

# **IFT Analyser V3.3**

## **a better way of measuring Ink Film Thickness on Screen Rolls**

By Symbotics and  
Technology Coaching



# IFT Analyzer Presentation Content

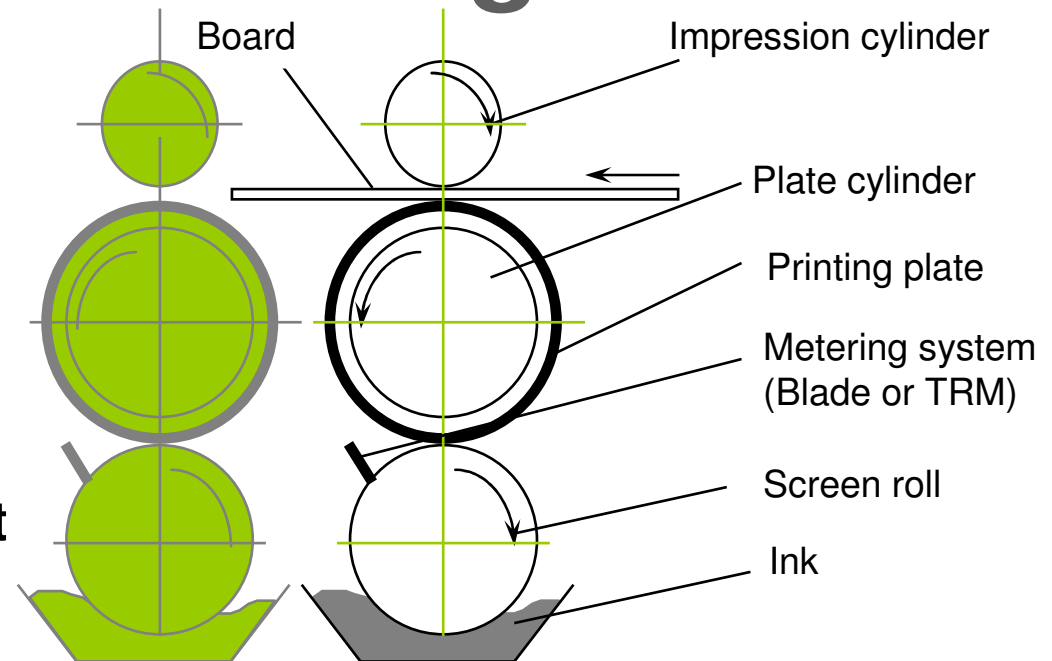
- What is printing;
- Screen roll (Anilox roll) function;
- Why is it important to monitor the screen roll performance;
- How do you monitor the screen roll performance;
- IFT Analyzer:
  - Measure Ink Film Thickness;
  - Measuring Cell Wall Thickness and Screen Count
- Selecting the right screen roll for the job;
- Using the USB Print Microscope.



# What is Printing?

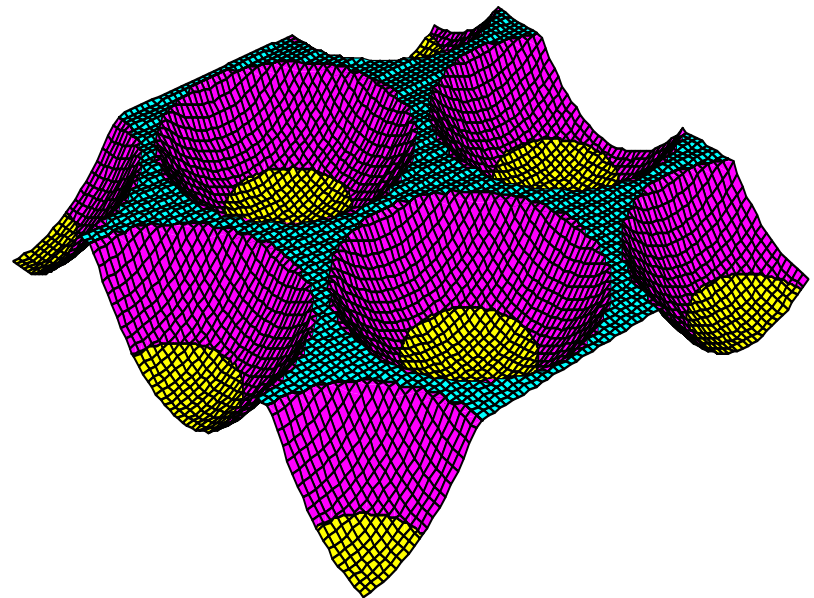
**Printing is:**  
**Getting the right**  
**of the right**  
**in the right**  
**on the right**  
**against the right**

**amount**  
**ink**  
**place**  
**paper**  
**costs**



# Screen Roll (Anilox Roll) Function

- This presentation focuses on the screen rolls in flexo printing machines;
- On the surface of the screen roll are cells that hold the ink;
- This ink is ready for being transferred to the high parts on the flexo print plate.
- The print plate transfers the ink to the substrate.



# Why is it important to monitor the screen roll performance (1)

- Colour consistency is a key print property on which print is judged today;
- Colour consistency is the “holy grail” for brand colour owners;

If we only focus on what can be controlled in the printing process then.....

- The printed colour depends on:
  - Substrate printed on;
  - Ink formulation;
  - Ink film thickness.



# Why is it important to monitor the screen roll performance (1a)

- The ink film thickness on the substrate printed depends on:
  - Shearing of the ink between printing plate and substrate;
  - Shearing of the ink between print plate and screen roll;
  - The ink film thickness available on the screen roll;
  - The ink being able to be released from the cells on the screen roll.



# Why is it important to monitor the screen roll performance (1b)

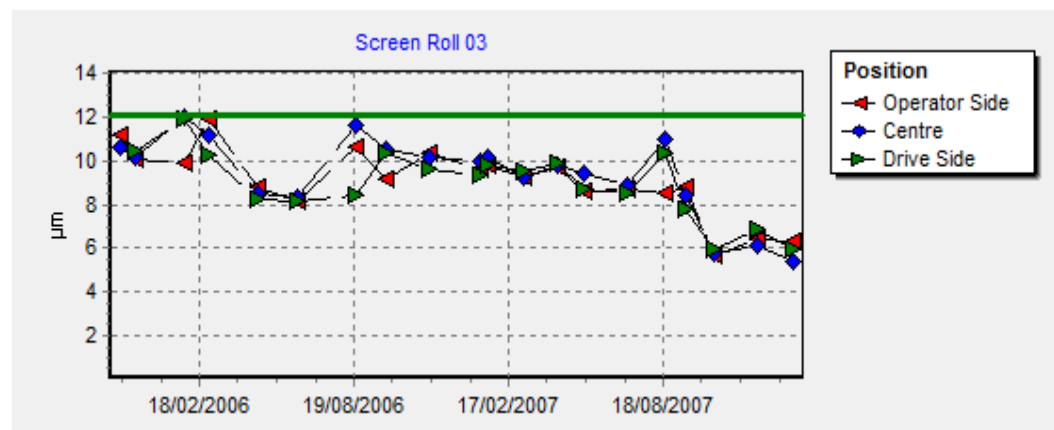
- In practise the printer has very limited influence on:
  - Ink release characteristics of the ink, screen roll and print plate;
  - Ink acceptance of the substrate;
- The cleanliness and wear of the screen roll is most likely the major factor during production influencing the ink film thickness transferred to the substrate.



# Why is it important to monitor the screen roll performance (2)

- During production it is the Ink Film Thickness variation caused by the variation in cleanliness and or wear of the screen roll cells that mainly effects the colour variation.

