



Impact of Flexo technology in the packaging market

Use of the printing technology worldwide in flexible packaging

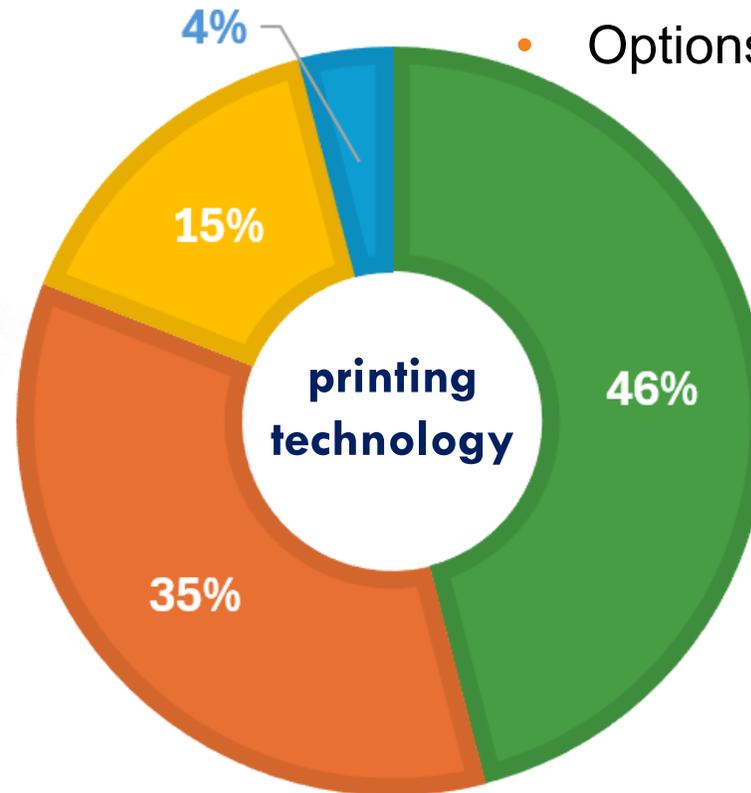
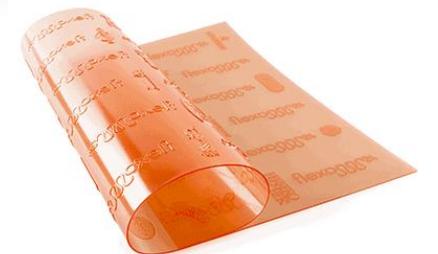
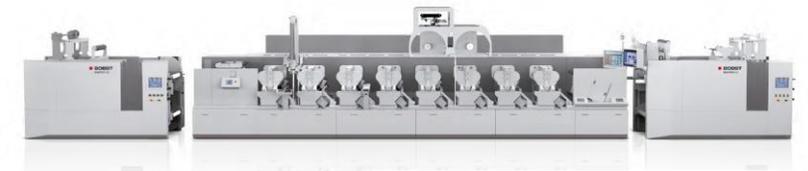
Gravure

- Massive install base of presses in the region
- New presses being installed but also lots of aging equipment
- Plenty of skilled operators



Flexo

- Compact, growing install base of presses
- Modern – growing fast
- Lack of skilled operators and standardization
- Options of ink, substrate



- Flexo
- Gravure
- Digital
- Other

Factors that driving the conversion

Environmental & Sustainability

- Reduction of carbon footprint in print process whenever possible.

Market Demand

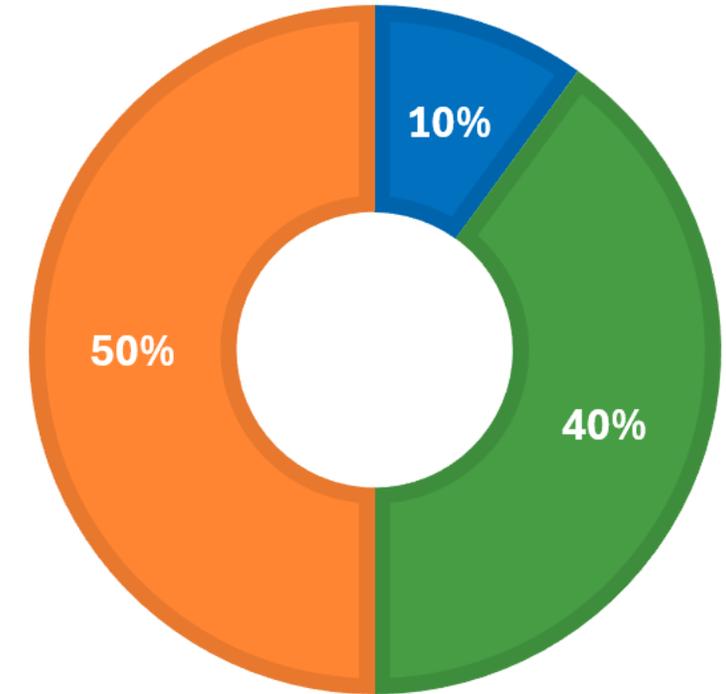
- SKU growth and personalization favor flexo for short runs.
- Evolution of mid-web has enabled more converters to go Flexible including the Narrow Web Label converters.

Cost Efficiency

- **Quicker Setup Time:** Quick changeover for short runs especially with Fixed Color Palette(ECG)

