# **HIGH END SOLUTION** FOR HIGH QUALITY FLEXO

FAG

FLEX³PRO

# Content

- Key design principles
- Control your Flexo process
  - Setup and control your laser
    - Stain density
    - Focus, laser power
  - Control your finished plate
    - Why checking the dot with the lens is not good enough
    - Let‘s talk about the minimum dot
  - Control your printing product
    - Measure the dot size
    - Measure the dot void



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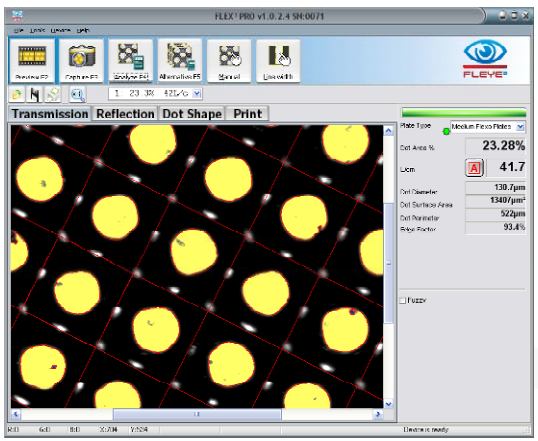
# Key design principles for a High End Flexo Control Device

PATENT PENDING


- Positioning arm for transmission readings
  - Directed light source requires exact positioning
- Free hand use in reflection modes and 3D mode possible
- Transportable unit in self containing box
- Connected and powered by USB
- Calibration target on glass included
- Windows XP SP3, Vista and Windows 7

- Designed by the VIPFLEX developer team based on 13 years of experience in Flexo control devices



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# Laser setup: control the stain density

**What is stain density?**

- The control of the stain density is an important step in digital flexo.
- The stain density tells you, how much LAMS remains on your polymer after ablation.
- The Laser should be set up such as the 100% patch is as clean as possible
- A stain density of 0.08 to 0.085 is a good setup

- The stain density has been controlled up to now with a transmission densitometer
- The transmission densitometer is not needed any more and can be replaced by the FLEX³PRO

- **CAUTION:** The density measurement on the 50% patch has nothing to do with the stain density! Checking the 50% patch to measure a density of 0.3 gives you an idea about the linearity of your Laser. It is not the state of the art any more to use the densitometer for linearity control since image analysis measurement devices are available.



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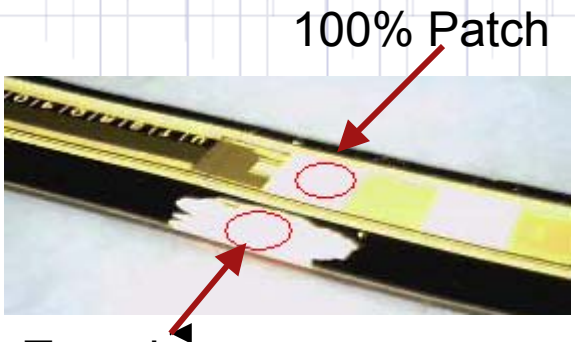
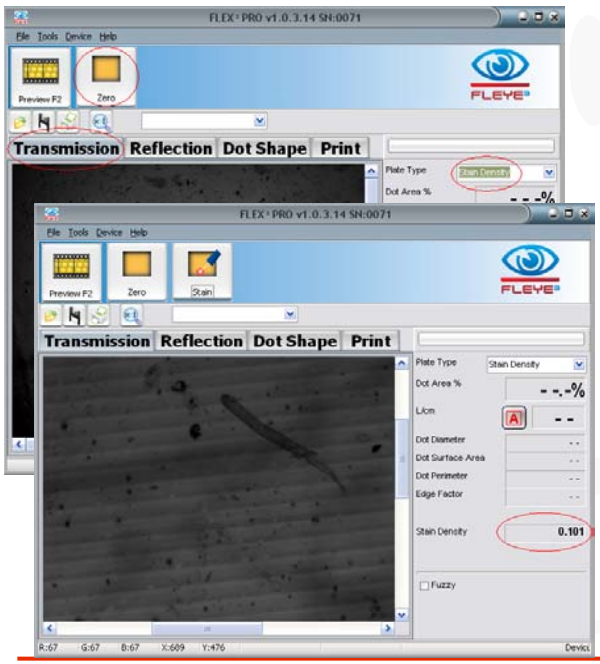
# Laser setup: control the stain density with FLEX³PRO




- Image a 100% patch
- Clean the polymere from LAMS using a tape. In case of Asahi plates, double image a 100% patch
- Select the plate type Stain Density on the page TRANSMISSION.
- Position the taped (or double ablated) area below the aperture, lower the sensor head and click ZERO.
- Now position the 100% patch below the aperture, lower the sensor head and click STAIN.
- The stain density as density difference between taped (double ablated) area and 100% patch is displayed.

- The FLEX³PRO is an intelligent densitometer, that measures only on ablated areas and does exclude high density areas. This makes the stain density control significantly more accurate, as dust or non perfect clean reference areas are not having an impact on the overall measurement result.



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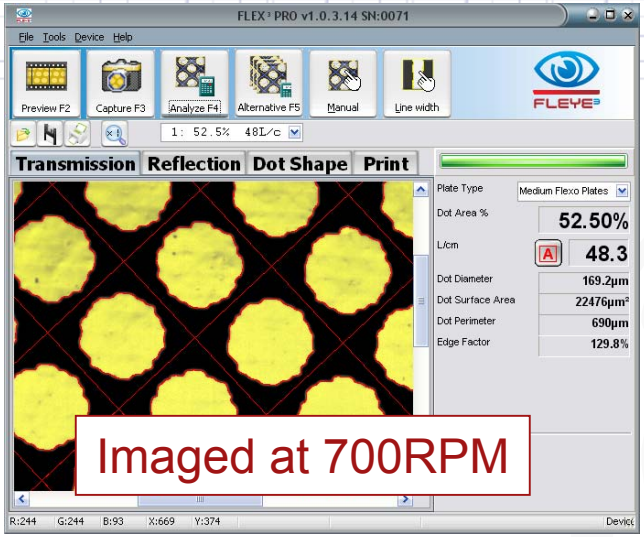
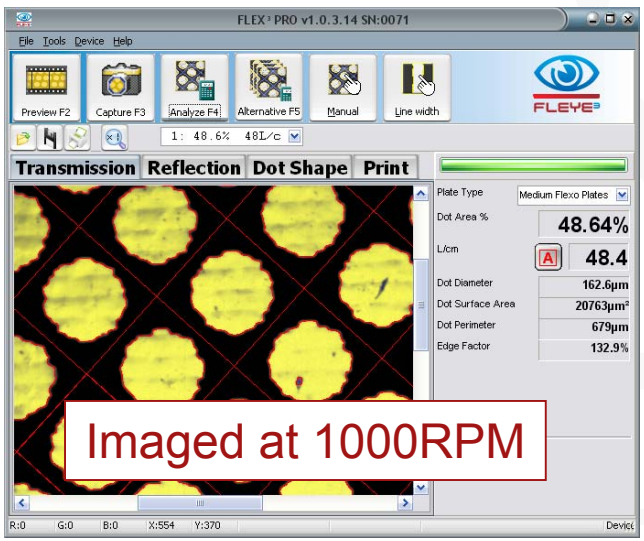
# Setup and control your Laser: Control the linearity




- Image a 50% patch (Pixel oriented)
- Select Masked Plates from the Plate type List.
- Measure the 50%patch
- Laser focus, laser power, and imaging speed has an impact on the linearity of the output
- A good Laser speed (RPM) laser power balance is reached, if the 50% patch is close to 50% patch

