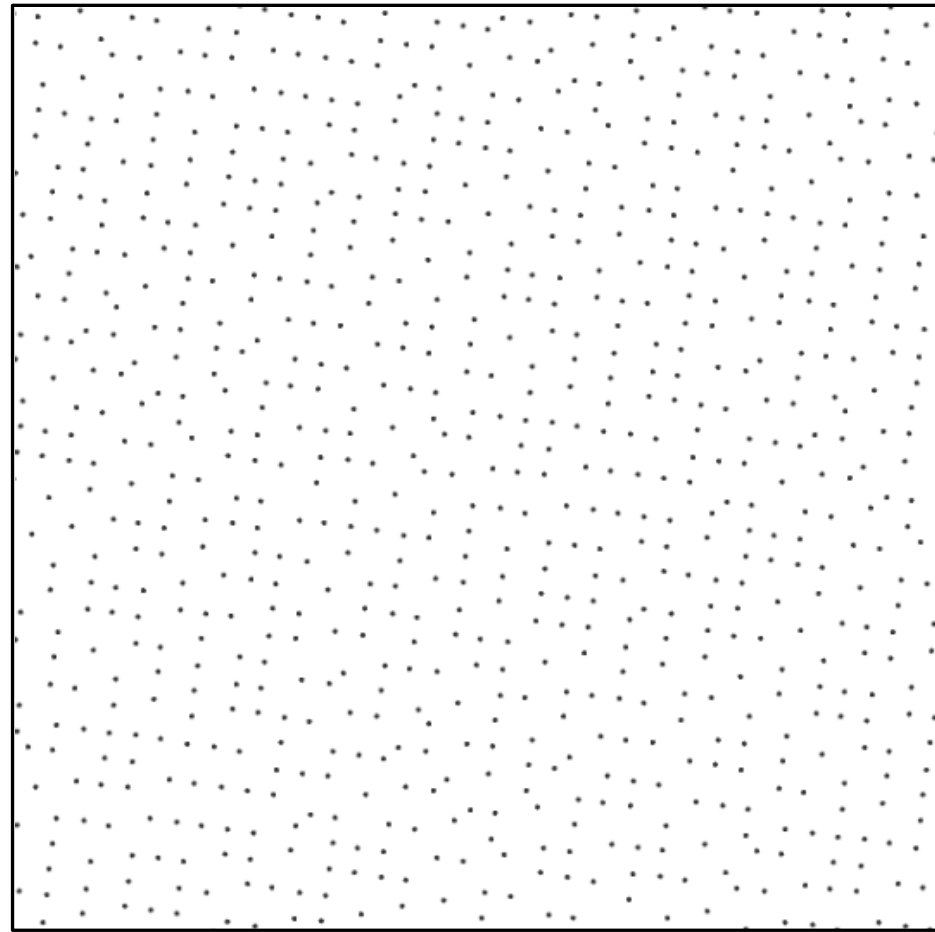
Hybrid Screening

- Utilizes AM screening from shadows to near-highlights
- Picks up a “custom” screen in the highlights
 - Stochastic-type
 - HD Flexo – dot stays on the grid like AM
 - » dots reduce at different levels once dot = “X” pixels
 - Flat-Top Hybrid or HD results in a high resolution stochastic screen in the highlight areas.
- Transition/meeting point of the 2 occurs less than 10%

