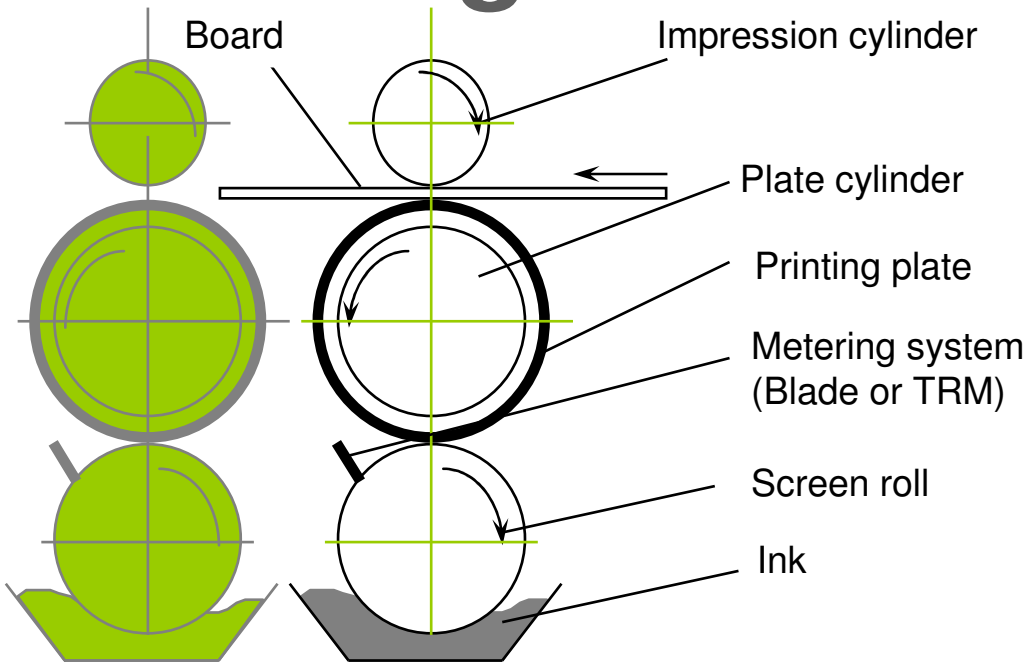
IFT Analyser V3.3
a better way of measuring Ink Film Thickness on Screen Rolls

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?

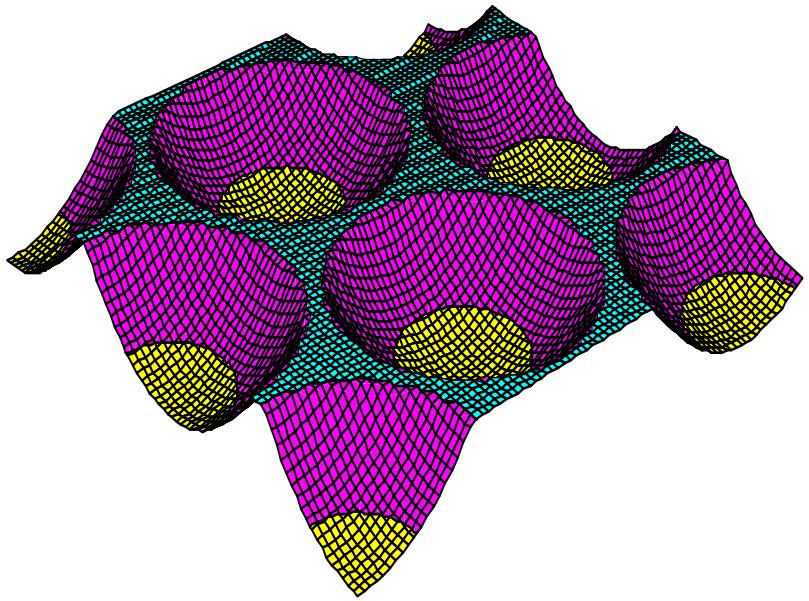


Printing is:

Getting the right amount
of the right ink
in the right place
on the right paper
against the right 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.