*Sample images are available in the directory PERET/FLEX3PRO/images/ImgCompare*



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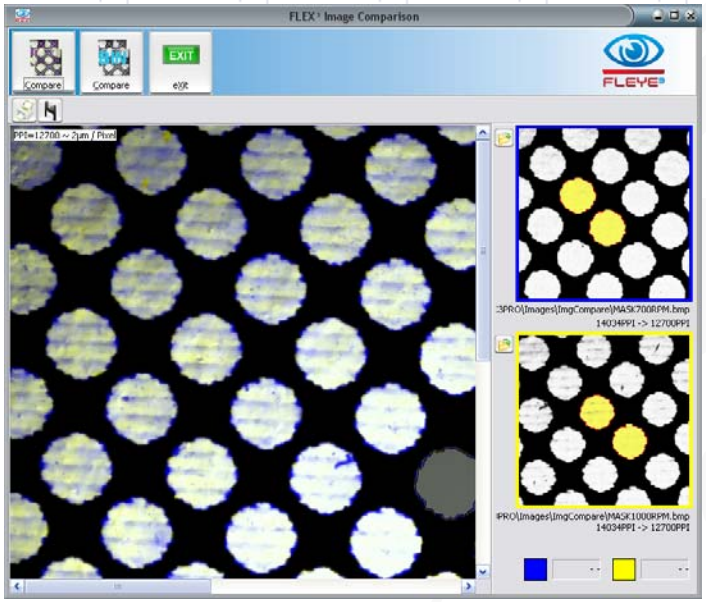
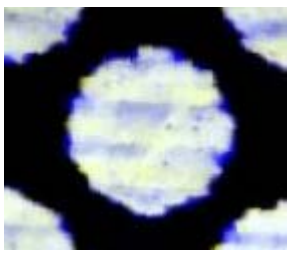
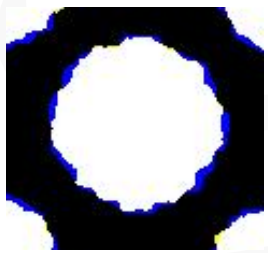
# Setup and control your Laser: fully understand the impact of variations in Laser parameters




- Select Image Compare from the Tools menu
- Load the sample image ‘MASK700RPM’ into the blue frame
- Load the sample image ‘MASK1000RPM’ into the yellow frame
- Select with the mouse 2 dots in each frame
- Click compare. The images are automatically scaled, rotated and overlaid showing the difference





- In this example we can see that the dot area difference on the preview slide is motivated by
  - Engraving traps removed
  - Rounding of the dot (TIFF structure gets lost with higher laser power)



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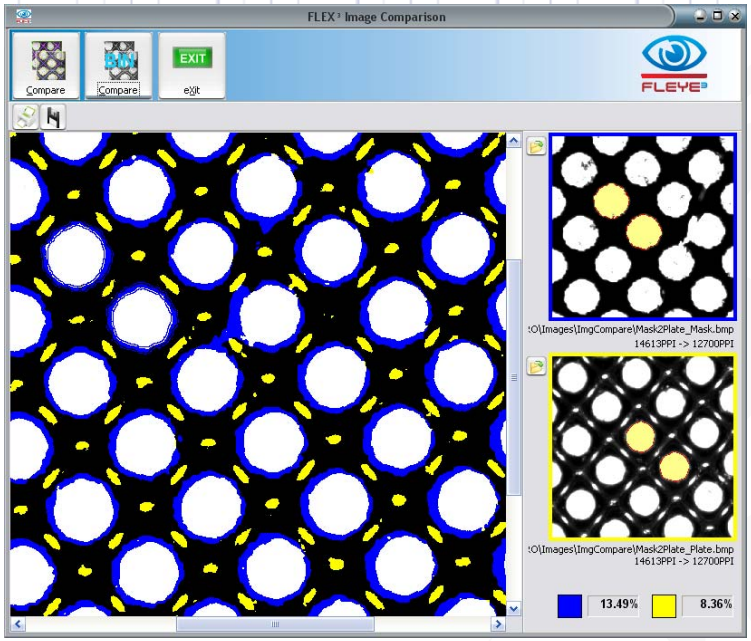
# Image Compare: a simple, but very powerful tool




Dot loss due
to oxygen inhibition

- Compare masked plates produced with different laser parameter settings
- Compare mask with finished plate
- Compare cyan plate with yellow plate
- Compare re-make job plate with original plate
- Compare plate before print and plate after print
- Compare plate with print
- Compare cyan print with yellow print

Images are much more easy to understand
than just numbers



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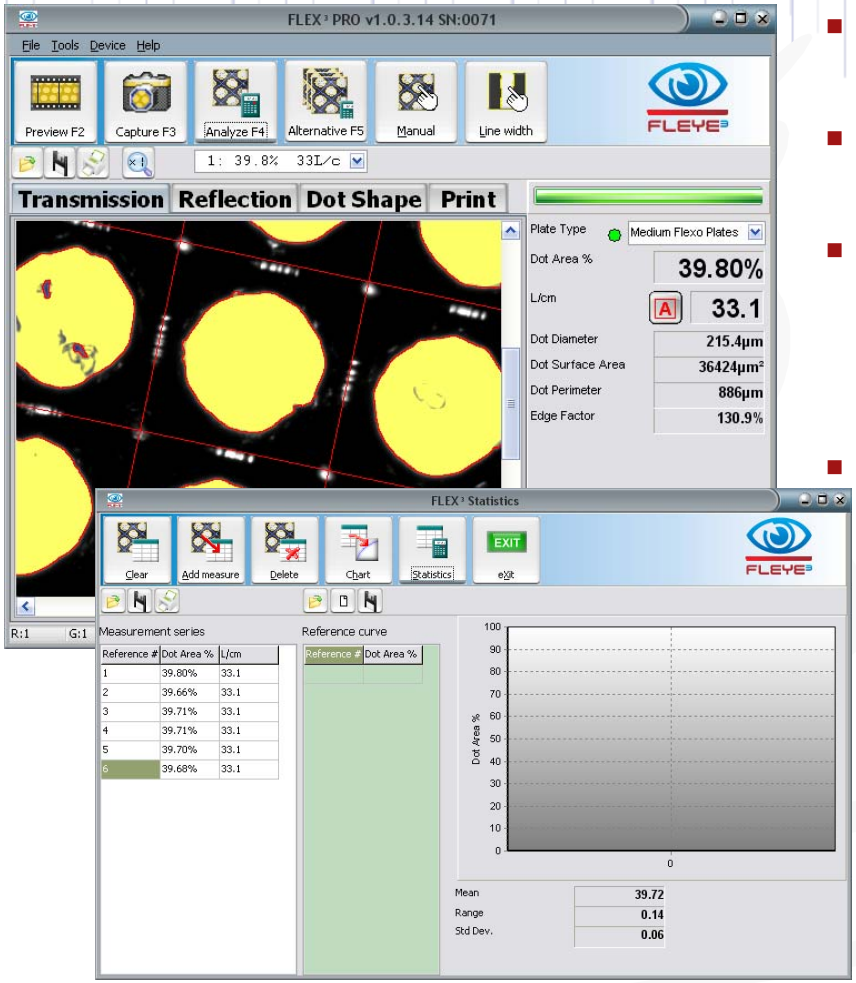
# Control your finished flexo plate




- Select the proper plate type from the Plate type list. Most of the plates work with Medium Flexo Plates.
- Position the control patch below the aperture and lower the Sensor. Measure the patch.
- Collect measurements in the statistic to see
  - Your print curve
  - Variations of the 50% on different locations of the plate
- Fast operation:
  - Press F2 for preview
  - Press F4 for capture and analysis
  - Press F6 to add measurement to statistics

Start with F2…



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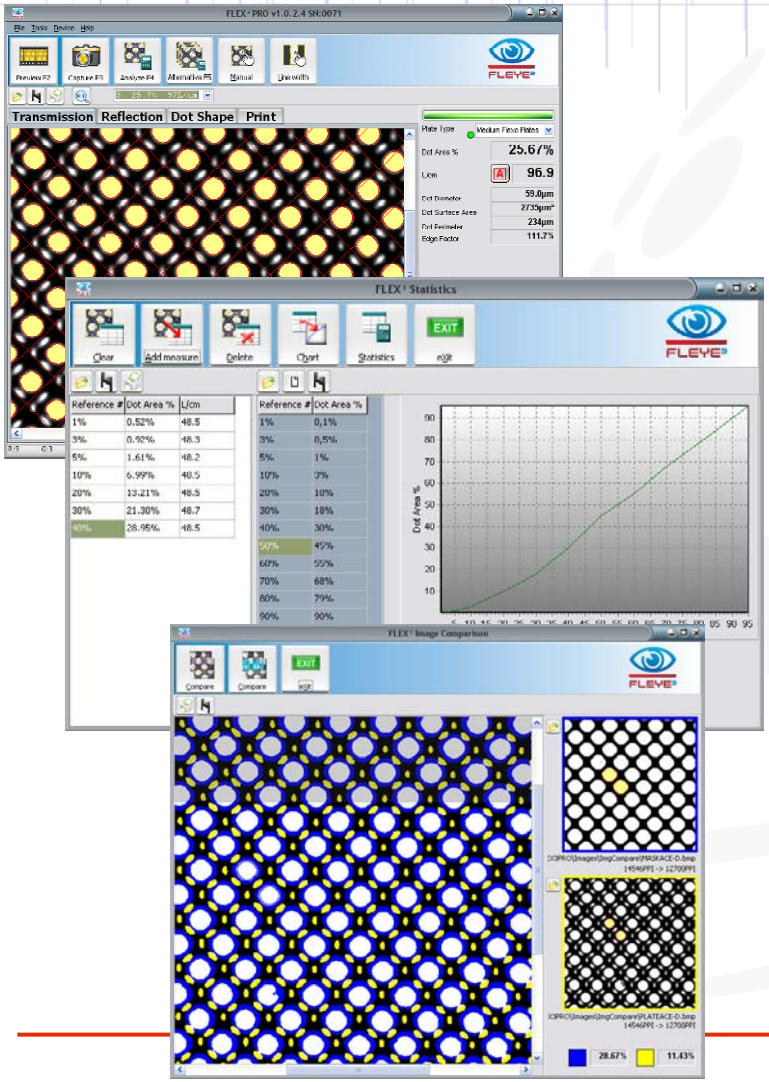
# Control the finished plate