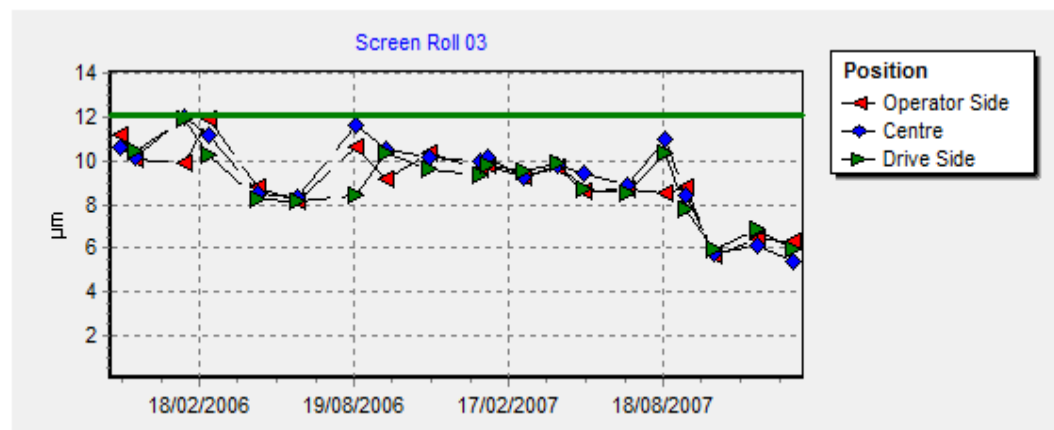
This is an example of a screen roll that was regularly monitored





# Why is it important to monitor the screen roll performance (3)

- It is essential to frequently clean screen rolls in order to reduce Ink Film Thickness variation to a minimum;
- The smaller the cleaning interval the lower the Ink Film Thickness variation;
- The roll does not need to be perfectly clean as long as the ink film thickness variation is small!



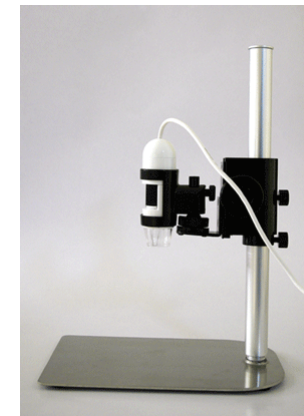
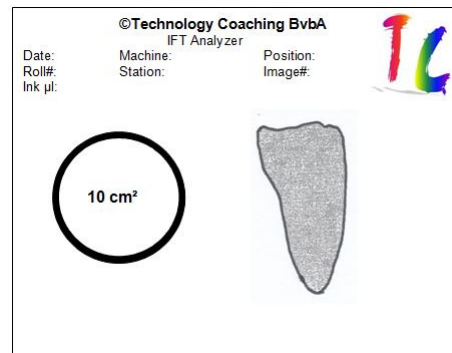
# How do you monitor the screen roll performance

We will now look at the procedure for measuring the ink film thickness and cell call thickness on a screen roll using InkFilmThickness Analyser.



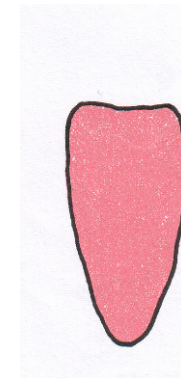
# What is needed?

- Computer;
- Scanner;
- IFT Analyzer software;
- IFT Analyzer ink;
- Micro pipette + 0.1 ml tips;
- Doctor blade;
- IFT Analyzer Paper;
- 0.5 mm black fine liner;
- Reference label;
- USB Microscope 20-200 x;
- USB Microscope 500 x;
- USB Microscope stand with extension pole.



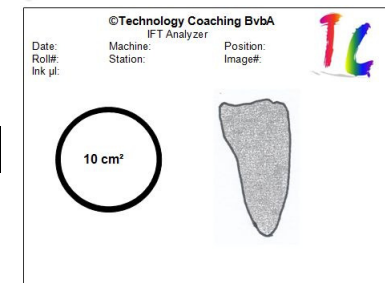
# Measuring the Ink Film Thickness on the screen roll Surface

- Make in 6 steps a “blot” to be analyzed by Ink Film Thickness Analyzer:
  - The “blot” is a full tone area made using a known amount of ink.
- Prepare the “blot” for measuring;
- Using Ink Film Thickness Analyzer to scan the blot and measure the ink film thickness.



# Make in 6 steps a “blot” to be analyzed by IFT Analyzer

1. Clean screen roll surface (using your standard detergents for cleaning screen rolls);
2. Dry screen roll surface;
3. Apply with the pipette a known amount of ink on the surface of the screen (e.g. 10 $\mu$ l);
4. Doctor the ink over the surface of the screen roll with the doctor blade;
5. Blot the ink off the surface of the screen roll with paper;
6. Clean ink off the surface of the screen roll (using your standard detergents for cleaning screen rolls).



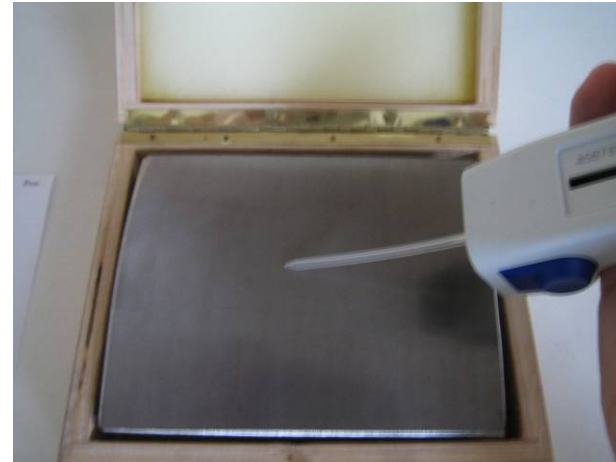
## Make a “blot” in 6 steps, Step 1 and 2

- Step 1: Clean screen roll surface (using your standard detergents for cleaning screen rolls);
- Step 2: Dry screen roll surface;



## Make a “blot” in 6 steps, Step 3 and 4

- Step 3: Apply with the pipette a known amount of ink on the surface of the screen roll (e.g. 10 $\mu$ l);
- Step 4: Doctor the ink over the surface of the screen roll with the doctor blade;





## Make a “blot” in 6 steps, Step 5 and 6

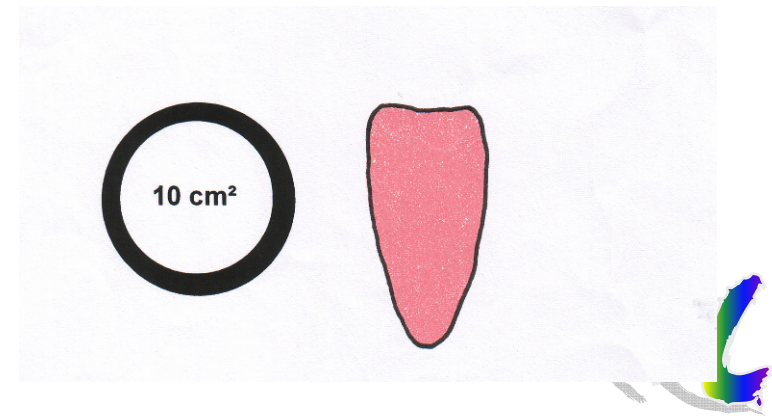
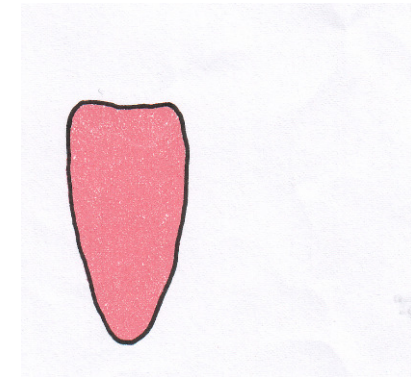
- Step 5: Blot the ink off the surface of the screen roll with paper;
- Step 6: Clean ink off the surface of the screen roll (using your standard detergents for cleaning screen rolls).





# Prepare the “blot” for measuring

- Draw a line around the blot area with a 0.5 mm fine liner;
- Place a reference label left of the blot area (you also can print a sheet with the reference area);
- Place the paper with reference circle and blot on the USB microscope standard with extension pole and use the USB print microscope 20-200x;
- Focus the USB microscope at 20x so that the reference circle and blot are both sharp and visible (The image will be visible on your PC when using IFT Analyser).



# Start IFT Analyser on your PC

The screenshot shows the IFT Analyser software interface. The main window is titled 'IFT Analyser' and contains several sections:

- Table:** A table with columns: Code, Nominal IFT, L/cm, Wall  $\mu\text{m}$ , PlantName, MachineName, Location, and Drawing. The 'Screen Roll 03' row is selected.
- Filter boxes:** Located at the top right, for filtering the list by roll number or names.
- Language button:** A button labeled 'Language' in the top right corner.
- Changing between metric and imperial measures:** A button labeled 'IFT Unit' with a dropdown menu.
- Help function:** A button labeled 'Help' in the top right corner.
- Click here to add a New roll:** A button labeled 'New' in the 'Roll' section.
- Click here for a report on a roll:** A button labeled 'Report' in the 'Roll' section.
- Click here for export data:** A button labeled 'Export' in the 'Roll' section.
- Tabs for IFT and Cell Wall Thickness chart:** Two tabs at the bottom left: 'Ink Film Thickness' and 'Cell Wall Thickness'.
- IFT Test Run:** A section on the bottom left with a table for test runs.
- IFT Measurements:** A section on the bottom right with a table for measurements.