Continuous Improvements from Industry Partners

- Advances: Aniloxes, inks, tapes, digital plate making, etc

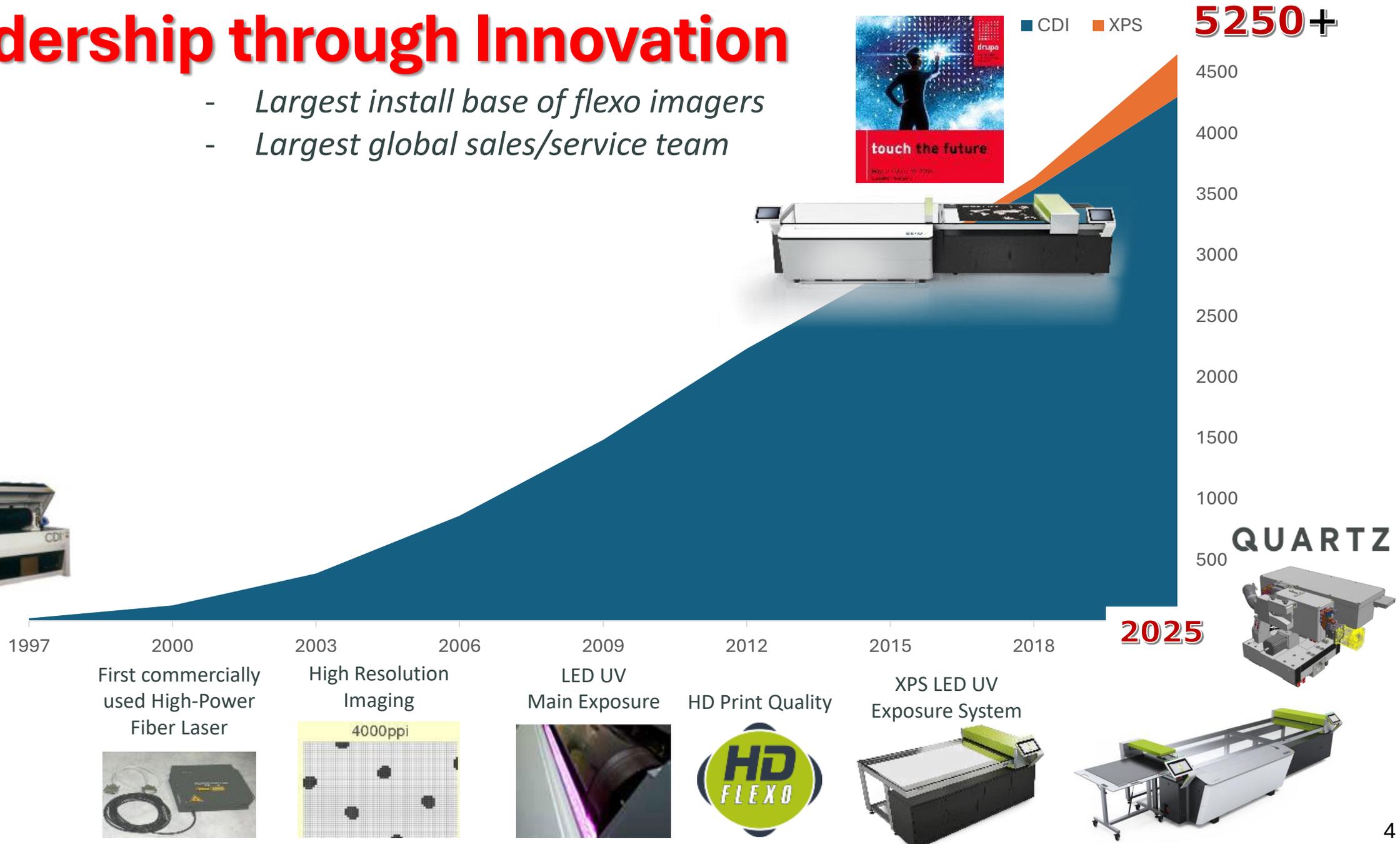


Estimated run length of flexible market:

- <5,000 m
- 5,000–15,000 m
- >15,000 m

Leadership through Innovation

- Largest install base of flexo imagers
- Largest global sales/service team

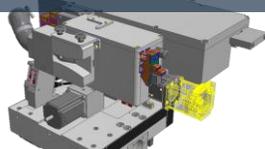


Introduction Quartz Ecosystem

CDI



Quartz Optics



XPS



Premium Care Plan



PCW Quartz



CDI Crystal

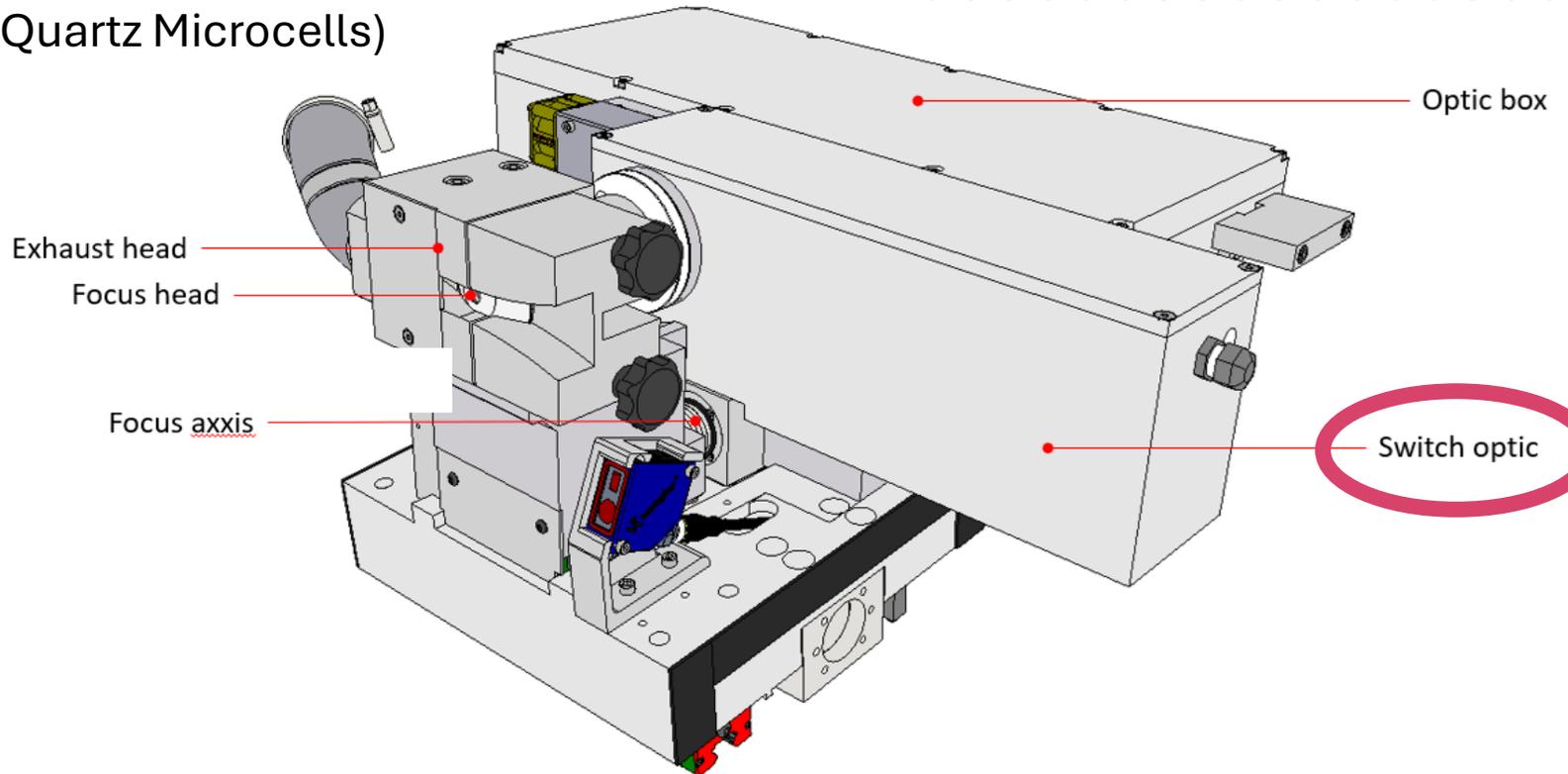
- **Modern, Fast and Automated** flexo plate imager
 - **3rd generation V3+** optics for legacy files
 - Quartz Optics for best imaging quality with new Quartz Screens (Quartz Microcells)
 - Touch display with simplified GUI
 - Built for automation and future evolution

- **Simple and Modular**
 - **training <1h** to start operating the system (CDI)
 - **eliminates human error**
 - **connectable** to XPS Crystal, Processing Lines and Cutting Table



Quartz Optics

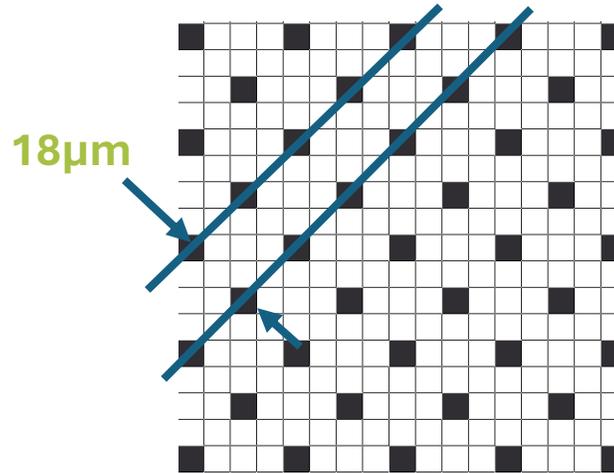
- **Switchable beam expander** to image both
 - **legacy** 2.400/2.540/4.000 bitmap files with Classic, HD Flexo, Crystal screen with **MCWSI**
 - **new** Quartz Screens with **Q-Cell** (Quartz Microcells)
- **Best in class imaging quality level**
 - Perfect beam balancing
 - Dot size homogeneity
 - Sharp LAMs perforation