- Measure the dot area of various patches
- Collect data in the statistics
  - Draw curve
  - Compare with reference curve
  - Calculate average and standard deviation
- Use the image compare to evaluate the dot loss between mask and finished plate
- Print a report
- Save images and compare plate before and after print



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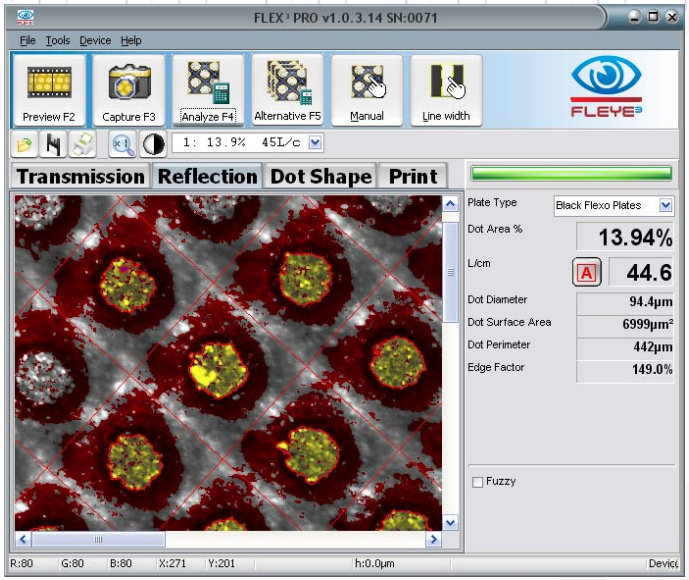
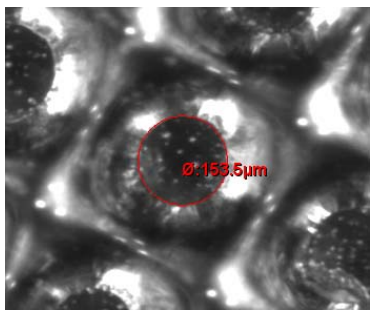
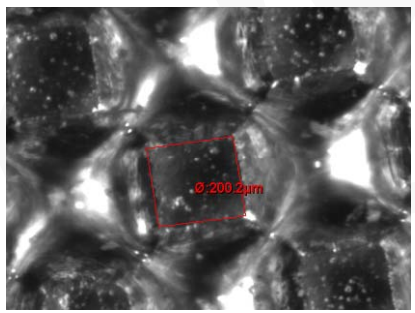
# Elastomeric Plates, Plate on steel, offset plates are measured in REFLECTION




- Measure in automatic
- Select manually dots
- Measure manually dots



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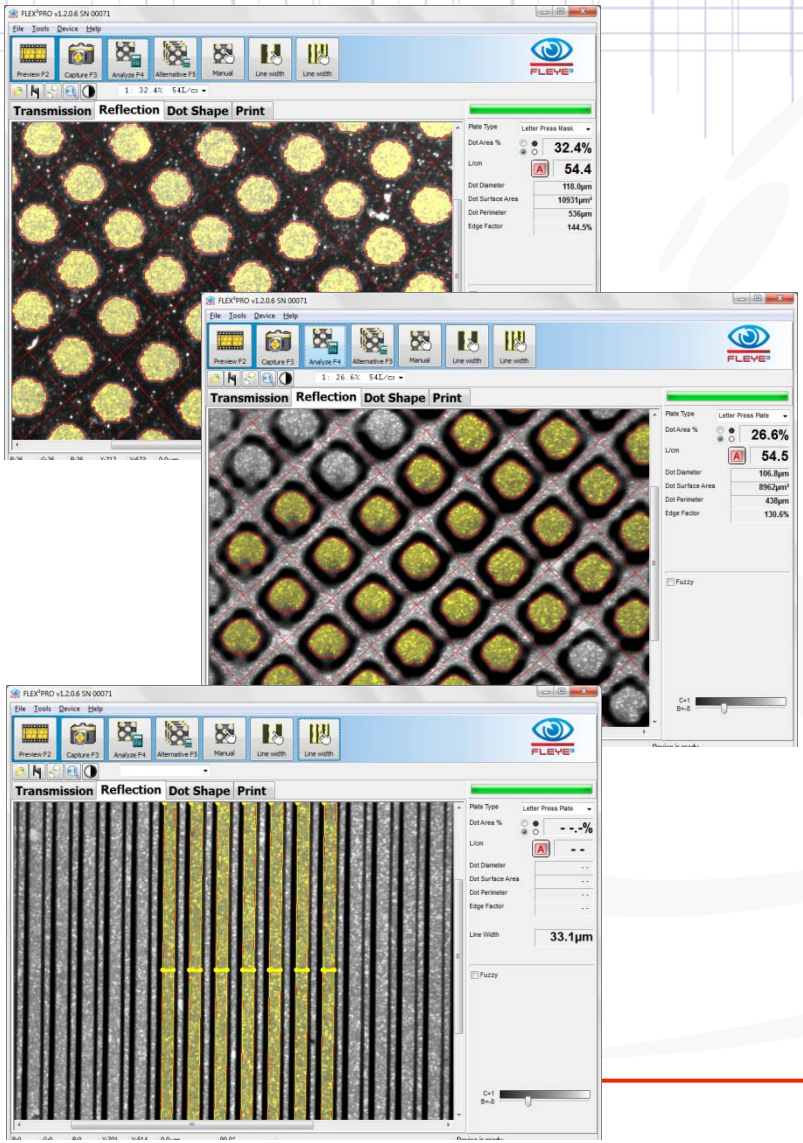
# Measure Flint WS Mask and Plate




In order to meet the needs in security printing there have been added proper features to the system