The 'Ink Film Thickness' tab is active, showing a line graph for 'Screen Roll 03' with data points for 'Operator Side', 'Centre', and 'Drive Side' over time. The 'Cell Wall Thickness' tab is also visible.



# Create new screen roll or select an existing screen roll

The screenshot shows the IFT Analyser 3.3 software interface. It includes a 'Screen Rolls' table, a line graph for 'Screen Roll 03', and sections for 'IFT Test Runs' and 'IFT Measurements'. Callouts point to specific features:

- Selected screen roll:** Points to 'Screen Roll 03' in the 'Screen Rolls' table.
- Tabs for IFT and Cell Wall Thickness chart:** Points to the 'Ink Film Thickness' and 'Cell Wall Thickness' tabs.
- Click here to add a Test Run:** Points to the 'New' button in the 'Test Run' section.
- Click here to edit a Test Run:** Points to the 'Edit' button in the 'Test Run' section.
- Click here to edit a measurement:** Points to the 'Edit' button in the 'IFT Measurements' section.
- Click here for a new measurement after selecting or creating a roll:** Points to the 'New' button in the 'IFT Measurements' section.

**Screen Rolls Table:**

Code	Nominal IFT	L/cm	W/cm	MachineName	Location	Drawing
PP 0002	10.4			Bobst 2000	ST2	C:\Users\Public\Syn
PP 0003	12.3			Bobst 2000	ST3	C:\Users\Public\Syn
Screen Roll 01	5.0	1		DRQ	Station 1	
Screen Roll 02	12.0			DRQ	Station 3	
Screen Roll 03	12.1			DRQ	Station 5	

**IFT Test Runs Table:**

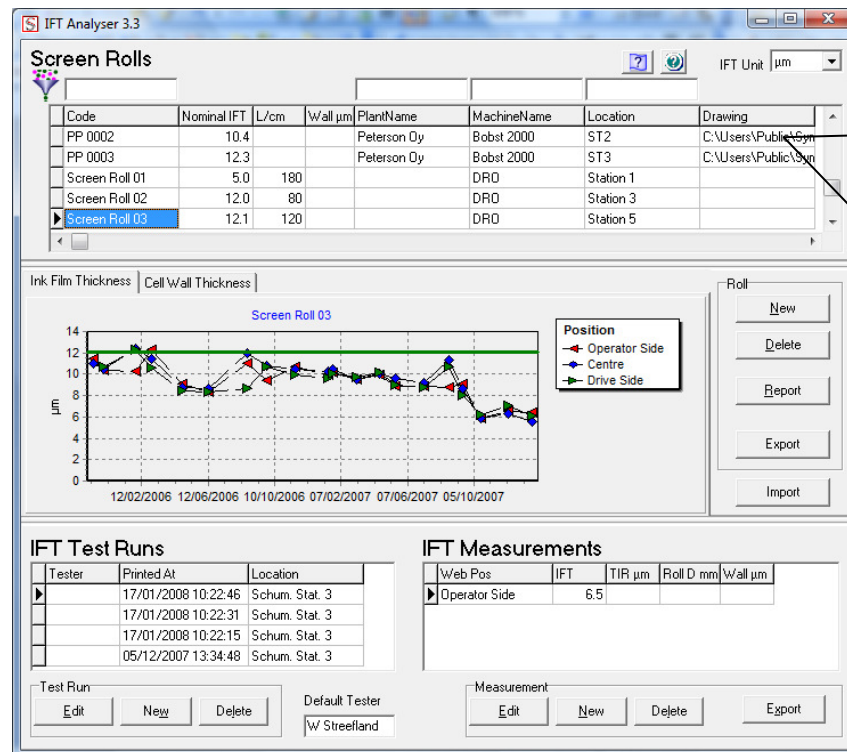
Tester	Printed At	Location
	01/2008 10:22:46	Schum. Stat. 3
	01/2008 10:22:31	Schum. Stat. 3
	17/2008 10:22:15	Schum. Stat. 3
	05/12/07 13:34:48	Schum. Stat. 3

**IFT Measurements Table:**

Web Pos	IFT	TIR $\mu$ m	mm	Wall $\mu$ m
Operator Side	6.5			



# Add screen roll drawing

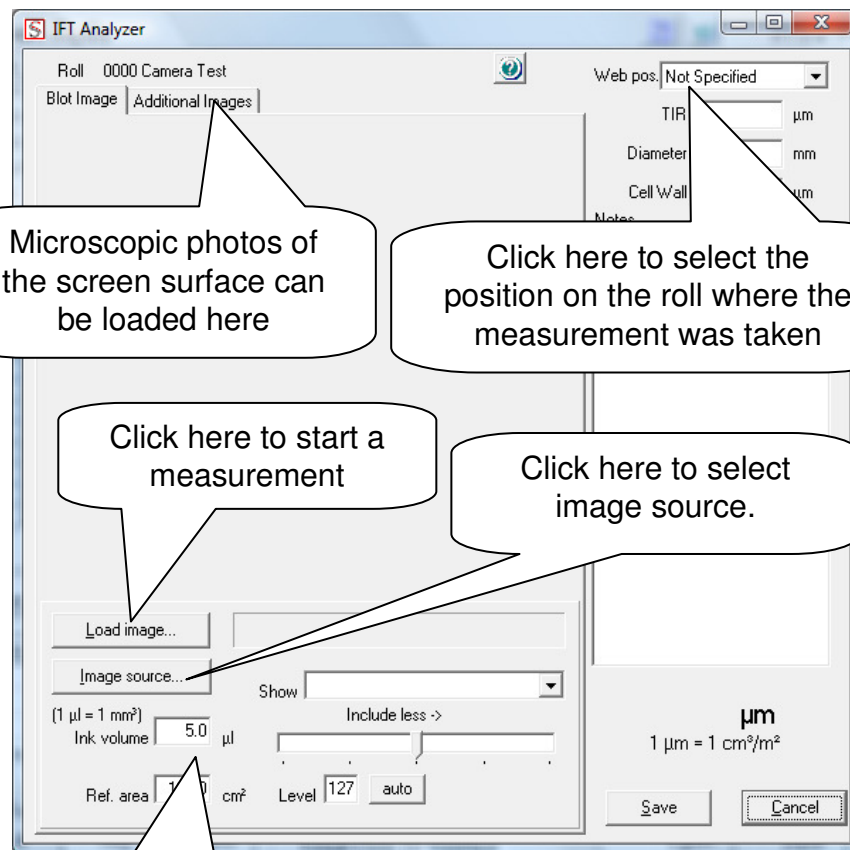


You can add a file showing the drawing of the screen roll. This will avoid searching for it when you need to order a new or refurbish the screen roll.

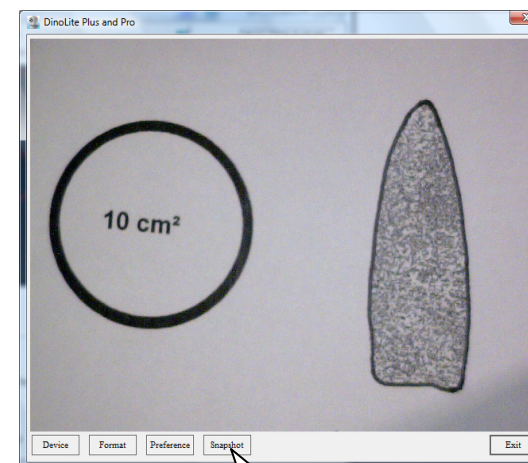
You are able to select the drawing file location when you click in the field.