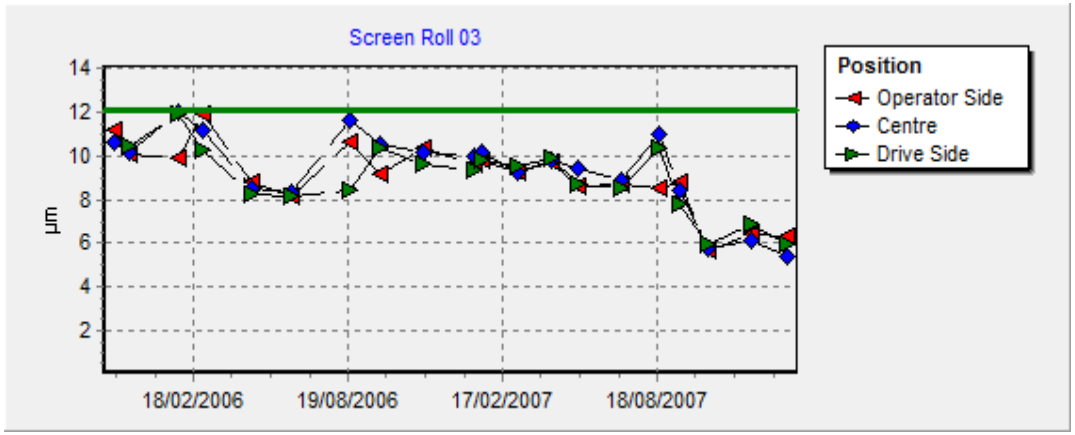
Why is it important to monitor the screen roll performance (1b)

- 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)

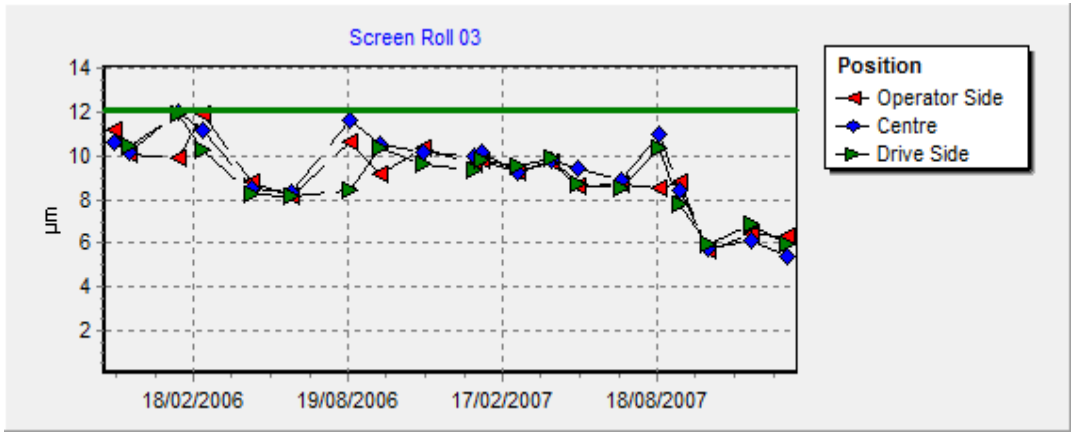
- During production it is the Ink Film Thickness variation caused by the variation in cleanliness and or wear of the screen roll cells that mainly effects the colour variation.

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!

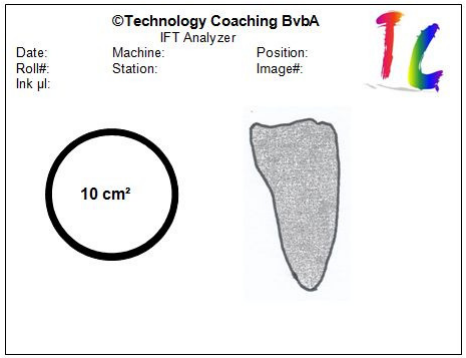


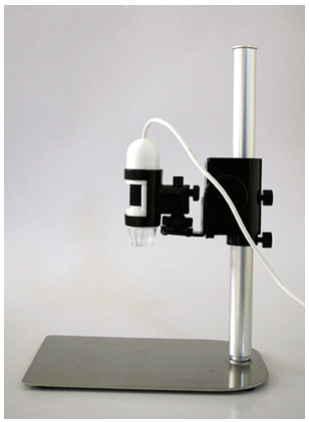
How do you monitor the screen roll performance

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?