- Letterpress Mask
- Letterpress Plate
- Multi Line measurement function



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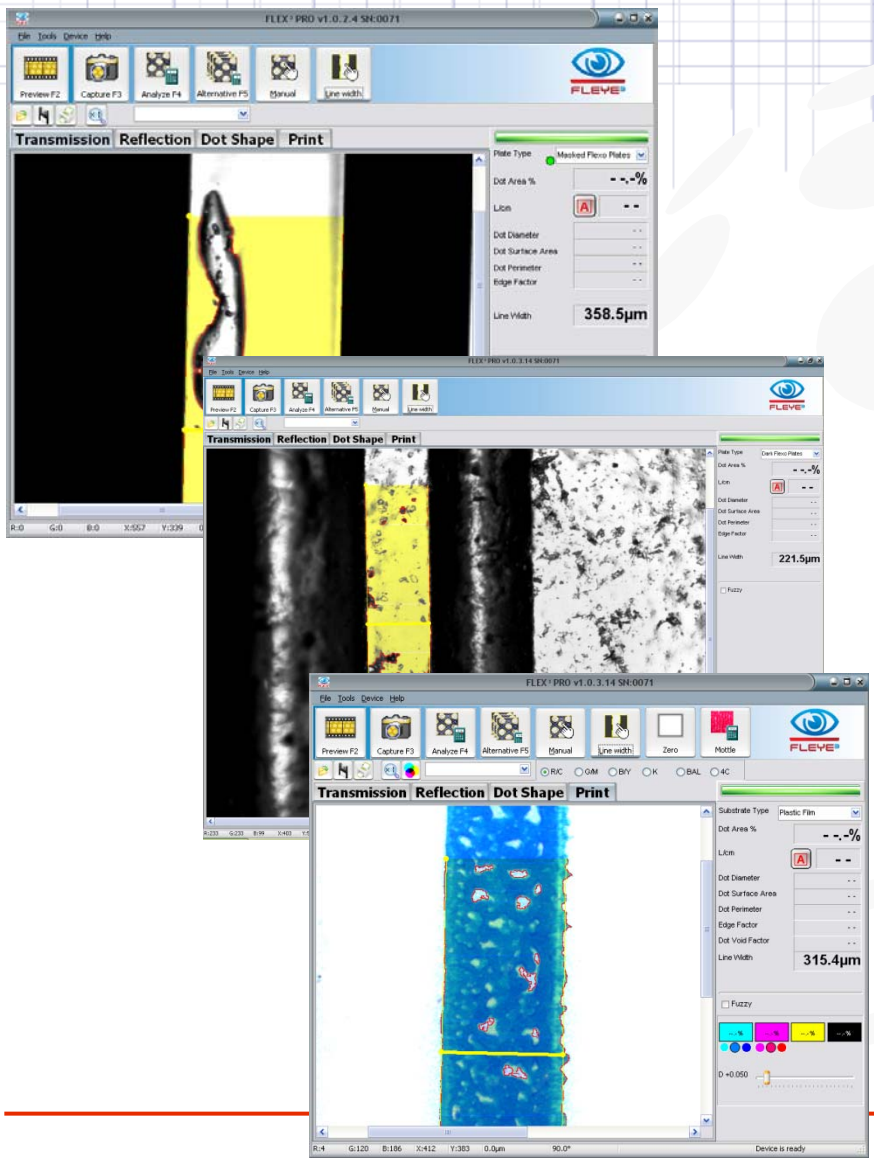
# Measure line width with high precision




- Measure your line width
  - On mask
  - On plate
  - On print
- To make sure your bar codes read correctly



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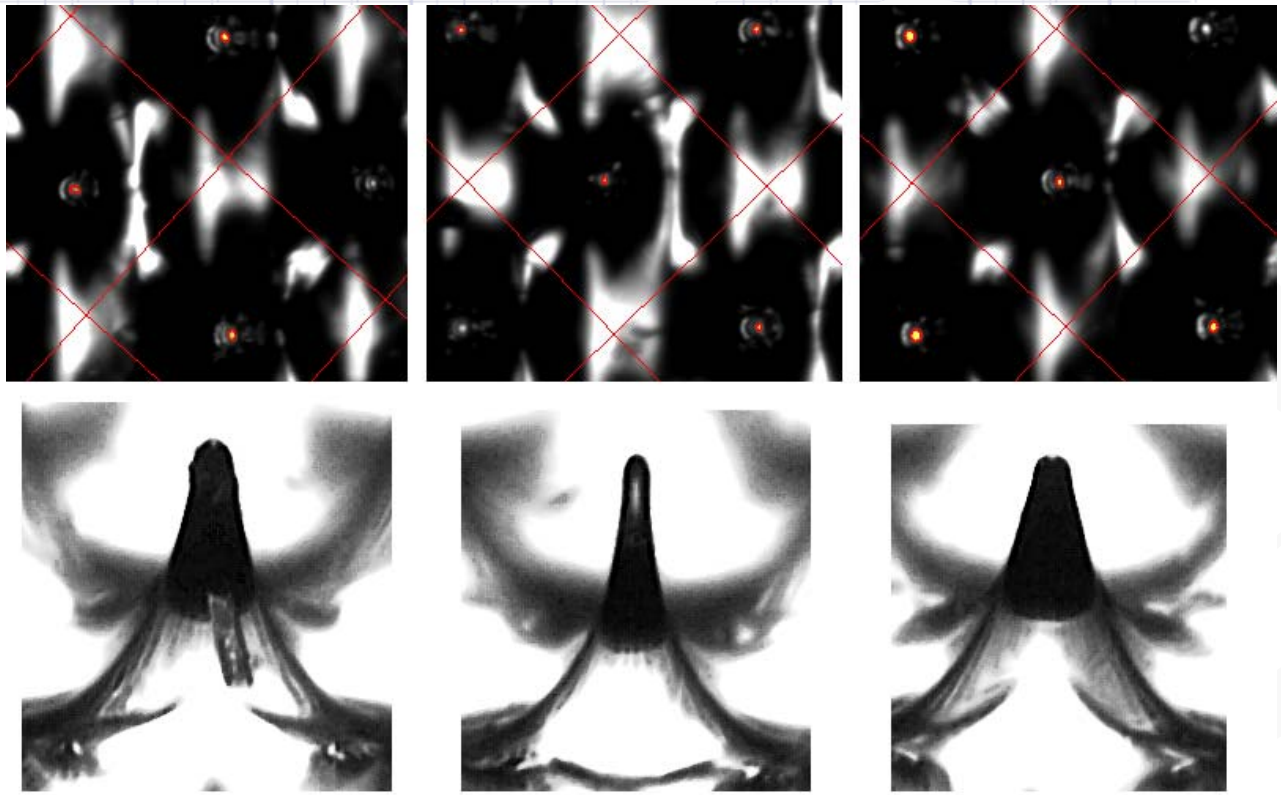
# Let‘s talk about the minimum DOT



Dots are looking the same from top while looking quite different in 3D!

**TOP View analyzes is not sufficient to control high light dots!**



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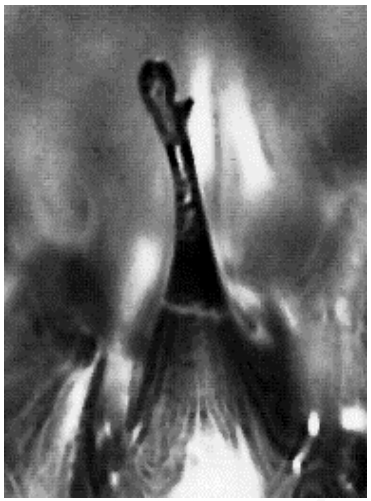
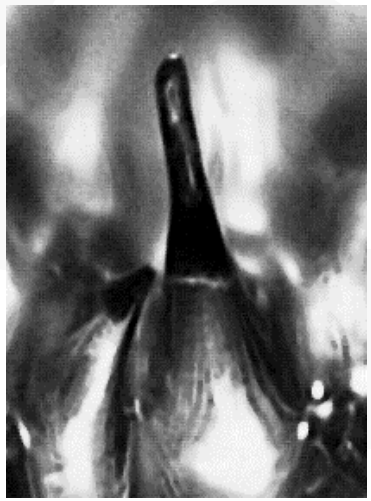
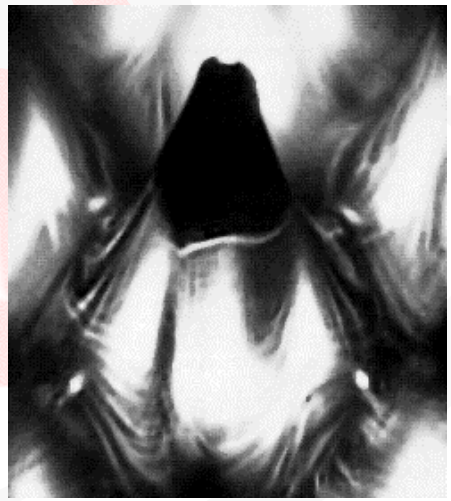
# While the transmission image still shows dots, the dots are not stable enough to print during the entire run of the job.







| | | |
|---|---|---|
| Will this dot print as a dot or will it break at the beginning of the job and print as a line? | For how long will this dot print as a dot before breaking? | This dot might be stable enough to print for the entire run of the job |