# Taking IFT measurement



1. Use the USB print microscope 20-200 and place it in the microscope standard with extension pole;
2. In the main IFT Analyser screen click on "New" in the measurement window at the bottom of the screen;
3. Click on load image;
4. Position the reference circle and blot area in the camera window as shown below;
5. Reference circle needs to be left of the "blot";
6. Click on "Snapshot"



"Snapshot"





# View result and save data

The screenshot shows the IFT Analyzer software interface. The main window displays a 'Roll' image with a yellow circular area labeled '10 cm²' and a dark, textured area. The 'Web pos.' is set to 'Not Specified'. The 'TIR' field is empty with a unit of  $\mu\text{m}$ . The 'Diameter' field is empty with a unit of mm. The 'Cell Wall' field is empty with a unit of  $\mu\text{m}$ . The 'Notes' section shows 'Image source: TC04/USB2.0 PC Camera'. The 'Date Source' field is empty. The 'Click here in case the image is not recognised and needs to be reanalysed' callout points to the 'Load image...' button. The 'Area to enter Total Indicated Run Out Measured' callout points to the 'TIR' field. The 'Area to enter Roll Diameter Measured' callout points to the 'Diameter' field. The 'Area to enter Cell Wall Thickness' callout points to the 'Cell Wall' field. The 'Pick Image Source' dialog box is open, showing options for 'From file. Default folder', 'Twain interface', 'Windows Image Acquisition interface', and 'Bitmap on Clipboard'. The 'Twain interface' option is selected, and the 'USB2.0 PC Camera' is chosen. The 'OK' button is highlighted. The 'The ink film thickness calculated on the surface of the screen roll' callout points to the '7.09  $\mu\text{m}$ ' result. The 'Save' and 'Cancel' buttons are visible at the bottom.

IFT Analyzer

Roll

Blot Image | Additional Images

Web pos: Not Specified

TIR  $\mu\text{m}$

Diameter mm

Cell Wall  $\mu\text{m}$

Notes

Image source: TC04/USB2.0 PC Camera

Date Source

Click here in case the image is not recognised and needs to be reanalysed

Area to enter Total Indicated Run Out Measured

Area to enter Roll Diameter Measured

Area to enter Cell Wall Thickness

Pick Image Source

From file. Default folder

C:\Users\Wilbert\Documents\03 Technology Coe...

Twain interface

USB2.0 PC Camera

Windows Image Acquisition interface

WIA Canon MP980 ser\_000085F0C327

Bitmap on Clipboard

OK Cancel

Load image...

Image source...

Show Cross Hatched

Include less ->

(1  $\mu\text{l}$  = 1  $\text{mm}^2$ )

Ink volume 5.0  $\mu\text{l}$

Ref. area 10.00  $\text{cm}^2$

Level 127 auto

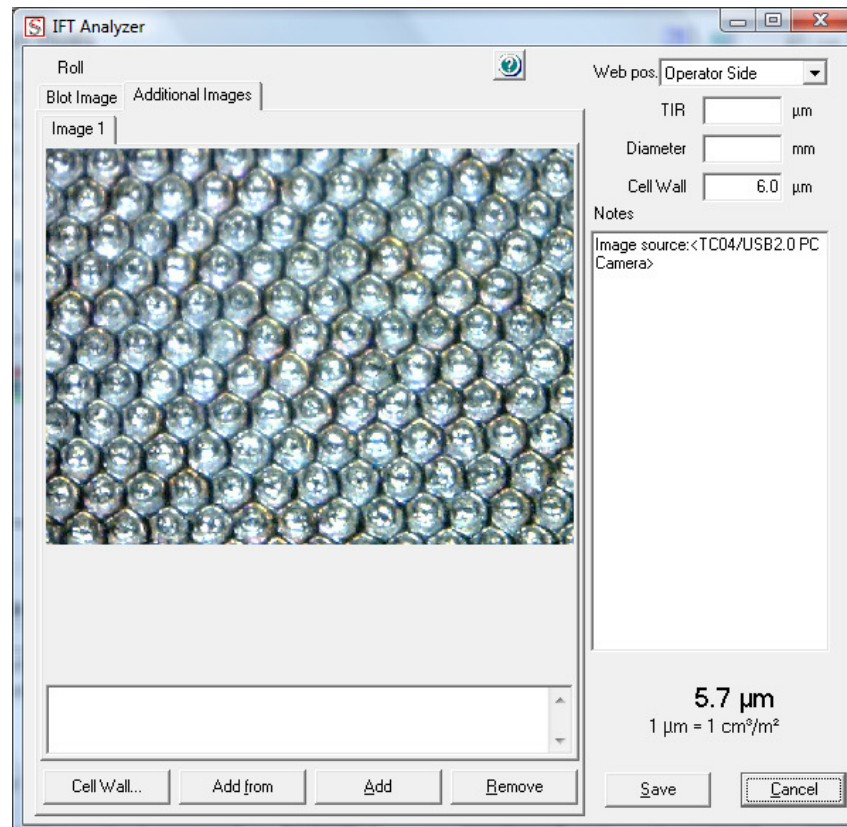
7.09  $\mu\text{m}$

1  $\mu\text{m}$  = 1  $\text{cm}^2/\text{m}^2$

Save Cancel

The ink film thickness calculated on the surface of the screen roll

# Adding an image to an IFT Analyser measurement using the USB Print Microscope



# History Screen Roll Report (1)

Roll Report Parameters

Report on Roll:  
**AB38876**

By Measurement | By Test Run | Compare Runs

Measurements in location: <All Locations>

Measurements of web position: <Any Position>

☐ Graph web positions separately

Parameter to Show:

- ☒ Ink Film Thickness
- ☐ Cell Wall Thickness

Show Auxiliary Images:

- ☒ None
- ☐ All
- ☐ Measured Water

27/10/20

Print Preview Cancel

Graph showing data by measured web position

Select measuring location

Select measuring position

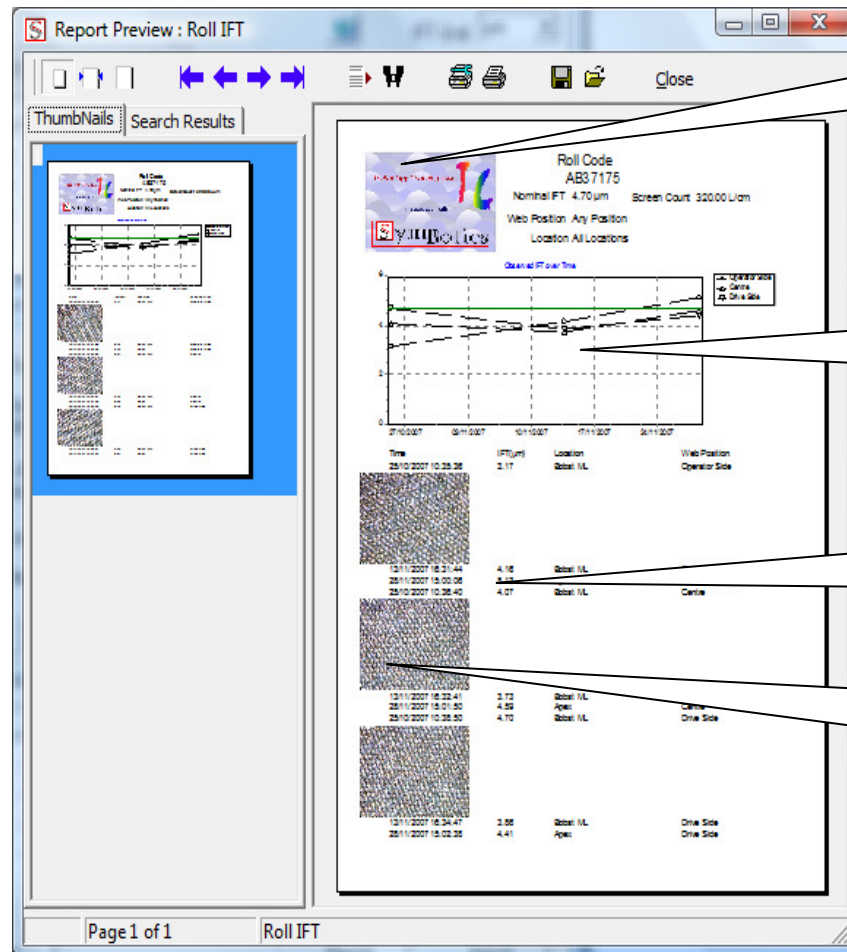
Selecting between Ink Film Thickness or Cell Wall Thickness Report