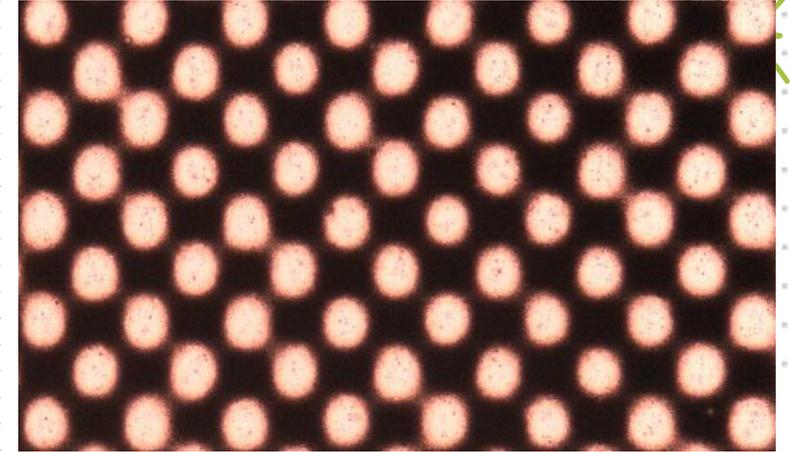
Quartz Optics

Crystal surface structure (Crystal MCWSI):

- Imaging resolution: 4.000ppi
- Frequency: 1.400lpi
- Dot diameter (LAMS): 12 – 18 μm
- Productivity: up to 8m²/h



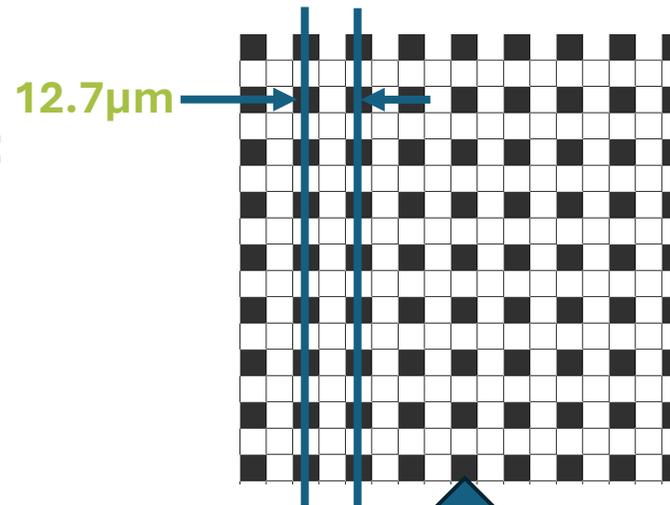
Digital Bitmap File



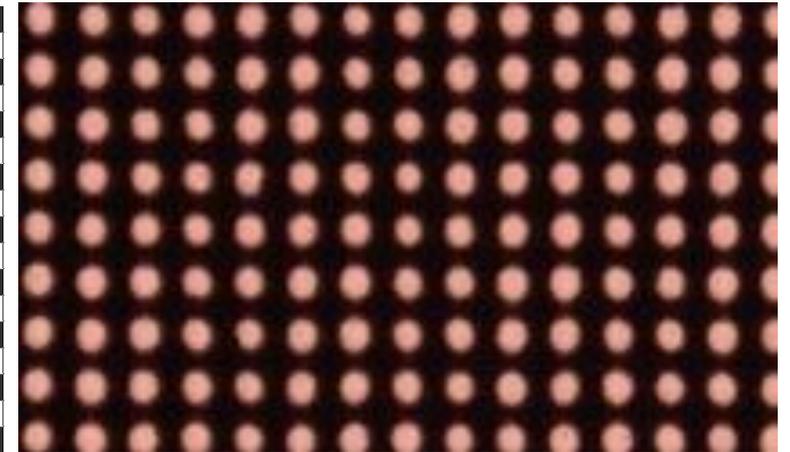
Imaged LAMS

Quartz surface structure (Q-cells):

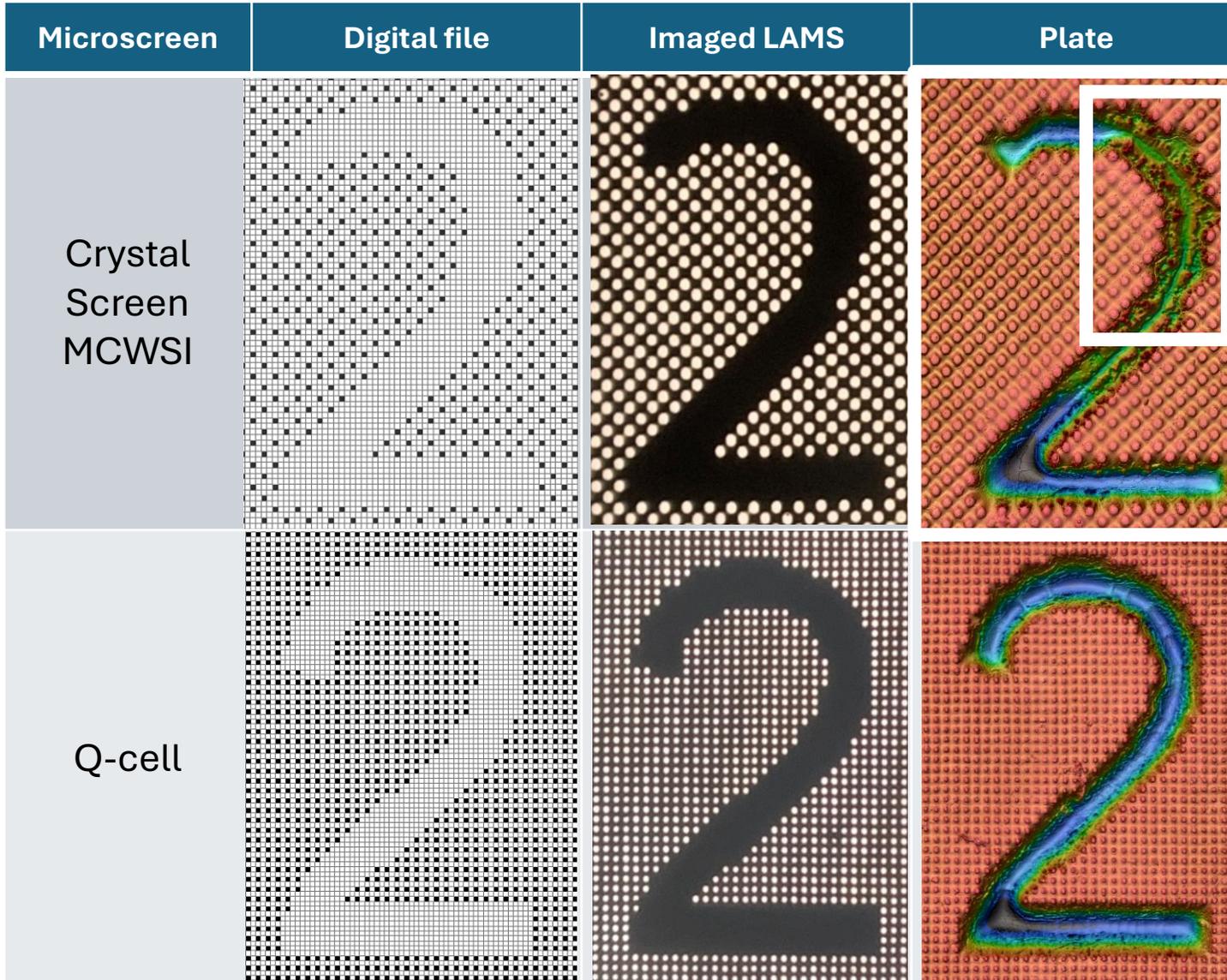
- Imaging resolution: 4.000ppi
- High frequency: 2.000lpi
- Dot diameter (LAMS): 6-9 μm
- Productivity: +4m²/h