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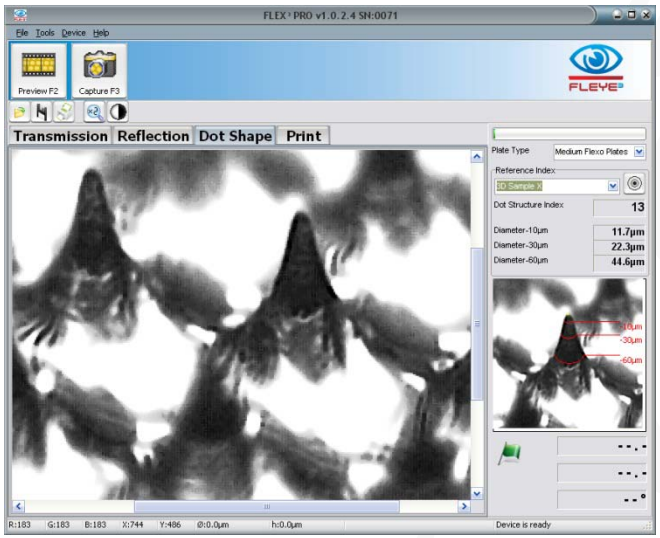
# FLEX³PRO Dot Shape function




$$\text{Index} = \frac{(D10+D30+D60) * (D60-D10)}{50\mu m}$$

**Use the Dot Shape function to make sure:**

- That the dots look the same at the left side, the right side and in the middle of the plate
- The dots on the magenta plate look the same as the dots on the cyan plate and the yellow plate
- The dots of the re-make job look the same as the dots of the original job
- Compare highlight dots before print and after print

**Don‘t use the Dot Shape function to**

- Compare one plate material / process with another plate material / process!
- The required dot shape is defined by plate material, screen type, printing environment, substrate, inks, number of copies, and many other parameters …



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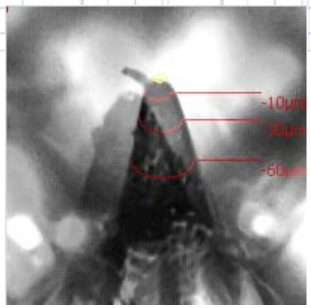
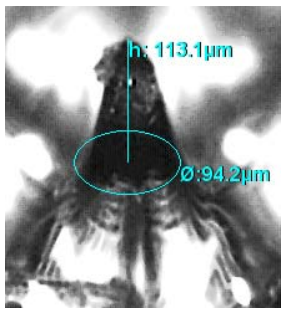
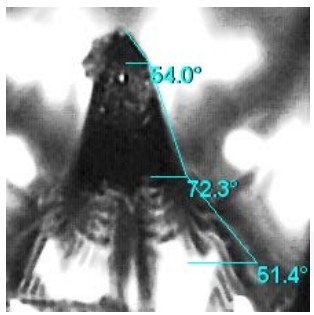
# How to use the powerful dot shape function






**Are all dots looking the same?**

- on different locations of the same plate
- On the cyan plate and the magenta plate
- On the re-make job plate and the original plate
- Before print and after print

- Store a reference dot
- Compare the actual dots with the reference using the ghost image function (CTRL key while moving the mouse)
- Measure diameters, angles and heights
- Save the JPG image (right mouse click inside the image)



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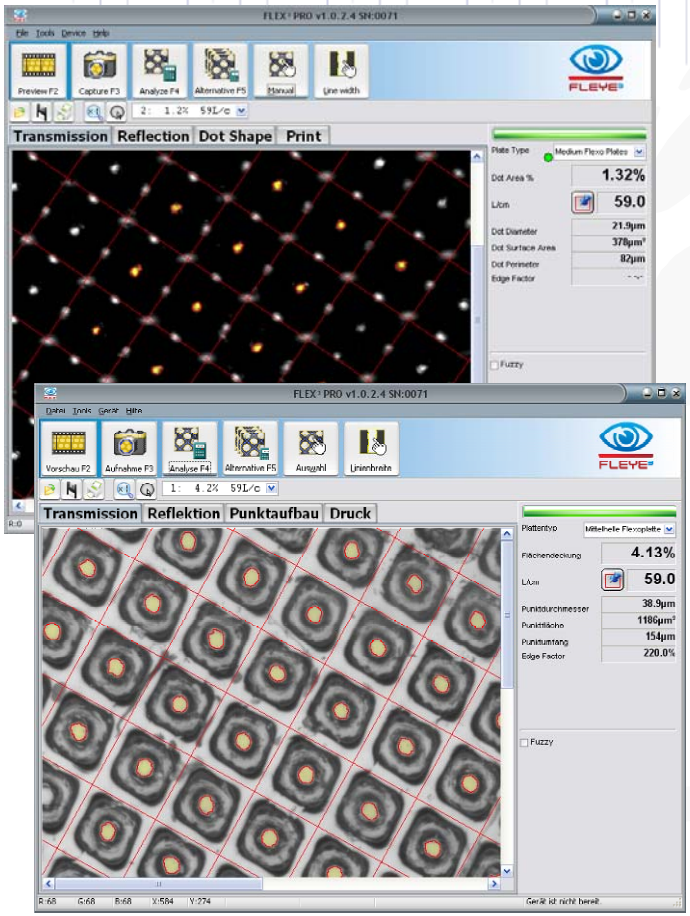
# Measure the finished plate: Is a lens and a light table good enough?




- 1% Dot at 59 L/cm
  - Expected dot diameter is 19µm
- Measurement with FLEX³PRO
  - Dot Area is 1.32%
  - Dot Diameter is 21.9 µm
- Simulated lens approach
  - Standard light table
  - Plate in upside down position

  - Dot Area measured is 4.13%
  - Dot Diameter measured is 38.9 µm

**What's wrong?**



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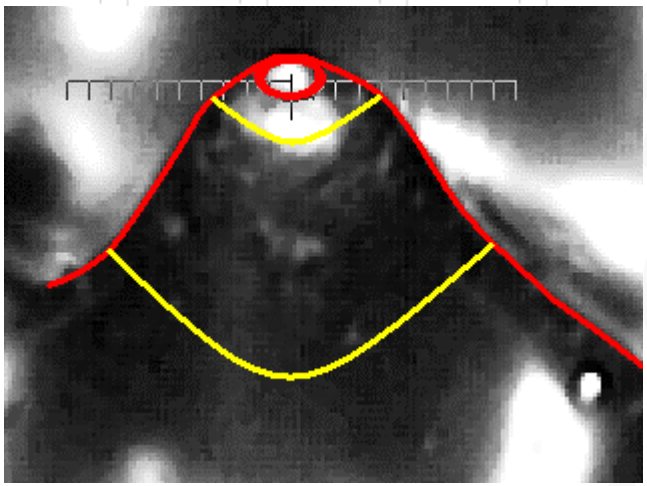
# The directed light source advantages:



Red: real dot shape / plateau
Yellow: wrong plateau seen with lens

**FLEX³PRO**

- Directed (parallel) transmission light source:
  - Flat area -> white
  - Non flat area -> Black

**Lens approach**

- Standard light table
  - Small change in steepness -> bright
  - Large change in steepness -> dark

**Lens can be used**

**The lens approach works only if the printing dot surface edge has a sharp cut in steepness!**

**Lens can NOT be used**



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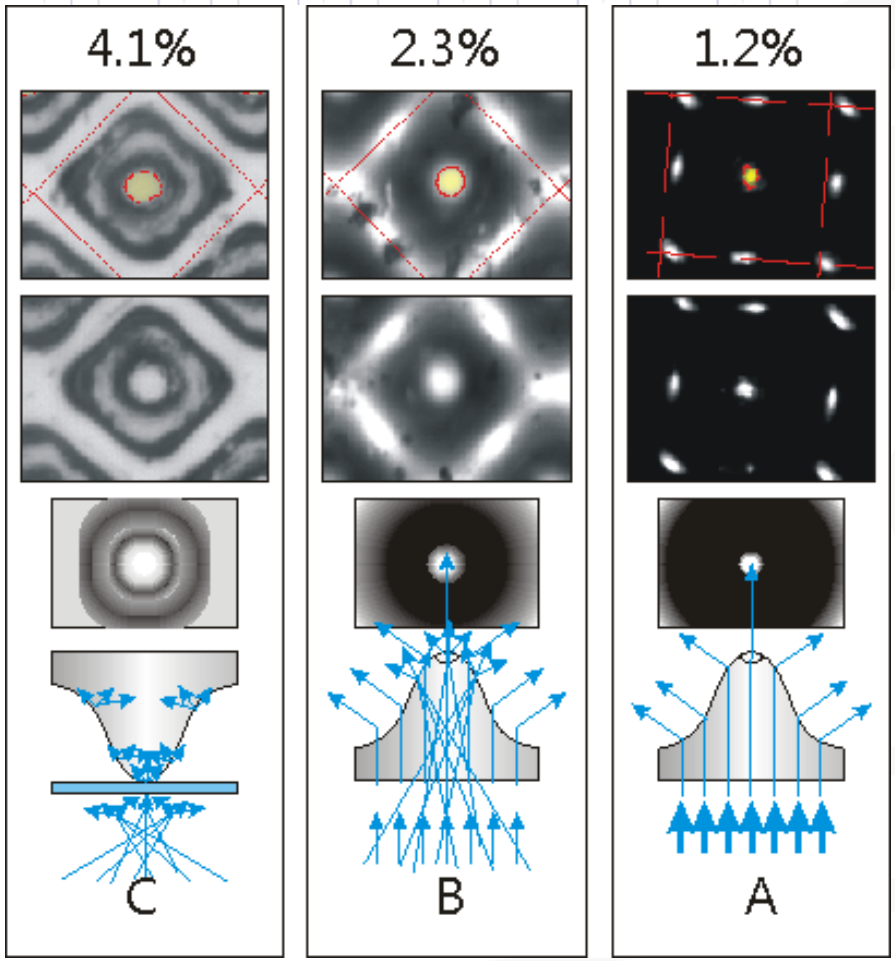
# Flexo printing : control your dot shape!