Options to add the Auxiliary images to the report





# History Screen Roll Report (2)



# QA Screen Roll Report

**Roll Report Parameters**

Report on Roll:  
**TOP SA 01 AB41574**

By Measurement   By Test Run   Compare Runs

02/03/2009 12:54:29

Acceptance

Print   Preview   Cancel

**Report Preview : Report By Run**

ThumbNails   Search Results

**Roll Test Run Report**  
Roll Code: TOP SA 01 AB41574  
Date and Time: 02/03/2009 12:54:29  
Plant Name: TOP SA  
Machine Name: 600gms/45L  
Location: Acceptance  
Nominal ST: 100 µm  
Cell Wall: 0 µm  
Screen Count: 100 L/cm

Position  
Drive Size  
PT: 1-17  
Initial: 100 µm  
TR: 10 µm  
Dimension: 10 µm  
Cell Wall: 10 µm

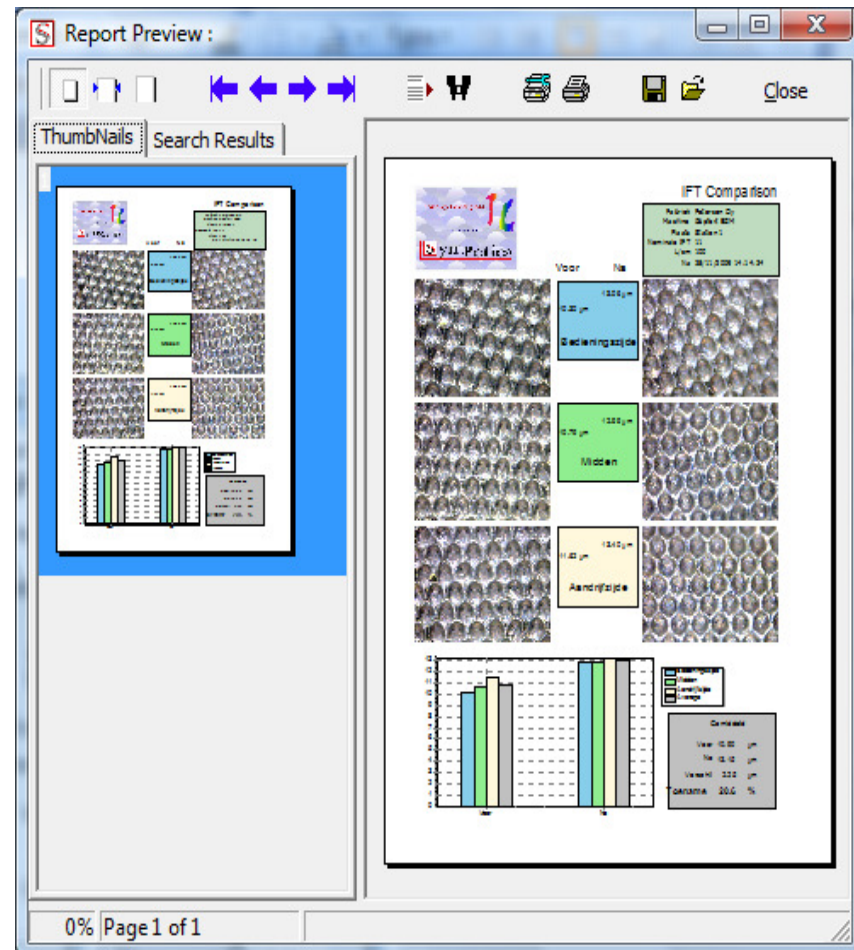
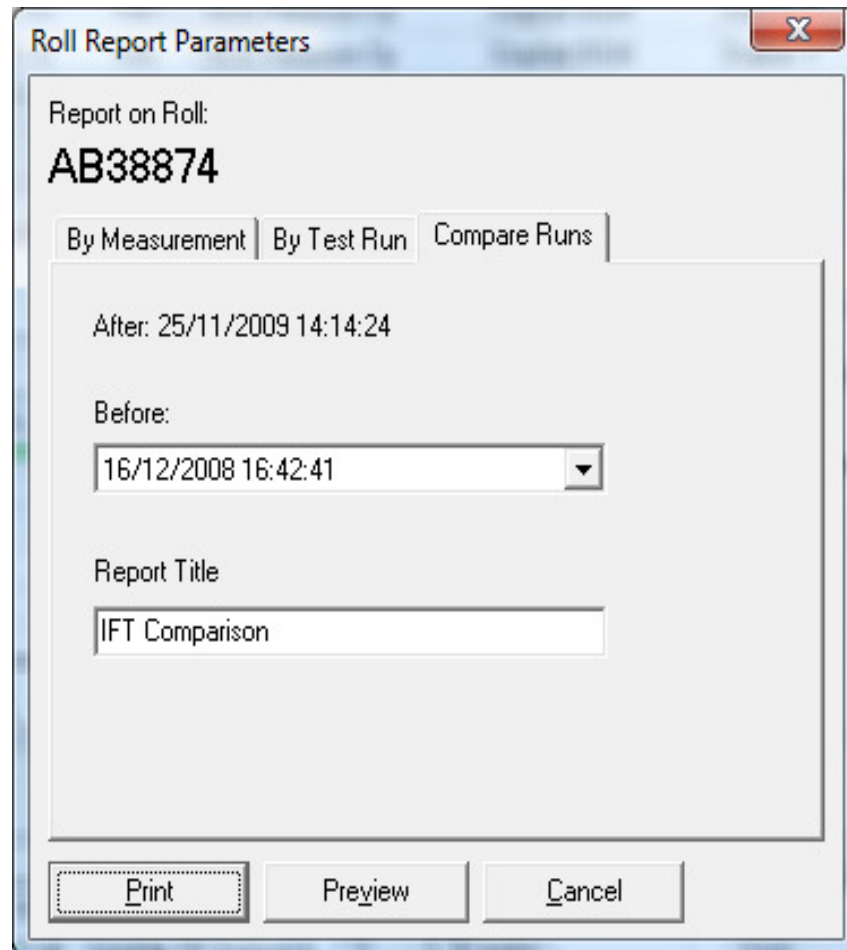
Position  
Drive Size  
PT: 1-22  
Initial: 100 µm  
TR: 10 µm  
Dimension: 10 µm  
Cell Wall: 10 µm

Position  
Drive Size  
PT: 1-24  
Initial: 100 µm  
TR: 10 µm  
Dimension: 10 µm  
Cell Wall: 10 µm

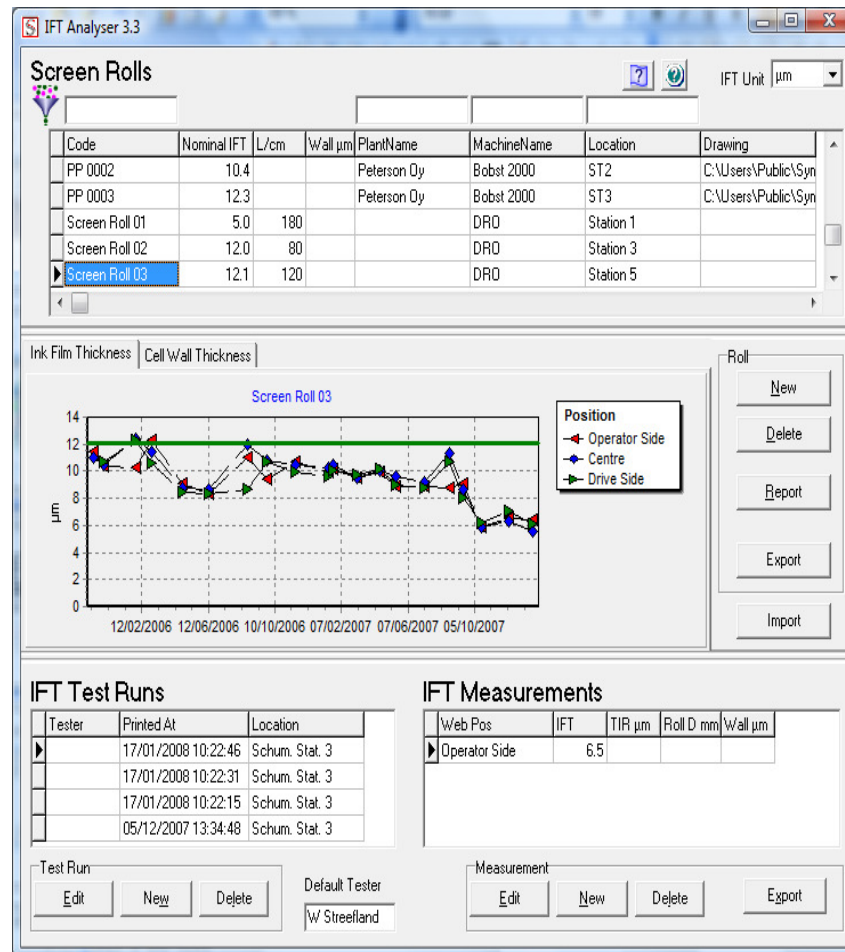
Printed By: W Greenfield   Signature: \_\_\_\_\_