Double number of dots,
higher density



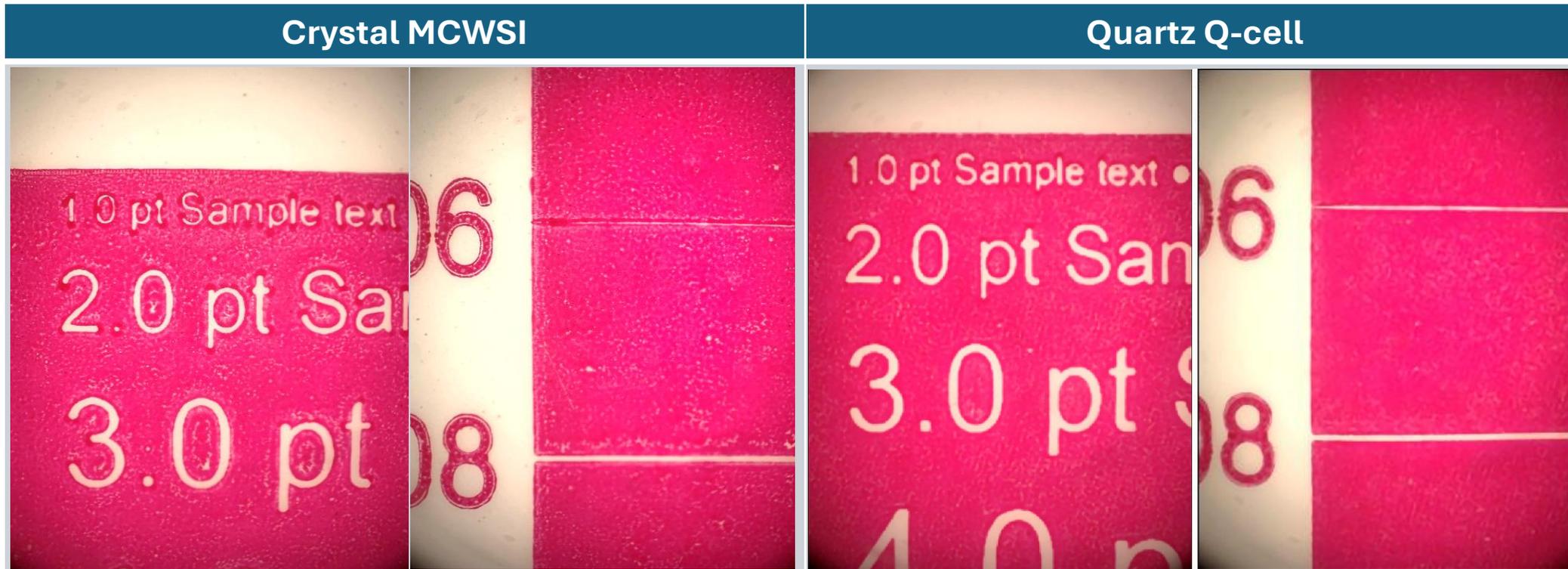
Quartz Optics



- Higher number of micro dots per anilox cell boosting ink transfer and homogeneity
- Higher anilox lineatures/lower volume for very high details (transition to zero).

Images shown are 2-point Negative Text

Quartz Optics – Reverse Elements



Q-cell
Higher definition with negative elements, text and linework

Anilox: 1,067 lpi, 2.3BCM, Medium Soft tape

XPS Crystal

Consistency

- UV LED Diodes simultaneously expose the face and back of the plate. No Waiting, Warm up!

Quality

- UV Head moves over the surface of the plate multiple times

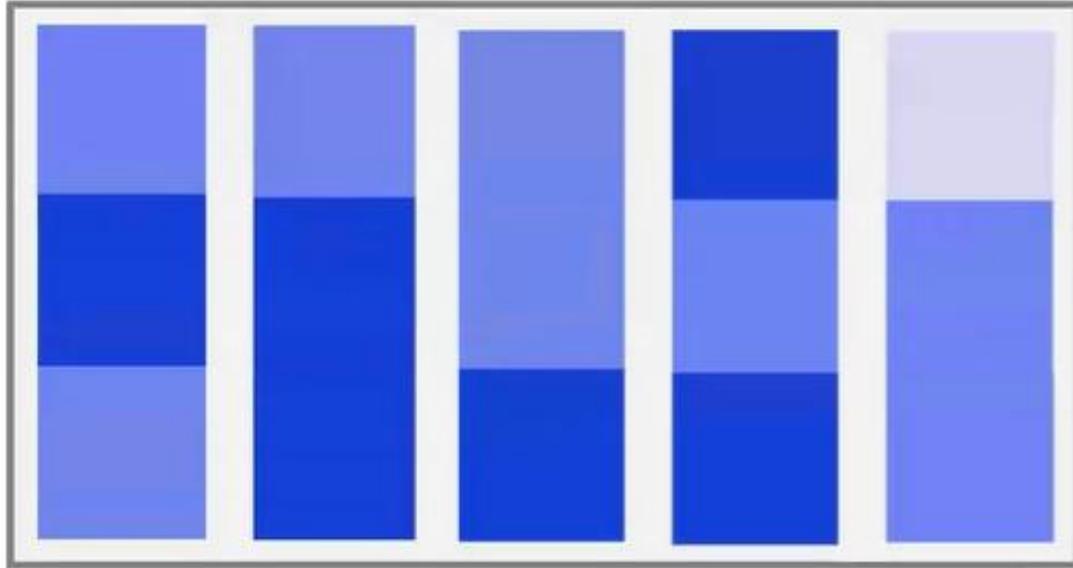
Simplicity

- Touch screen and preloaded exposure settings simplify operation.



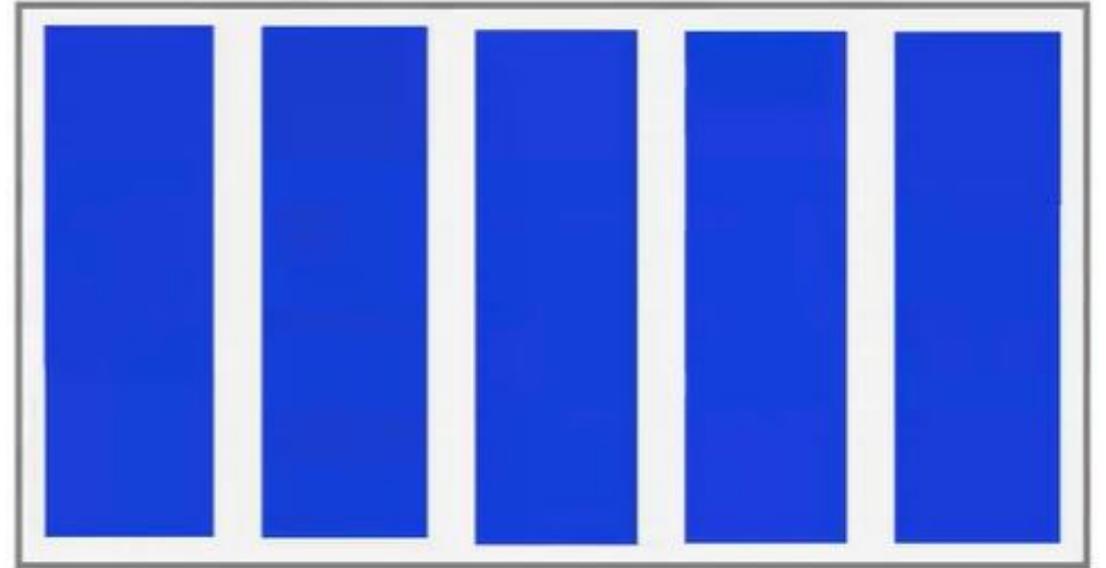
Repeatability: UV Intensity Distribution