The difference in Specialty Screens



HD Flexo Screening – Digital Plate

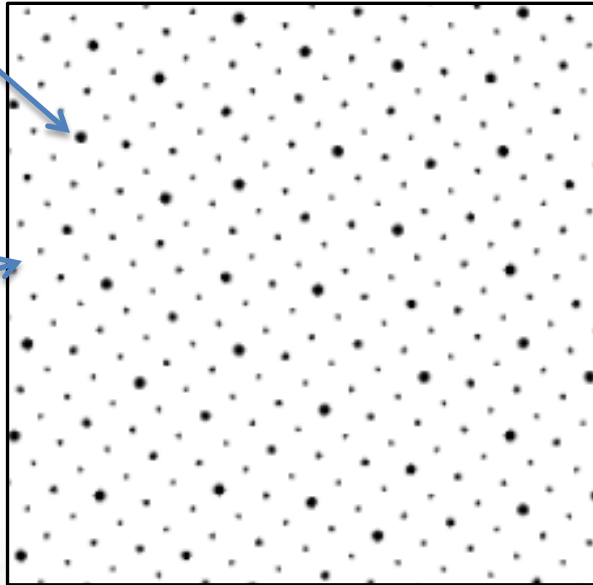


HD Screening for Flat-Top

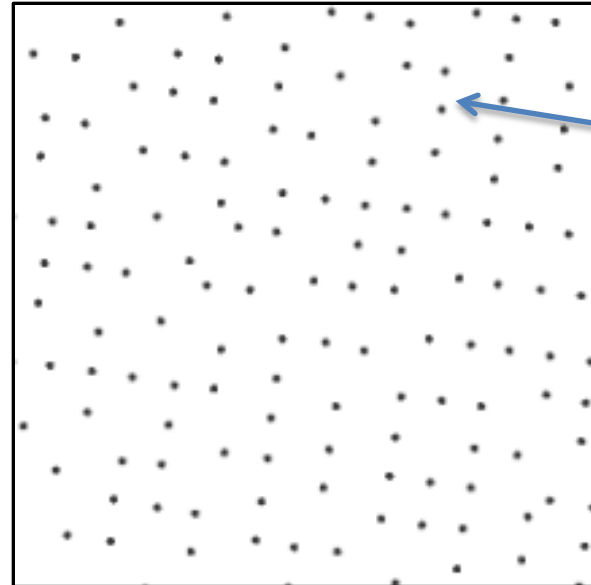
The difference in Specialty Screens

These larger dots will be the main printing dots.

Some of these small dots will form below the surface of the plate and will not print.