Page 1 of 1   Report By Run

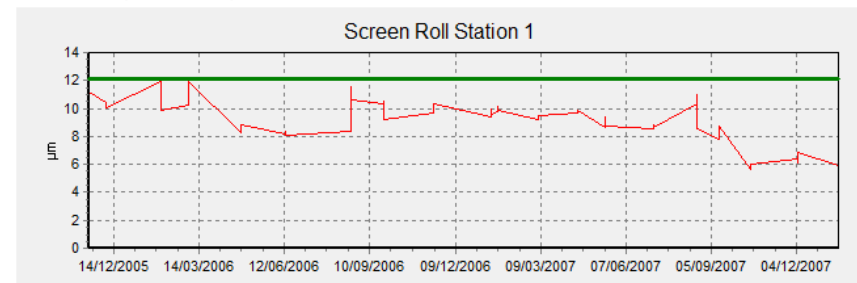
# Compare Runs Report



# Copying the IFT result Graph to a document

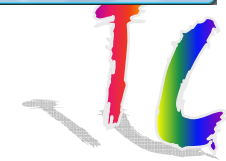
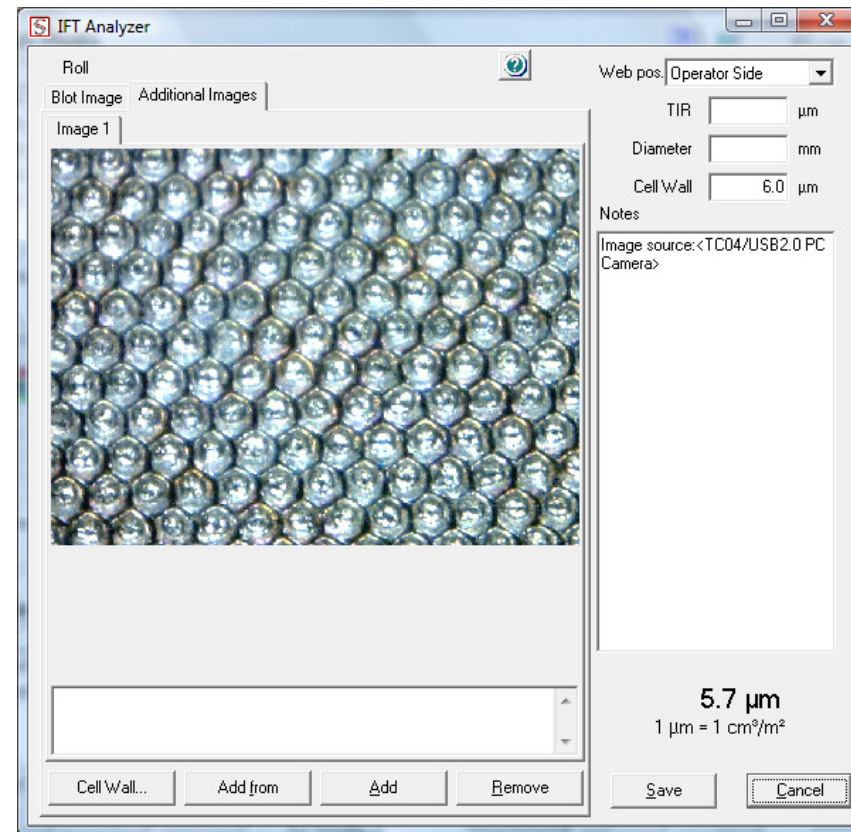


1. Select the screen roll from which you want to copy the graph;
2. Select if you want to copy the IFT or Cell Wall Thickness graph;
3. Use the right mouse button to click on the graph and click on "Copy";
4. Open the document you want to copy the graph to;
5. Paste the graph in the document (ctrl C).



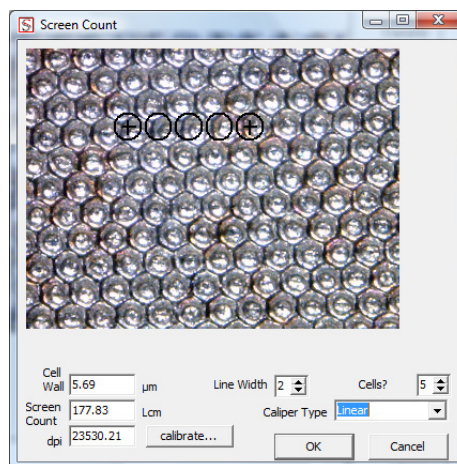
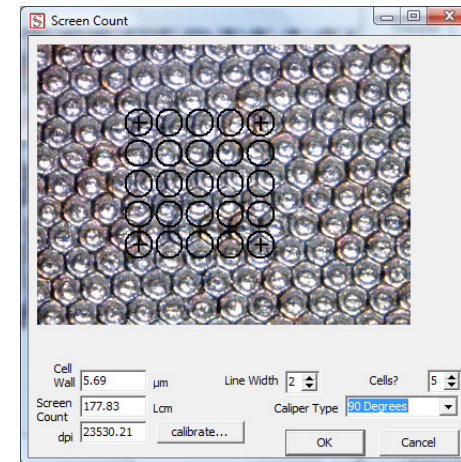
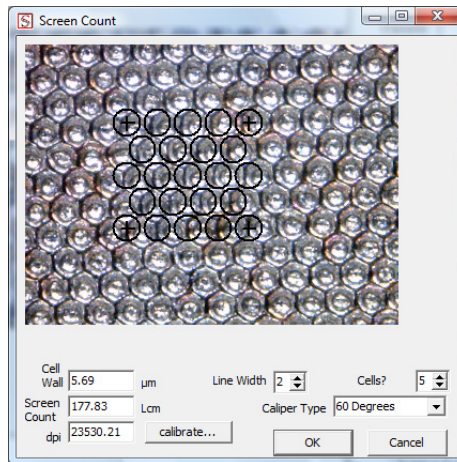
# Cell Wall Thickness / Screen Count

- Cell wall thickness can be measured clicking the bottom left button: “Cell Wall..”
- The next slide will show the 3 options for aligning a grid with the cells on the surface of the screen roll.