50x80 Plate Size

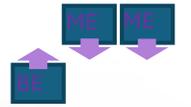
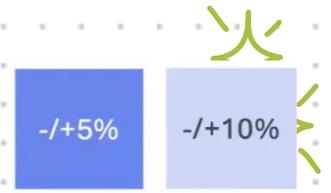


Variation in
Static LED
UV Distribution

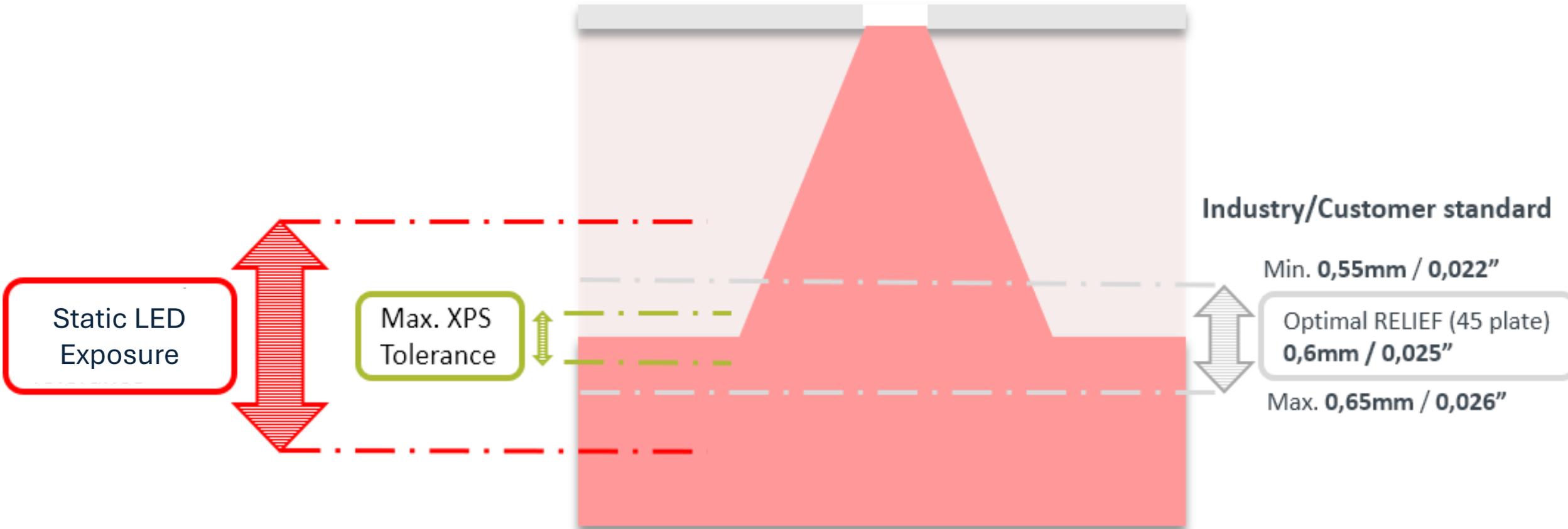
50x80 Plate Size



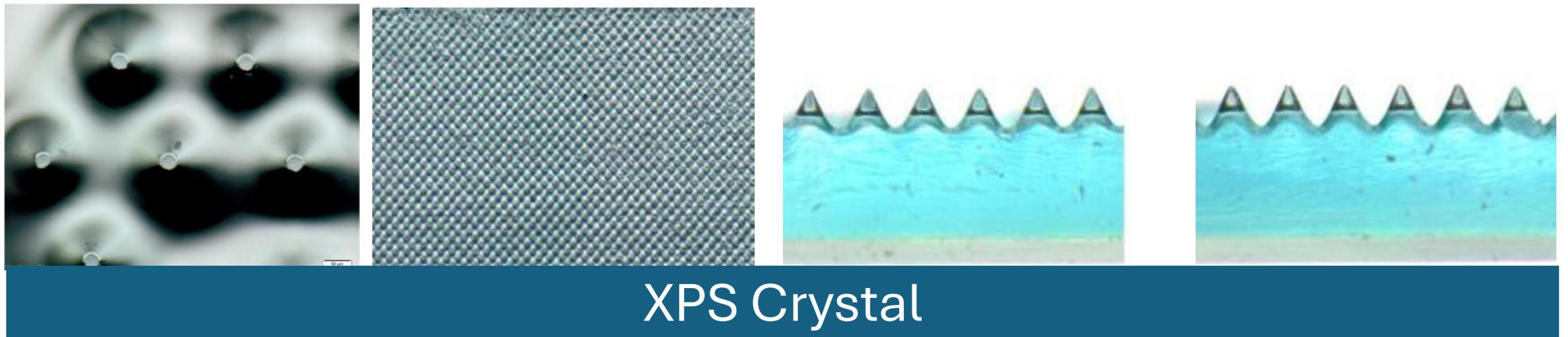
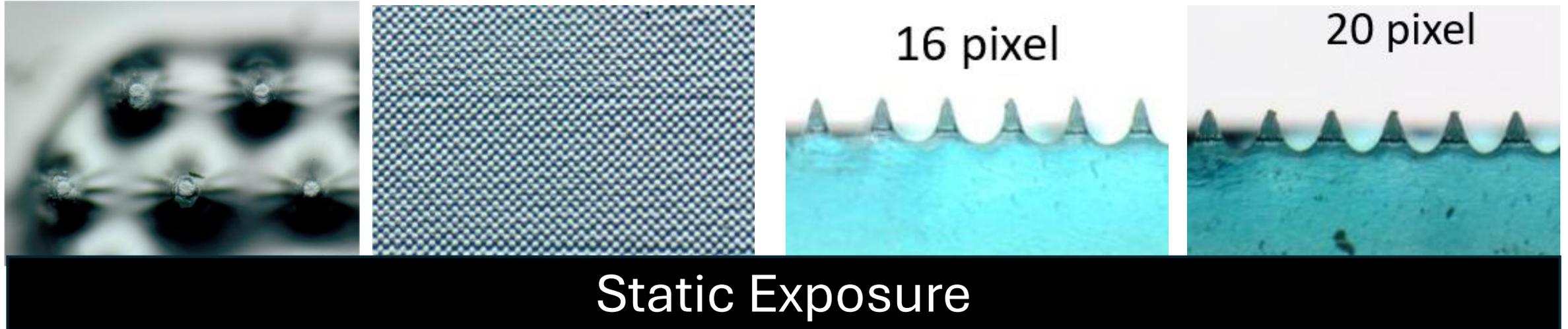
Variation in
XPS Crystal Scanning
UV Distribution