HD Flexo Screening – Digital Plate

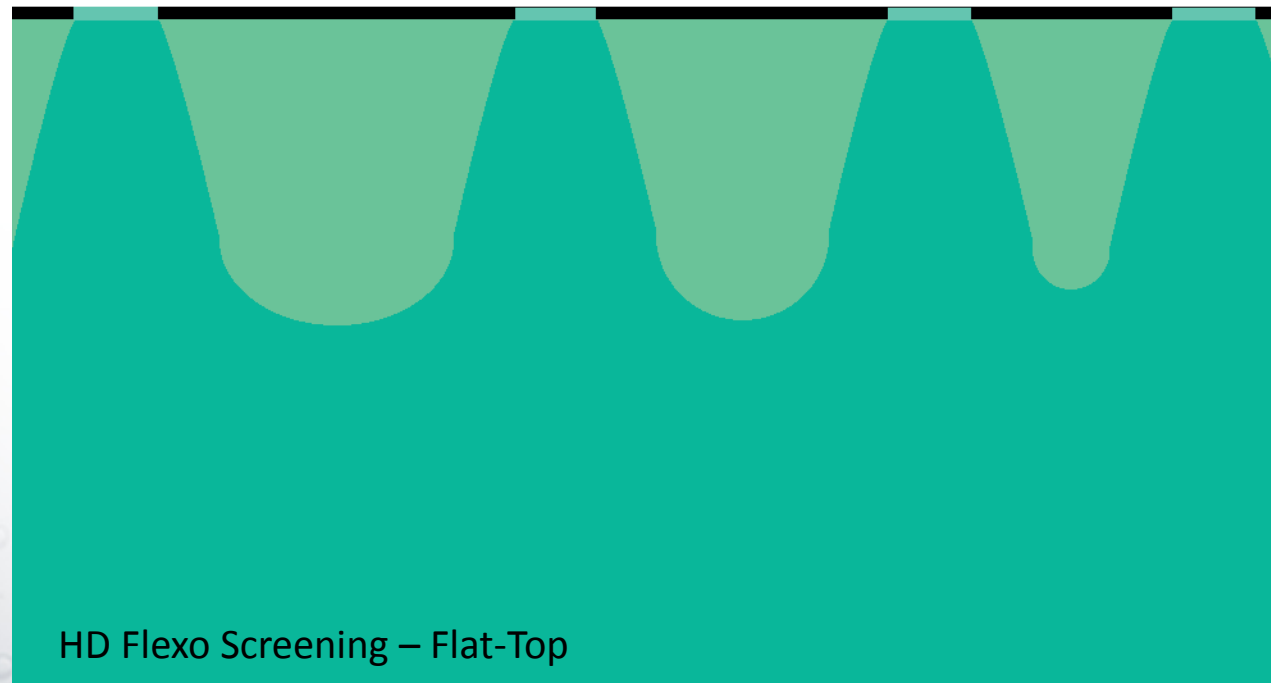


All of these dots are the same size, and are arranged in a scattered pattern.