# Cell Wall Thickness and Screen Count Grid Option

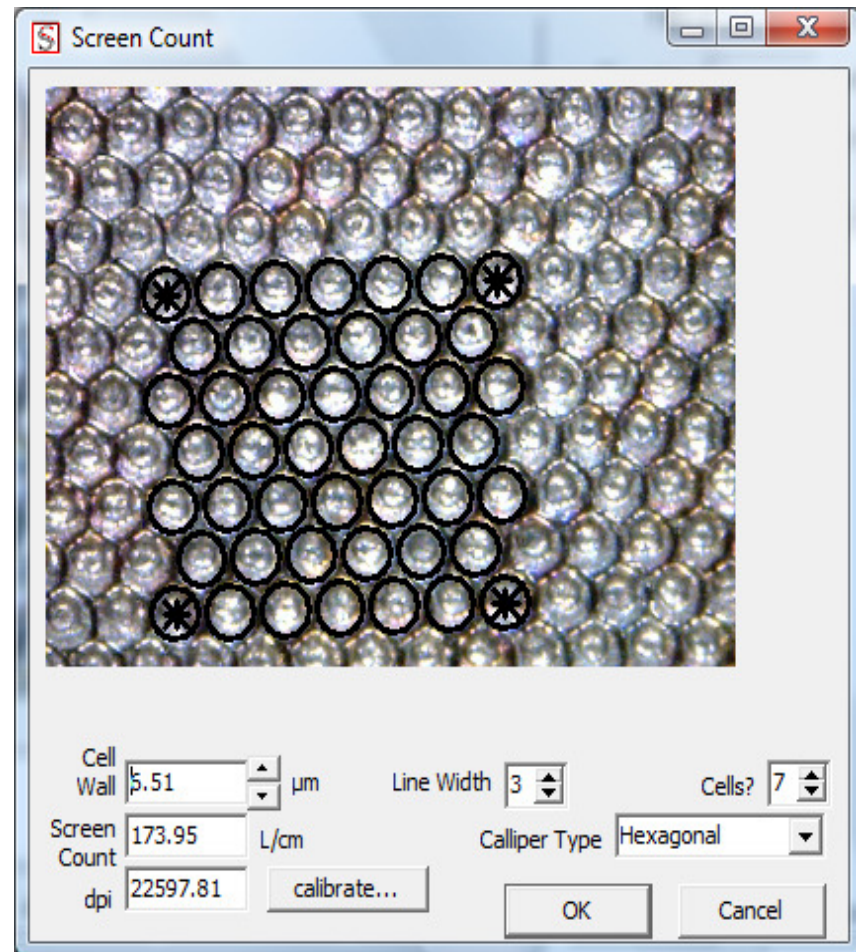


- Top Left: Hexagonal Pattern
- Top Right: Square Pattern
- Left Linear pattern



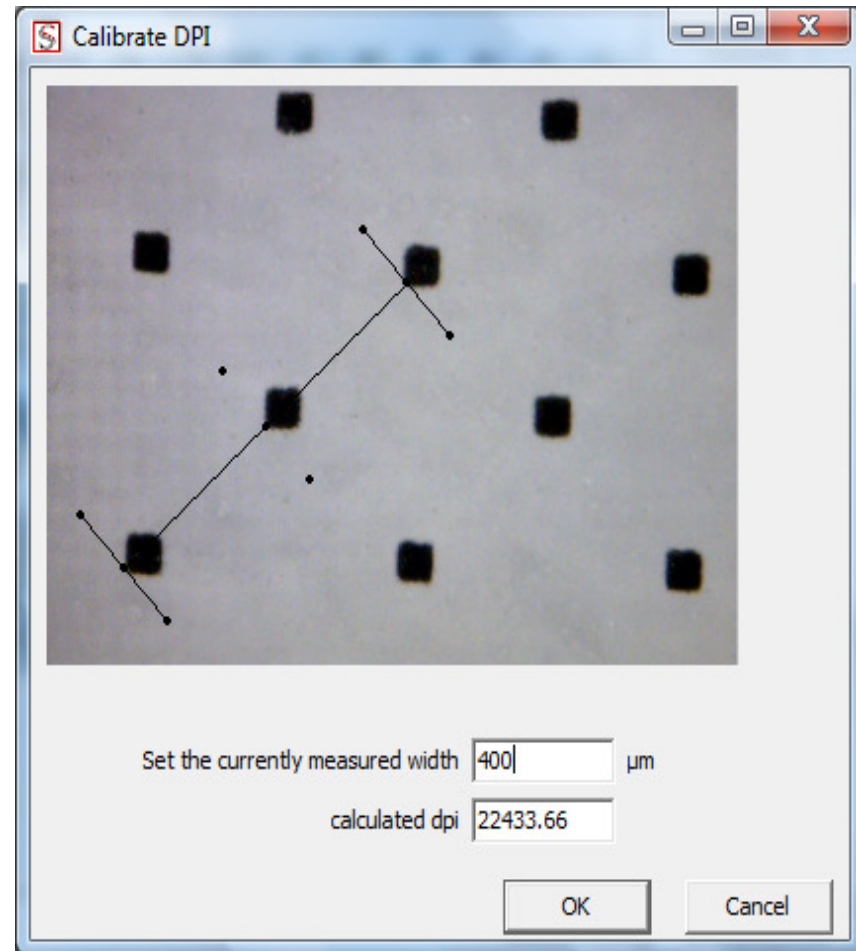
# Cell Wall Thickness and Screen Count Grid Option

- This is the result when aligning the overlay grid to the cells on the surface of the screen roll.
- The moving from the grid is done by picking up the corner cells with your mouse.
- Double clicking the corner cells of the grid allows fixing the cell to the image.



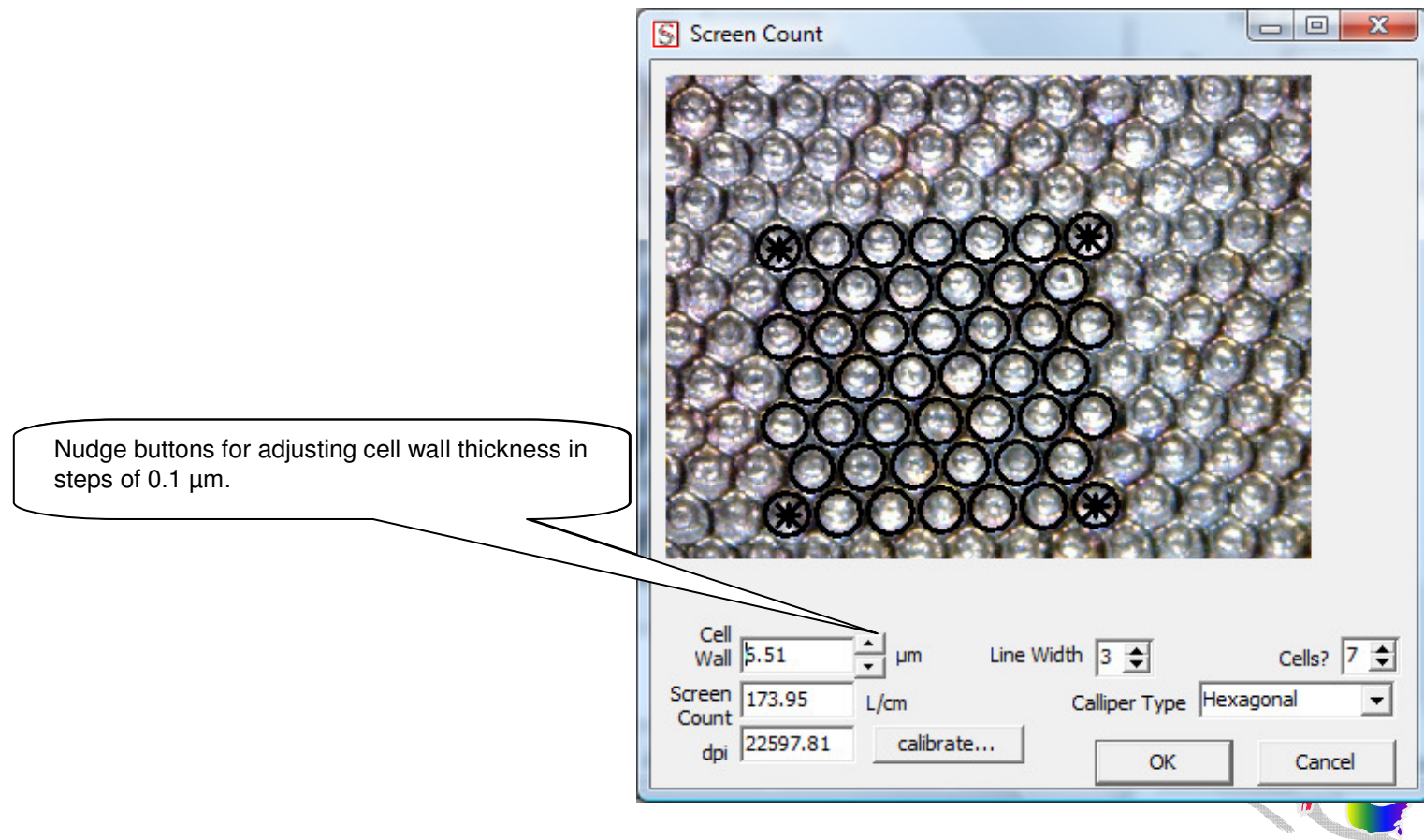
# Calibration Screen

- Calibration is needed before measuring the cell wall thickness or screen count.
- The same calibration setting can be used when always using the same USB microscope.
- A calibration film is provided





# Grid Alignment



# Selecting the right screen roll for the job

- Who is involved in the selection of the screen roll:
  - Printer;
  - Substrate supplier;
  - Ink Supplier.
- What determines the screen roll specification:
  - Substrate;
  - Ink;
  - Printed image.
- What needs specifying:
  - Ink Film Thickness;
  - Cell wall thickness between cells;
  - Cell depth to width ratio;
  - Screen Count.