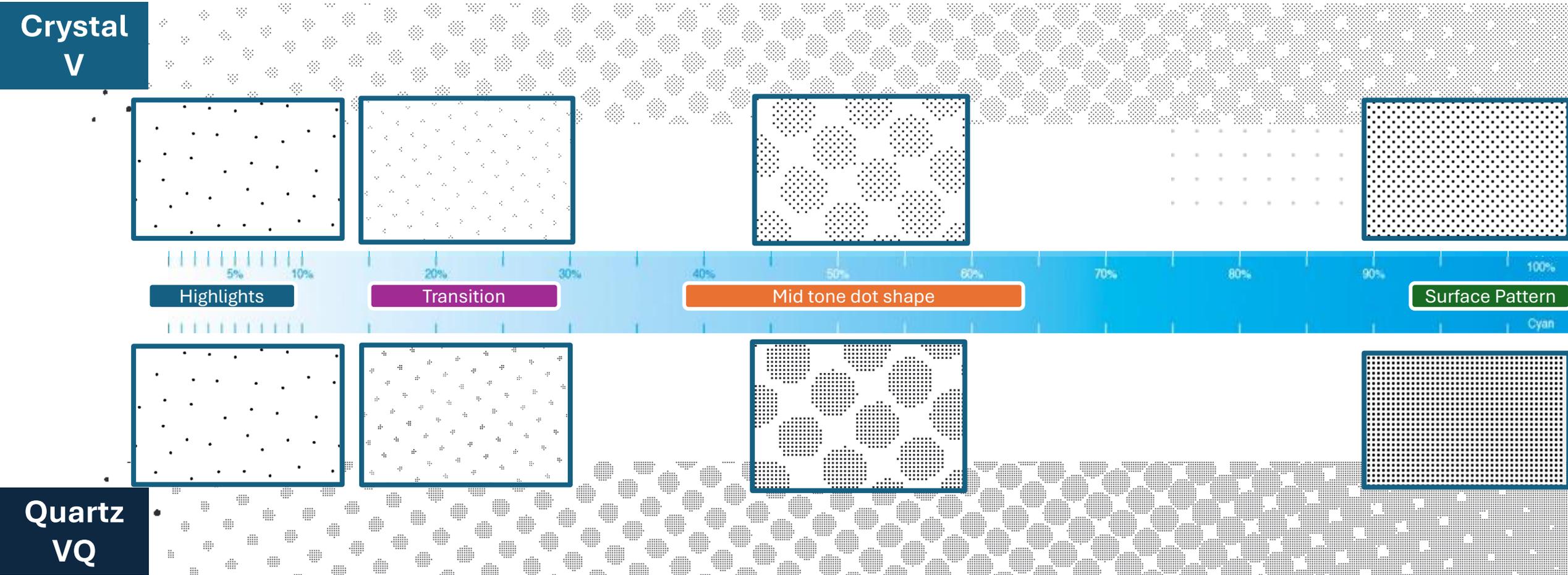
Repeatability



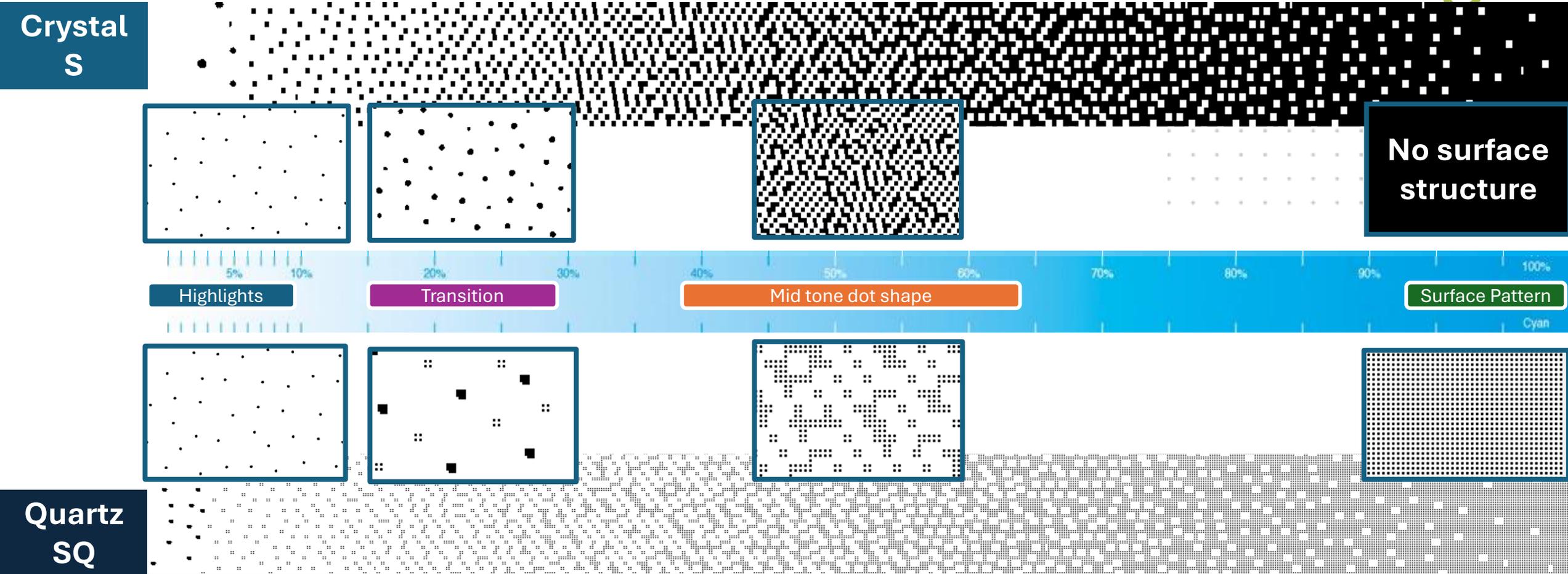
Repeatability on Plate: Static LED vs. XPS Crystal



Screening: Quartz Q-cell (AM)



Screening: Quartz Q-cell (FM)



How do Quartz Cells (Q-cells) impact dot gain?



	Full tone	99%	75%	50%	25%	10%
Crystal 150 lpi						
Density/ Tonal value	1.54	99.9%	91.2%	73.5%	41.5%	17.6%
Quartz 150 lpi						
Density/ Tonal value	1.85	99.2%	89.6%	72.5%	38.4%	15.7%

Q-cells:

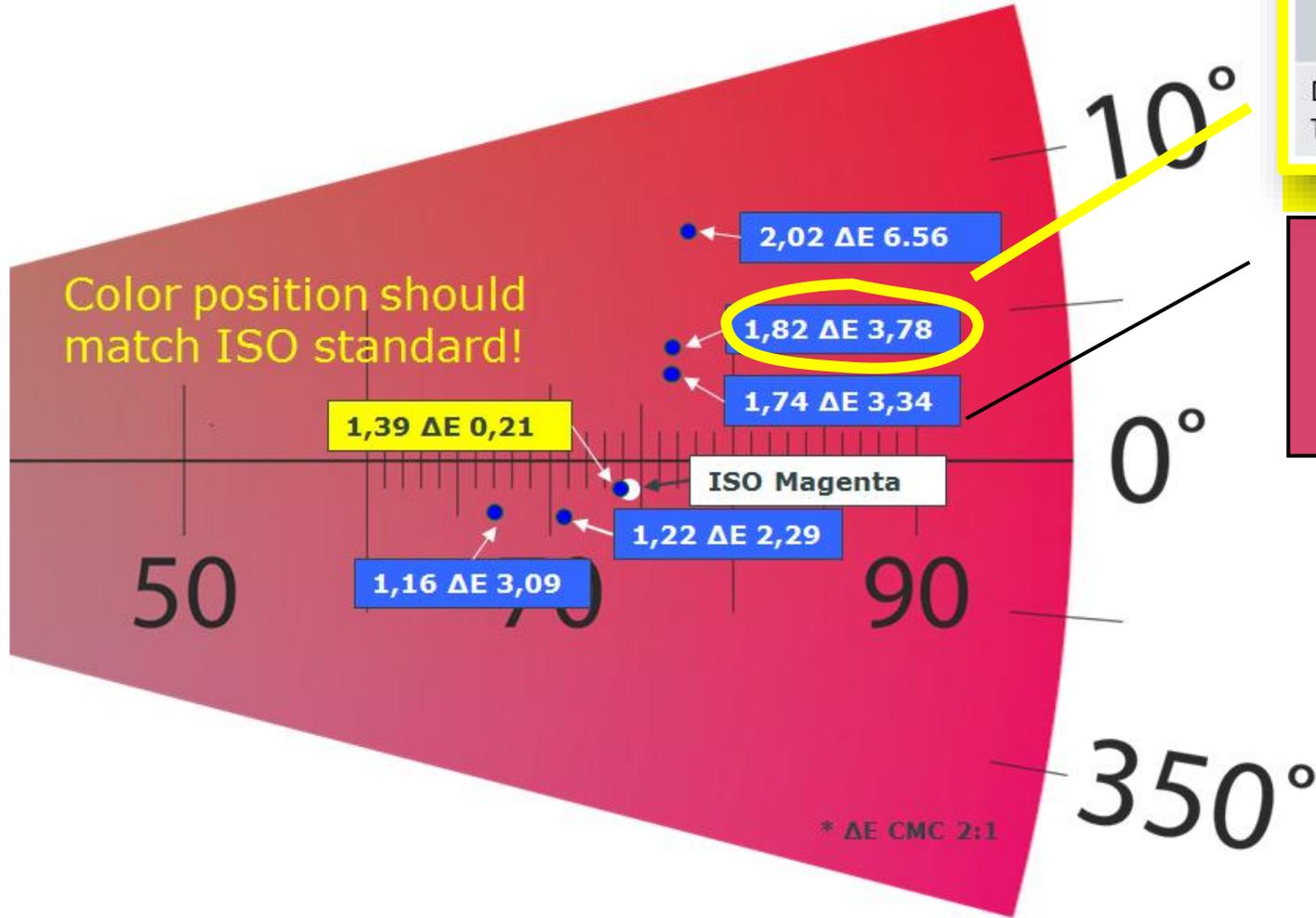
- Pinhole-free ink laydown
- higher SID

better screening
dot definition

Anilox: 1,067 lpi, 2.3BCM, Medium Soft tape

How does density impact color?

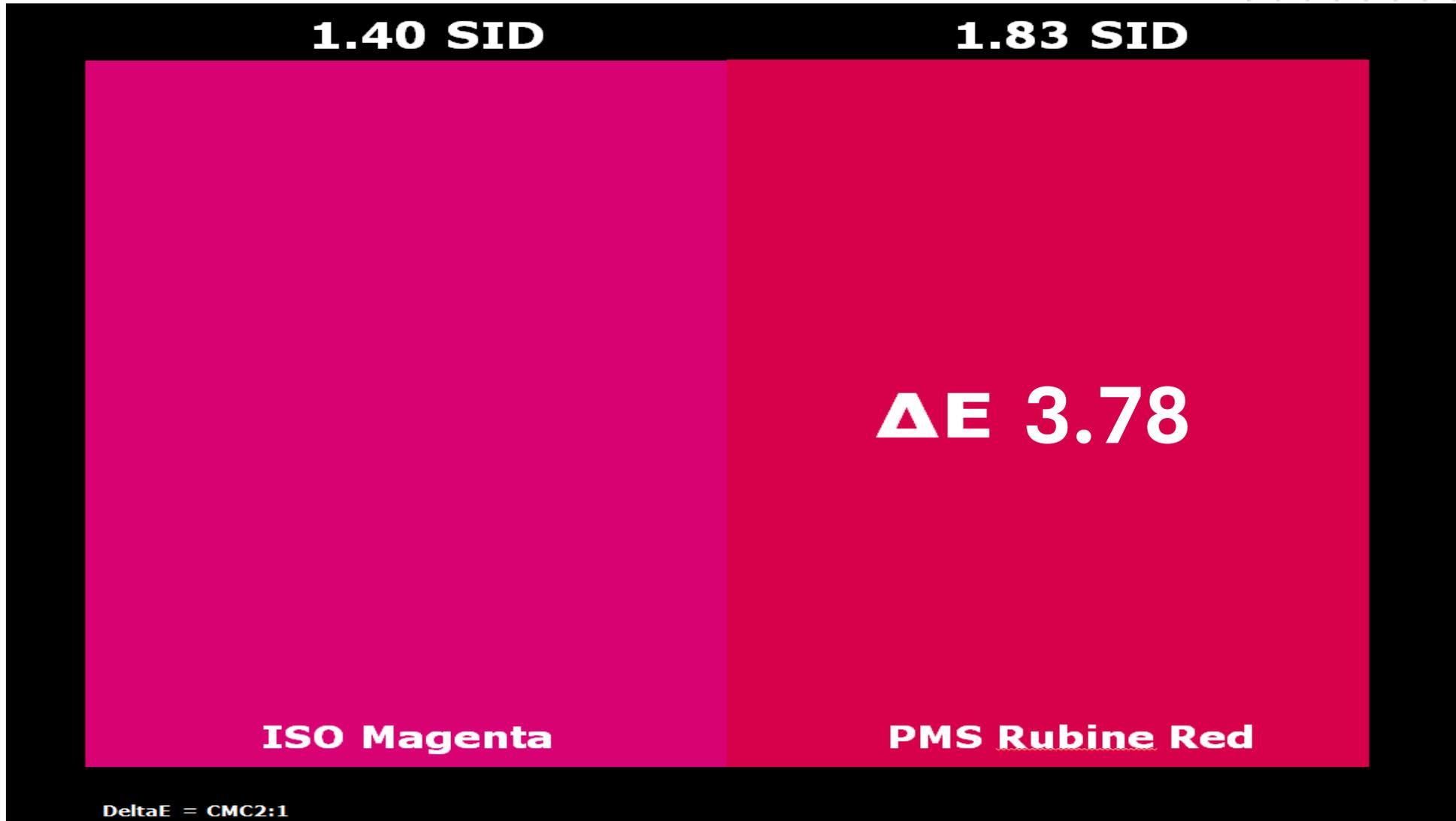
Spectral measurement at different solid ink densities:



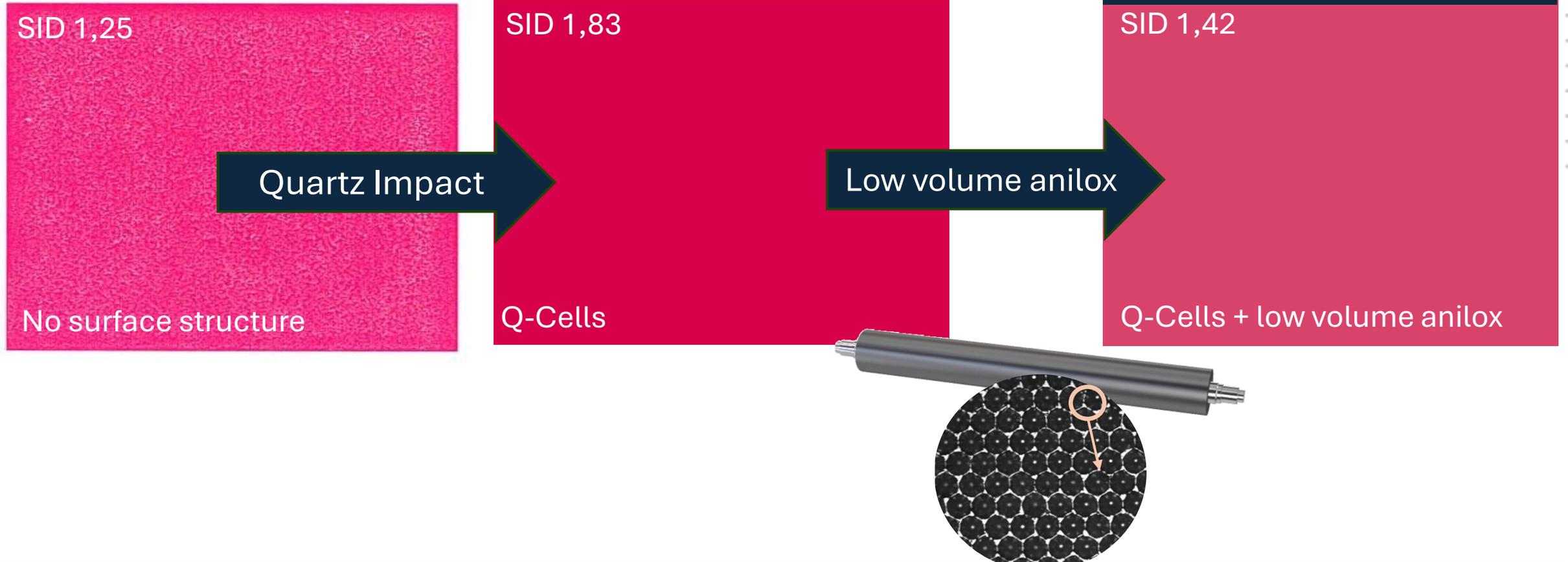
Quartz 150lpi	
Density/ Tonal value	1.85

Ideal Magenta
SID
1,35 – 1,45

How does density impact color?