- It is now important to use technology, that can clearly distinguish between flat printing dot surface and shoulder portion



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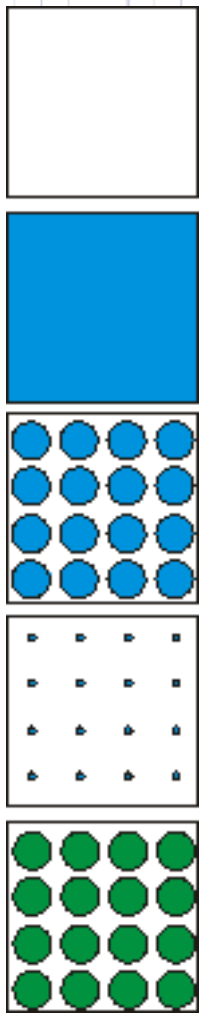
# Use FLEX³PRO and FLEYEplus for daily work



- 0% area
  - for Relief depth measurements
  - White or transparent of print
- 100% Patch
  - Stain Density
  - Density on print
- 50% Patch (by Pixel)
  - Plate making process Linearity (black box)
  - Dot Gain on print
- Minimum Dot (DFTA Wedge A..U)
  - Dot Shape on Plate
  - Minimum dots on Print
- 50% Patch (by Vector)
  - Impact of Workflow, Image setup, …



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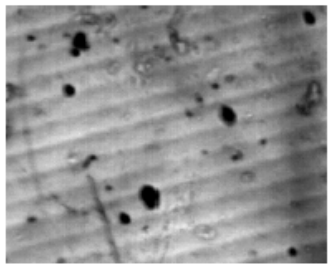
# Quick Laser Check with FLEYEplus Software

**FLEX³ REPORT**

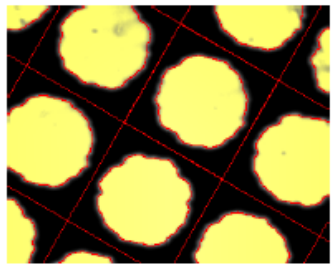
PERET GmbH
Vahrner See Weg 17, 39040 Vahrn, Italy

**Laser Prüfbericht 05.08.2011**

| | | | |
|---|---|---|---|
| Grundschleier | **0.068 (-0.032)** | Flächendeckung | **51.10% (0.03%)** |
| | | L/cm | **50.8 (-0.0)** |



Grundschleier 18:02:34



LAMB Maske 18:02:44

| | |
|---|---|
| Ausgabegerät | |
| Material | **Mustermaterial** |
| Laserenergie (Watt) | |
| Bebilderung (RPM) | |

05.08.2011
FLEX³ PRO v1.0.3.20 SN 0071

# Quick Plate Check with FLEYEplus Software

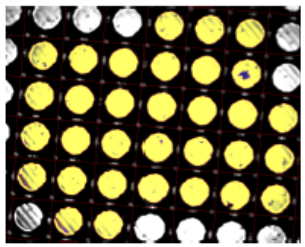
## FLEX³ REPORT

PERET GmbH
Vahmer See Weg 17, 39040 Vahrn, Italy

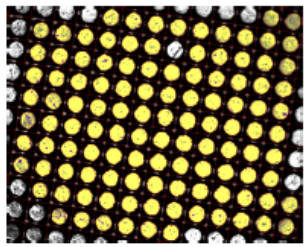
FLEYE³

### Plate check report 16.08.2011

| | | |
|---|---|---|
| Dot Area % | 38.84% (0.06%) | 39.76% |
| L/cm | 32.6 (0.2) | 58.4 |

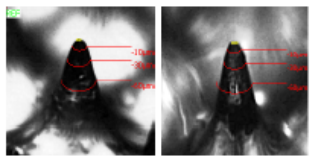


Medium Flexo Plates 13:39:23



(Vector oriented)

17 Dot Structure Index 18



3D Sample 3
Medium Flexo Plates 13:40:01

Thickness Measurements

| | | |
|---|---|---|
| Drying (mm) | 100% | 1.55 |
| | 50% | -0.019 |
| | TO | -0.020 |
| Relief Depth (mm) | | -0.42 |

| | |
|---|---|
| Material | **Mustermaterial** |
| Image Setter | **CDI** |
| Color separation | **Cyan** |
| | **Control side** |

Operator 1 16.08.2011

FLEYEplus v1.0.3.20 SN 0071



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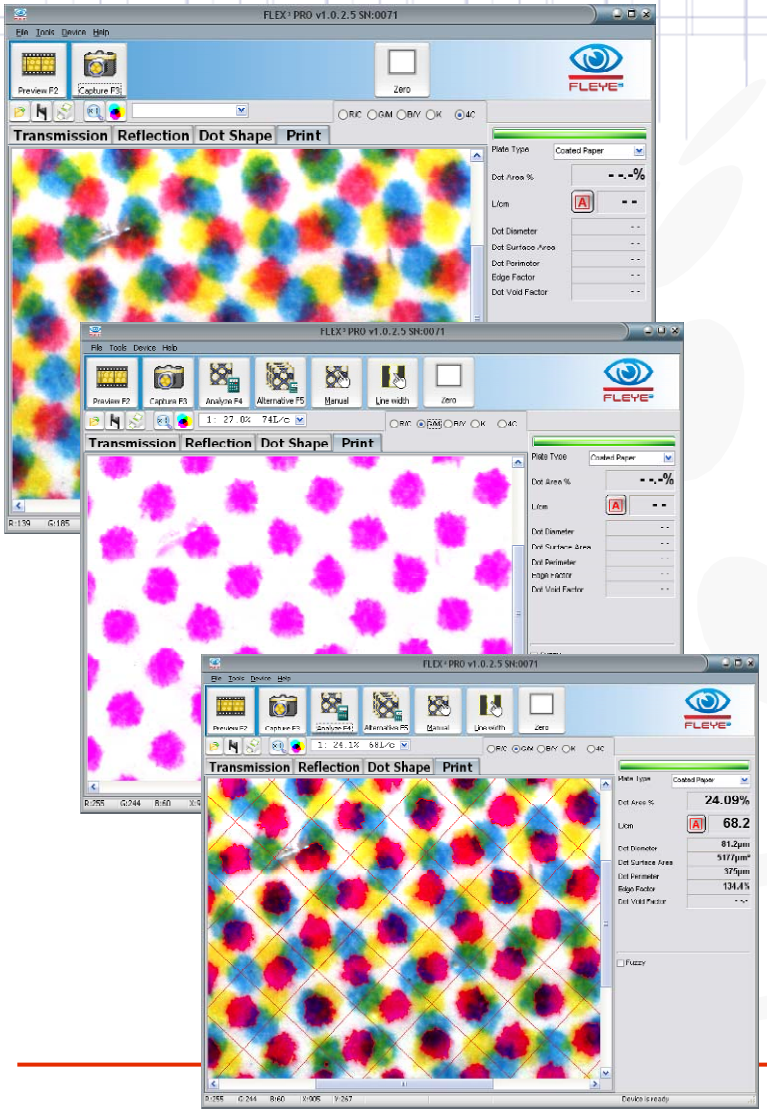
# Control your printing product