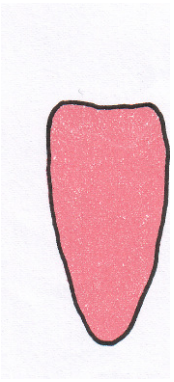
- Computer;
- Scanner;
- IFT Analyzer software;
- IFT Analyzer ink;
- Micro pipette + 0.1 ml tips;
- Doctor blade;
- IFT Analyzer Paper;
- 0.5 mm black fine liner;
- Reference label;
- USB Microscope 20-200 x;
- USB Microscope 500 x;
- USB Microscope stand with extension pole.





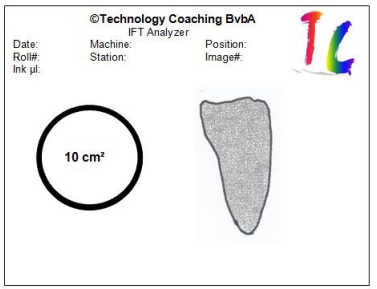
Measuring the Ink Film Thickness on the screen roll Surface

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



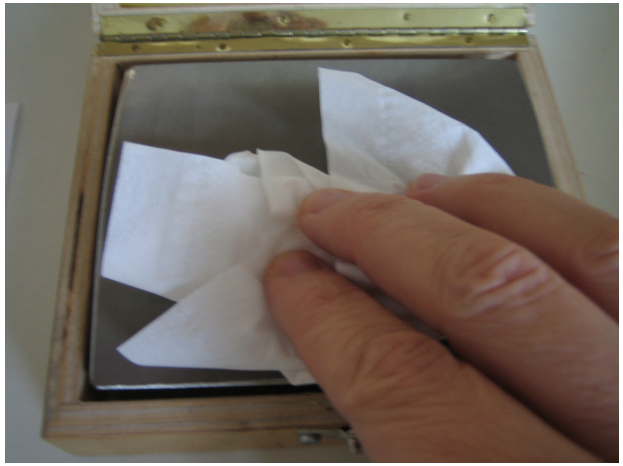
Make in 6 steps a “blot” to be analyzed by IFT Analyzer

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. 10µl);
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).



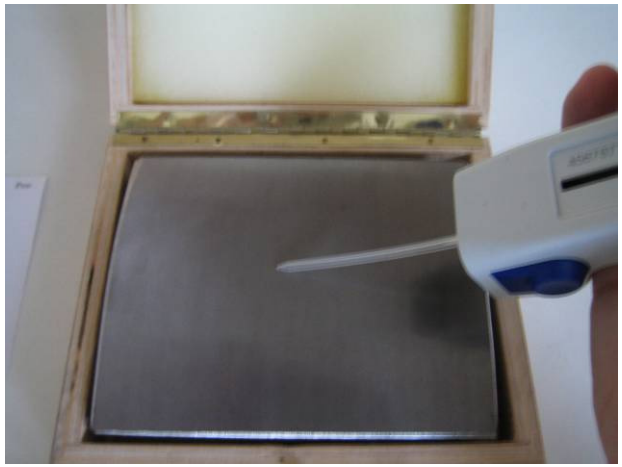
Make a “blot” in 6 steps, Step 1 and 2

- 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. 10µl);
- Step 4: Doctor the ink over the surface of the screen roll with the doctor blade;