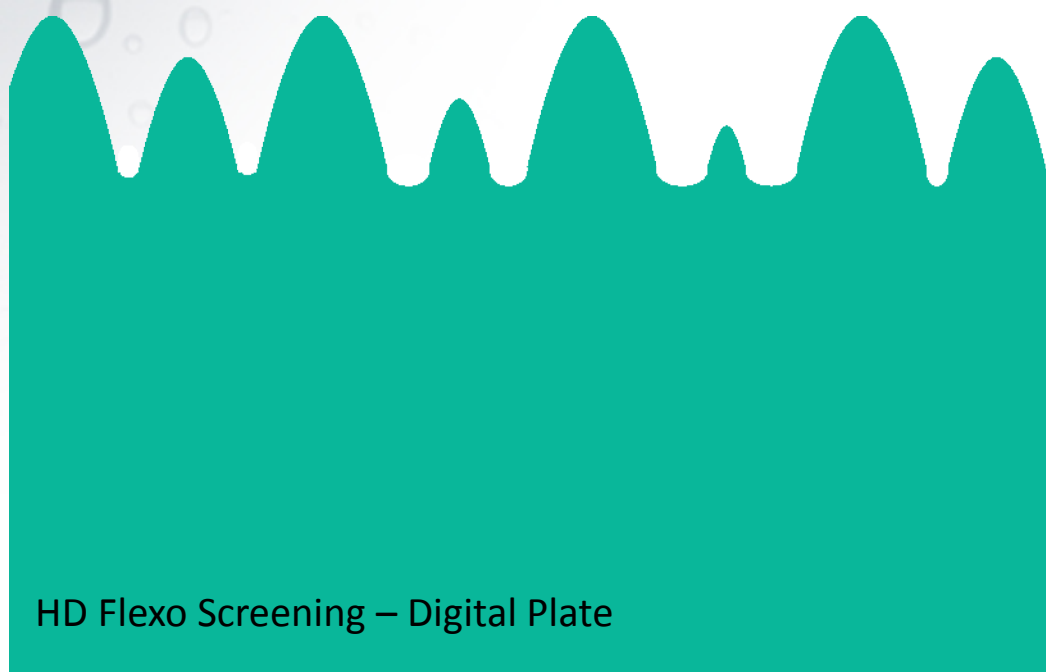
HD Screening for Flat-Top

Estimated Dot side-view on Digital Plate with with Ablated Mask

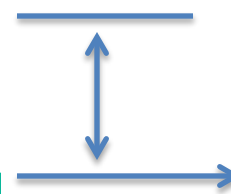
HD Flexo Screening – Digital Plate



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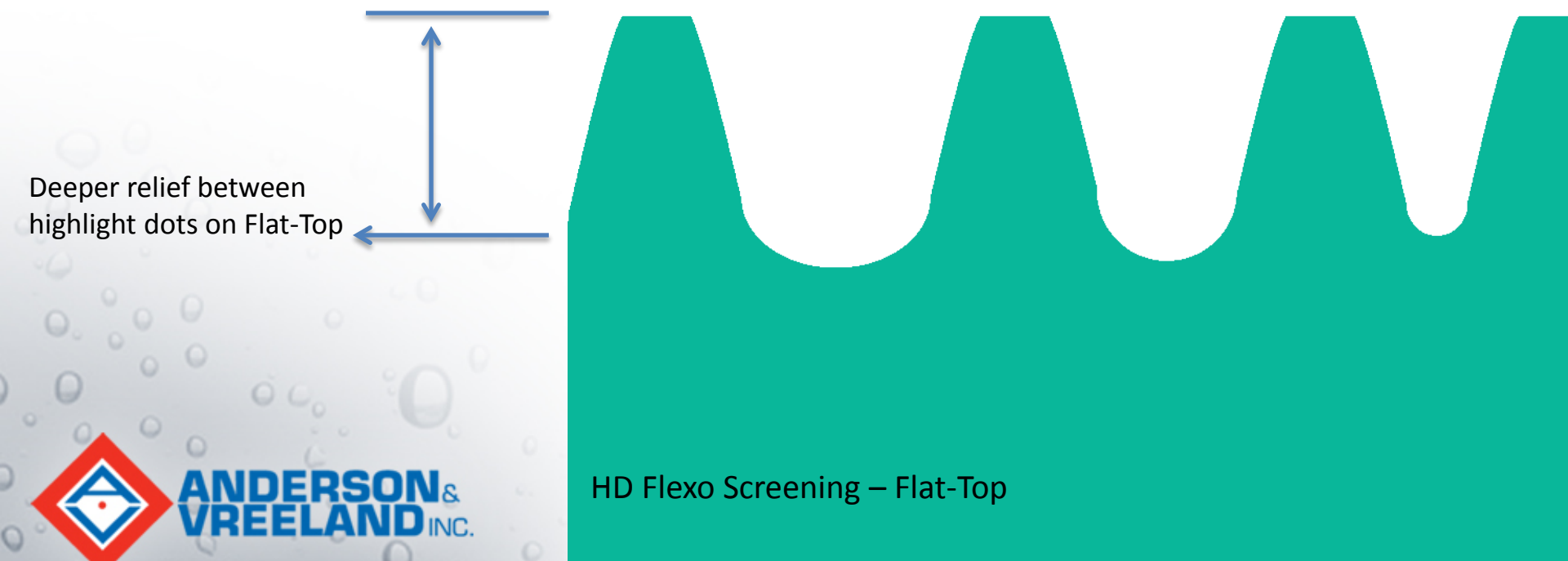


HD Flexo Screening – Digital Plate

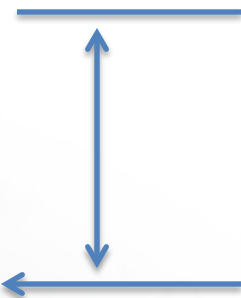


More shallow relief on
digital – non Flat-Top
HD Flexo plate

Estimated Dot side-view on Digital Plates - Processed



Deeper relief between
highlight dots on Flat-Top



HD Flexo Screening – Flat-Top



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Flat-Top & Hybrid...

- Flat-top can use a Hybrid Screen
 - No oxygen-inhibition/dot reduction?
 - » Stochastic dot in the extreme highlights
- Will this stochastic-hybrid Flat-Top print as well as the digital plate-HD Flexo Screening?

- The return to Flat-Top dots is relatively new
- There are still a lot of Technologies being tested
- Open discussion about when to use:
 - **Standard Digital**
 - **Flat-Top**
 - **Solid surface Screening**
- More to come...

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