- A densitometer is used to control density and dot gain on print
- A spectrophotometer is used to control the visual impression of the printed color (CIE Lab)
- Mechanical characteristics of the dot are measured with FLEX³PRO
  - Mechanical dot size, dot deformation
    - control pressure plate : substrate
  - Dirt / little ink spots around the dot – visual control
    - Pressures to high
- Remake a job with unknown screen rulings, dot gains etc?
  - Measure directly the printed sample in an overprint area



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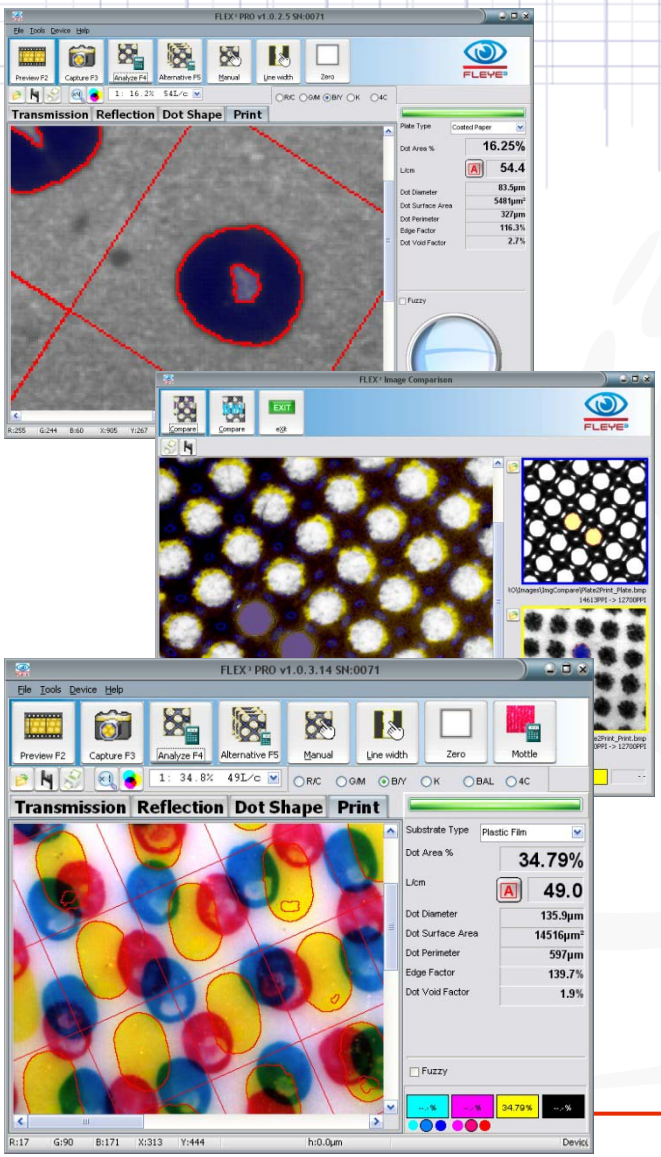
# Control your printing product




- Dot Void (low density areas inside the dot)
  - Ink problem, corona-treatment of substrate, storage of the substrate
- Compare plate image with print image
  - Check mechanical dot gain
  - Check changes in screen ruling because of plate stretching
- Print problems in yellow?
  - Roundness of yellow printing unit?
  - Diameter of yellow plate cylinder?
  - Thickness of tape?



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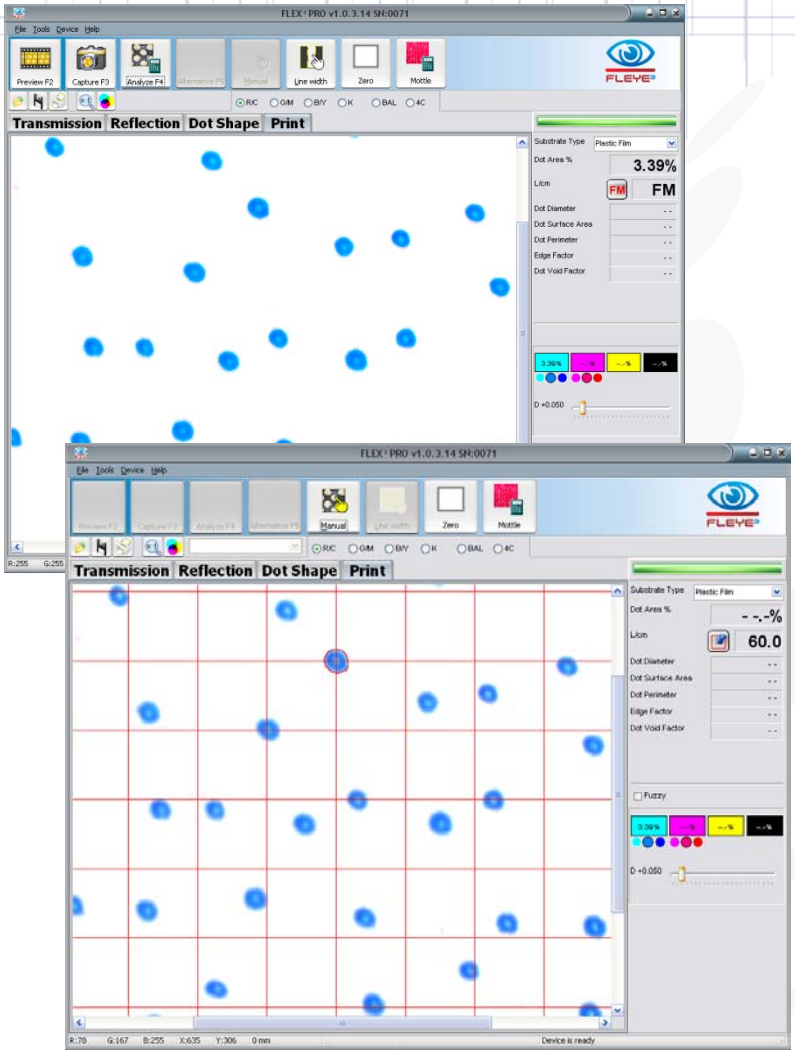
# How to measure HD-Flexo on print




- HD-Flexo dot area is measured with FM setting
  - No regular screen ruling
  - No regular dot size
- Single dot size measurement in HD-Flexo
  - Select Fixed screen ruling with 60L/cm
  - Select Manual selection of dots
  - Click inside the dot to be measured
  - Click Manual again to get
    - Dot Diameter
    - Dot Surface Area
    - Dot Perimeter
    - Edge Factor
  - Ignore dot area and screen rulings

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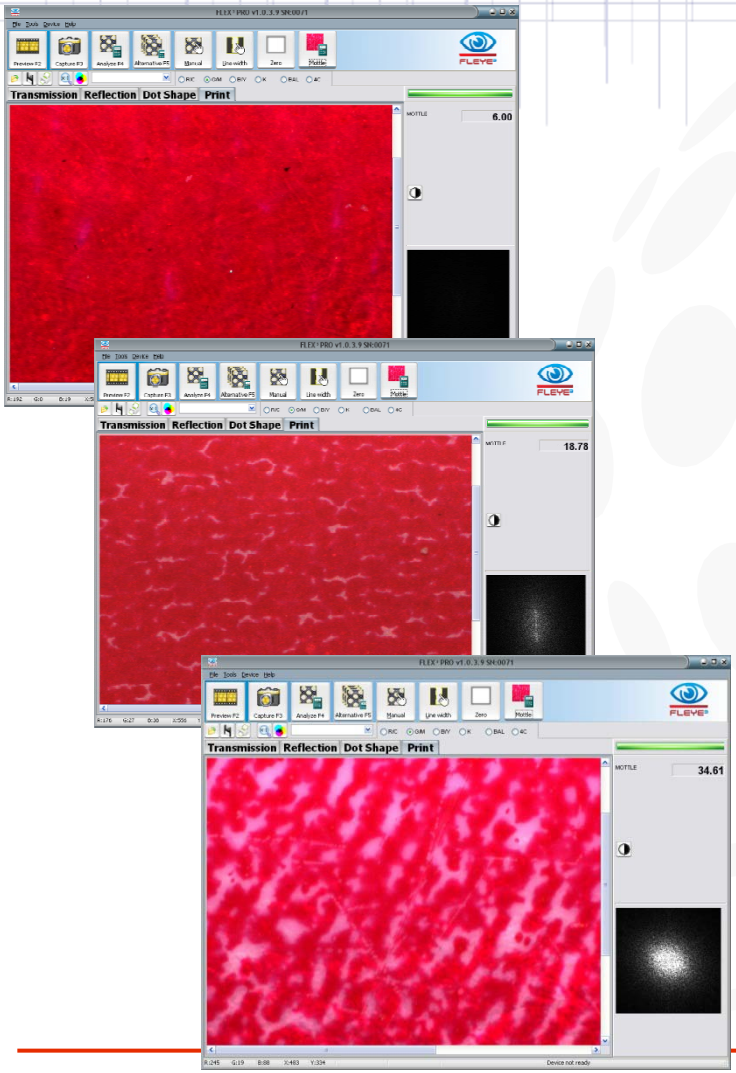
# Mottle – high density can be achieved only with low mottle effect