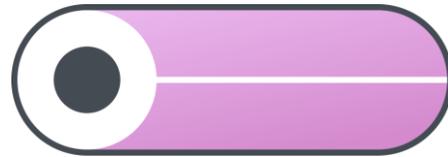
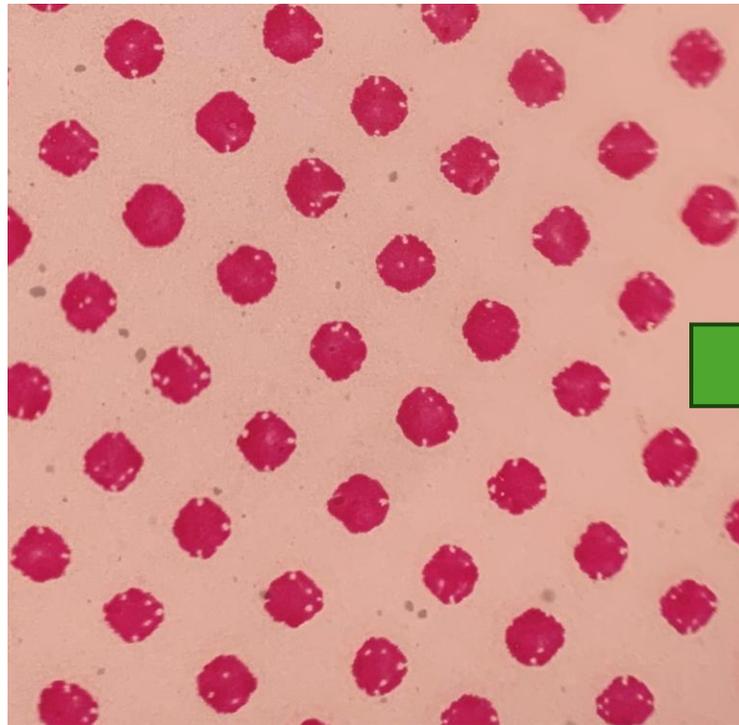


What can I do?

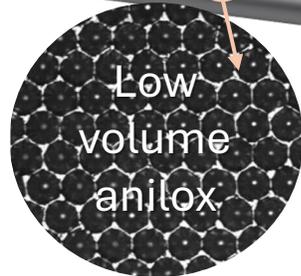
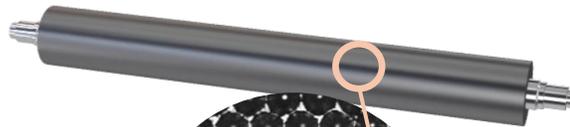


Use of lower volume /finer line anilox to bring the density down and stay within ISO Lab value

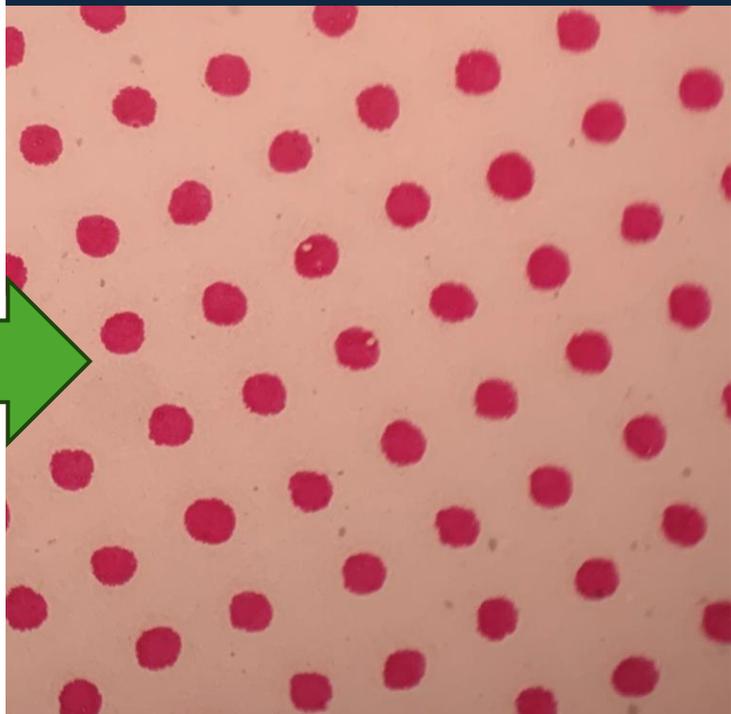
How do Quartz Cells (Q-cells) impact dot gain?



Soft or Medium Soft Tape



Customers report higher printing speeds with less ink



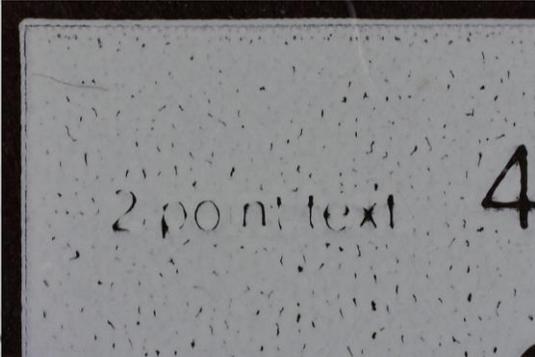
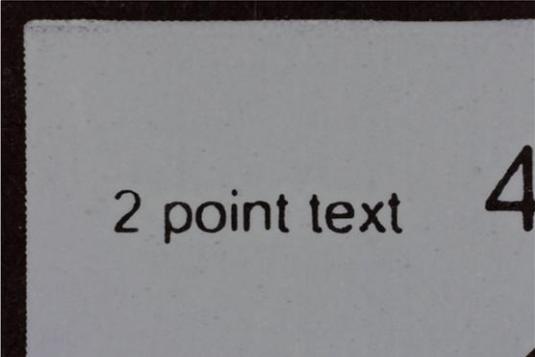
Use of lower volume anilox + soft/medium tape reduces the dot gain, especially in the highlights

Anilox: 1,067 lpi, 2.3BCM, Medium Soft tape

White Ink: Zero Pinholes ink lay with less volume of ink



Solids (White Ink & Spot)

14cm ³ /m ² Anilox	12cm ³ /m ² Anilox
57% Opacity	57% Opacity
Strong "Mottling"	Smooth ink film
8.5g/m ² ink usage	6.0g/m ² ink usage
	
Result	Result
High Opacity	High Opacity
Lower print quality	Higher print quality
High ink cost	30% lower ink cost

Conclusion

Where does Quartz help?



Improved Density

- No pinhole
- Higher Solid Ink Density
- Reduced Ink consumption

Up to 20% ink saving

Better Highlights

- Improved details
- Smoother transitions
- Reduced dot gain
- Fades to zero

Faster Printing Speed

Gravure to Flexo

- More environmentally friendly
- Better print quality
- ECG enabled

Sustainable



Thank You