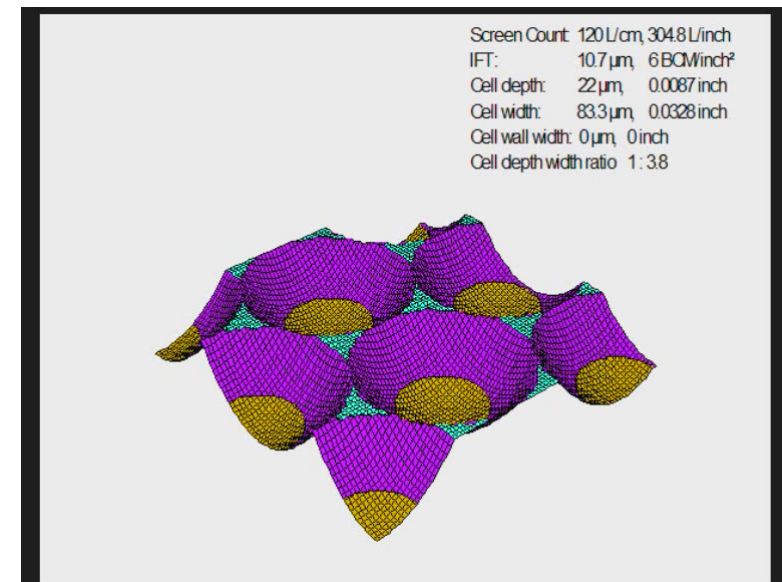
# Checking the screen roll specification (1)

- IFT Analyzer V2 has a module for checking your screen roll specification;
- Assume you have been talking to your partners:
  - Repro house claims you need for your jobs a 120 L/cm (305 L/inch) screen;
  - The substrate supplier and ink supplier agree the need to use a screen roll IFT of 11  $\mu\text{m}$  (5.9 BCM/inch<sup>2</sup>);
  - Your ink supplier advises a cell width to depth ratio of 1 : 2.5. This to be sure the ink is released from the cells and the cells can be cleaned;
  - The screen roll manufacturer claims that the minimum cell wall thicknesses he can engrave is: 10  $\mu\text{m}$  (0.0039 inch);



# Checking the screen roll specification (2)

- You enter the values in the IFT Screen roll specification checker;
- The video on the right shows how it checks the specification and updates the specifications.



Click on the image to  
start the video



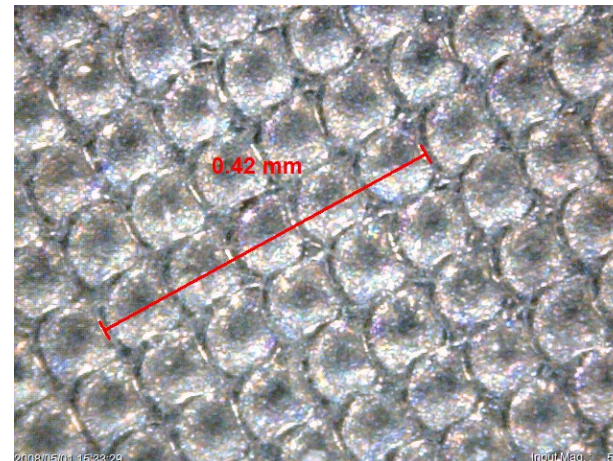
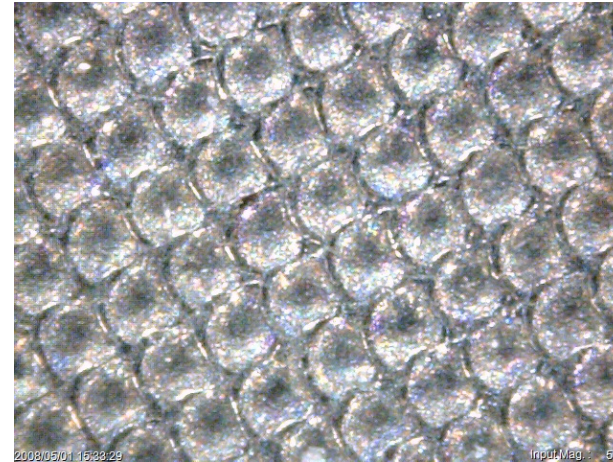
# Checking the screen roll specification (2)

- The result shows that it is **not** possible, with a screen count of 120 L/cm (305 L/inch), to meet the other screen roll specifications. The screen count has been reduced to 110 L/CM (279 L/Inch);
- You might want to rethink the other targets. If the screen count has to be 120 L/cm then:
  - Reduce the IFT. This might result in not having a good full tone print or the need for upgrading substrate specification. You might not have the option to change the screen roll for every job so you need to have rolls in the machine fit for the majority of substrates you print on;
  - Reducing the cell wall thickness. It might not be possible to be engraved by the screen roll supplier. In the previous example he indicated 10  $\mu\text{m}$  was the minimum;
  - Reduce the cell width to depth ratio. This might result in ink release problems and can cause quickly clogging of the cells in the screen roll thus no ink is transferred from the screen roll to the print plate.
- It might be better to reduce the screen roll screen count in order to have a reliable process, printing a consistent colour, in stead of being able to print very high screen count halftone images.



# Measuring Screen Count using the USB Print Microscope

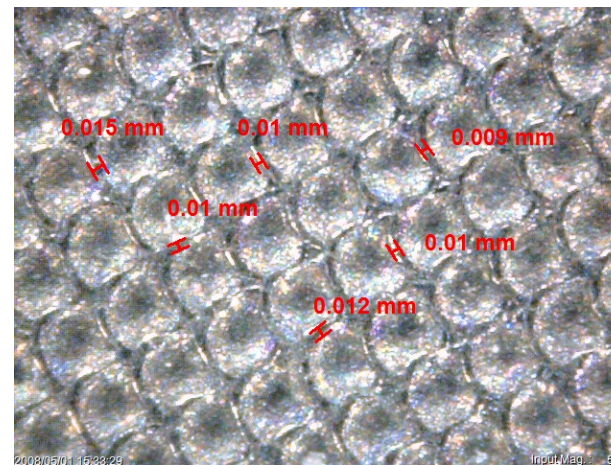
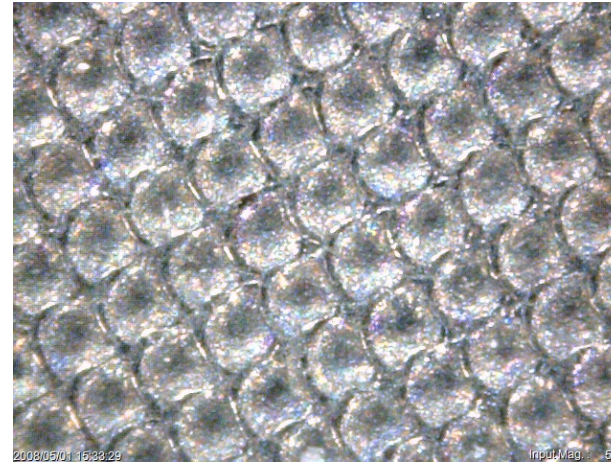
- Using the USB print microscope 500x magnification makes it easy to measure the screen roll line count;
- Take an image of the screen roll (Top image);
- Open the image and set the magnification on: 500x
- Select the option of measuring using a line;
- Draw a line over a number of cells as shown in the bottom picture;
- The screen count: Number of lines measured divide by the distance measured. For the metric system this needs to be multiplied by 10 to get Lines/cm;
- The image in the example has:  
 $5 \times 10 / 0.42 = 118 \text{ Lines/cm}$





# Measuring Cell Wall Width using the USB Print Microscope

- Using the USB print microscope 500x magnification makes it easy to measure the cell wall width;
- Take an image of the screen roll (Top image);
- Open the image and set the magnification on: 500x
- Select the option for measuring using a line;
- Draw a line over a cell wall as shown in the bottom picture;
- Repeat this to get an idea of the average cell wall thickness. Notice it is around 0.010 mm which is equal to 10  $\mu\text{m}$ .



# Conclusion

- IFT Analyser is a practical tool for measuring and analysing your screen roll Ink Film Thickness over time;
- You can exchange data and images with your customer/supplier and discuss cleaning procedures and roll condition;
- It will help to avoid setting the wrong screen roll specifications by checking them before you order the roll.





# Thank you for your attention

**Wilbert Streefland  
Technology Coaching BvbA  
Kerkhofdreef 3/4  
3001 Heverlee  
Belgium  
Phone: +32-16 652760  
Fax: +32-16 795264  
Mobile: +32-479 673716  
Website: [www.tcbvba.be](http://www.tcbvba.be)**