- Solid area coverage
  - Low mottle example : 6.00
  - Middle mottle example : 18,78
  - High mottle example : 34.61
- The mottling effect has an impact on dot gain measures obtained with a densitometer
- The mottling effect limits the maximum density of solid areas. If f.e. 10% of the area are not covered with ink, the density can never be higher than 1.0, independently from the amount of ink the press is transferring
- Reduction of mottling means ink saving
- Reduction of mottling means higher density and better contrast images and better print quality



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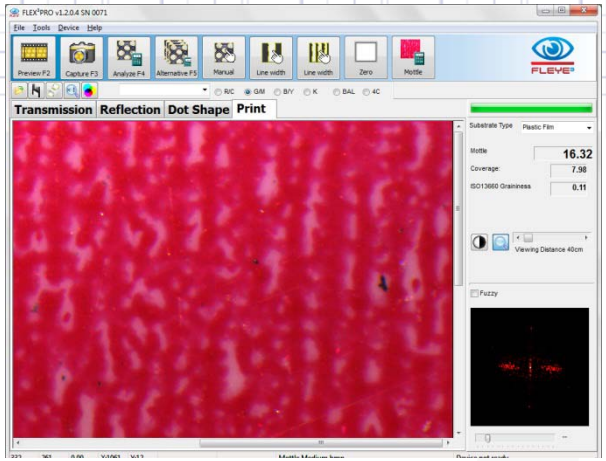
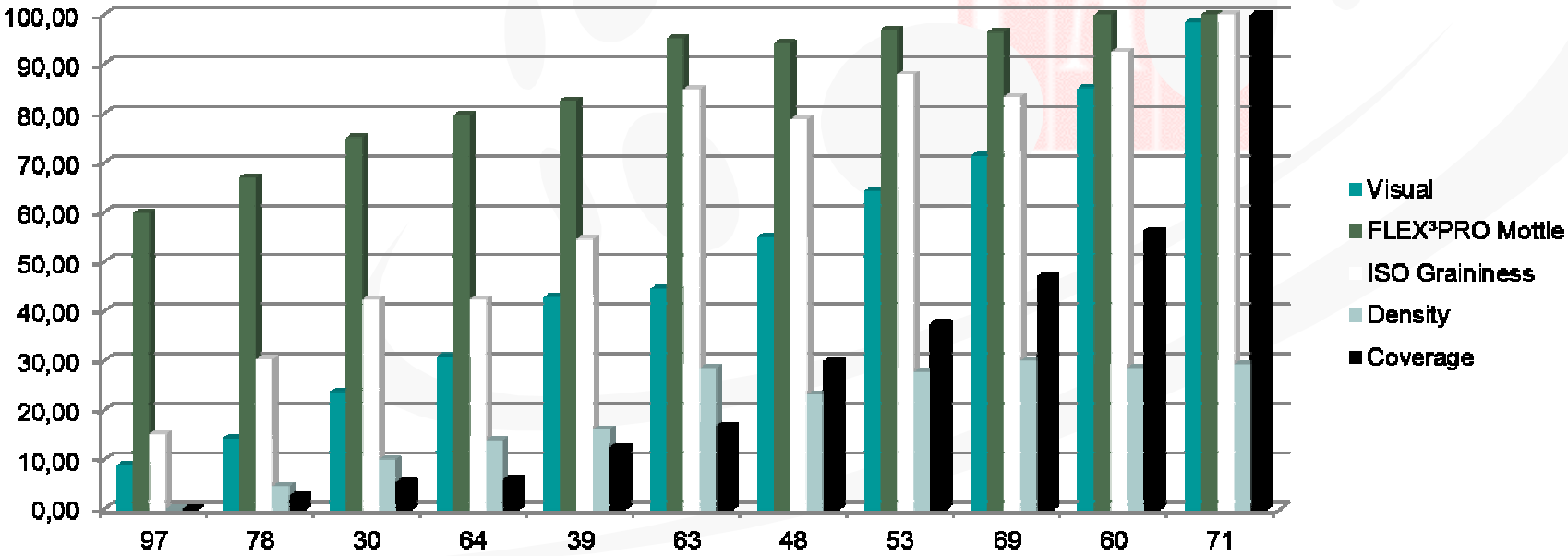
# Coverage matches humand judgement




| | |
|---|---|
| Mottle | 16.32 |
| Coverage: | 7.98 |
| ISO13660 Graininess | 0.11 |



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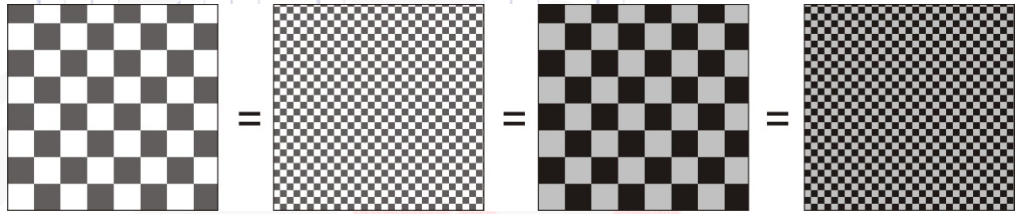
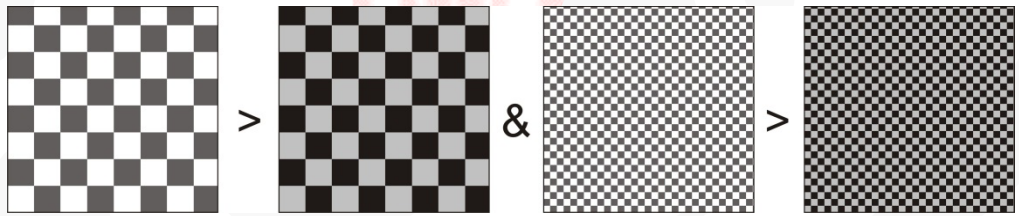
# What's different?

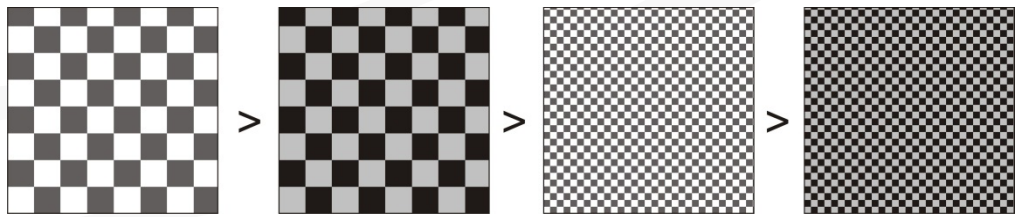
- ISO is a simple standard deviation of density measurements




- FLEX³PRO Mottle takes into account that bright areas are more critical than dark one




- Humand judgement is sensitive to the size of the void areas



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# Use the densitometer do control your print quality

Once the mechanical parameters of your printing process are correct, the densitometric characteristics have to be checked.

- Measure solid density
  - To make sure your printing product shows saturated colors
- Measure dot gain
  - To make sure your printing product shows all drawing details
- Measure densitometric surface coverage
  - To make sure your print curve is right
- Measure balance
  - To make sure your gray tones are correct



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# Complete process control with FLEX³PRO

- Control laser by controlling mask
- Control processor / exposure / washout by controlling finished plate
- Control minimum dots to avoid dot gain problems on highlights during print
- Control plate before print and after print
- Control mechanical dot size and shape on print
- Control density, dot gain, balance with the densitometer



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