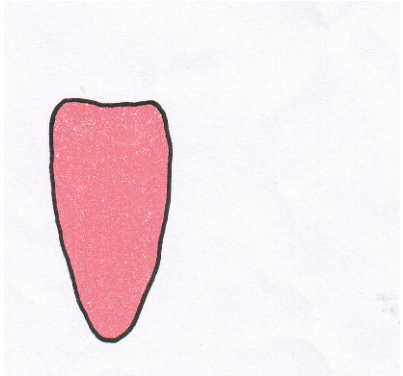


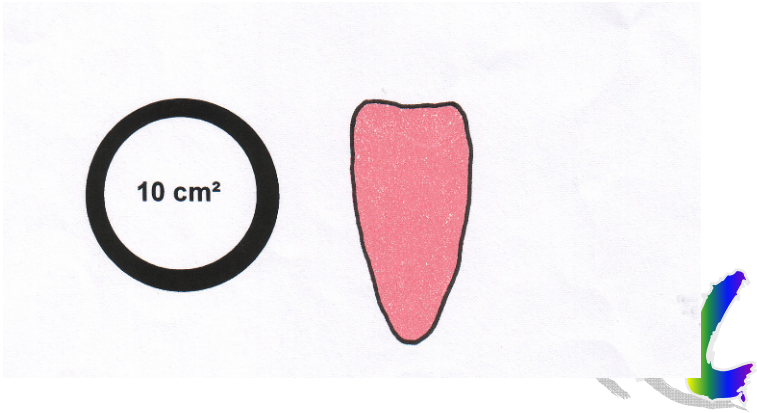
Make a “blot” in 6 steps, Step 5 and 6

- 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

Click in the table heading to sort the list

Filter boxes. Type roll number or names to filter list

Language button

Changing between metric and imperial measures

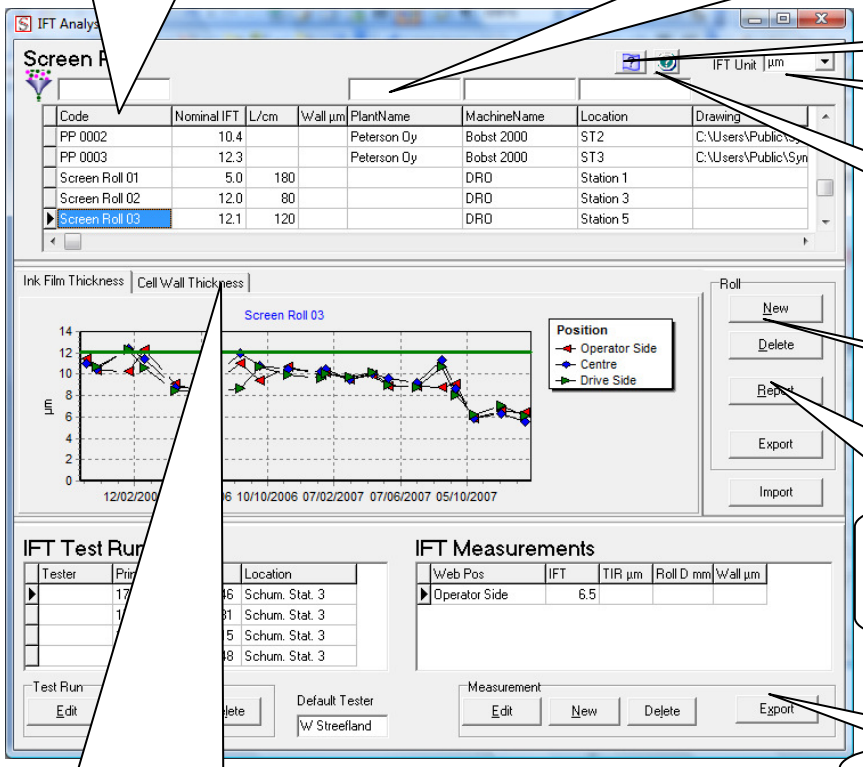
Help function

Click here to add a New roll

Click here for a report on a roll

Click here for export data

Tabs for IFT and Cell Wall Thickness chart



Create new screen roll or select an existing screen roll

Selected screen roll

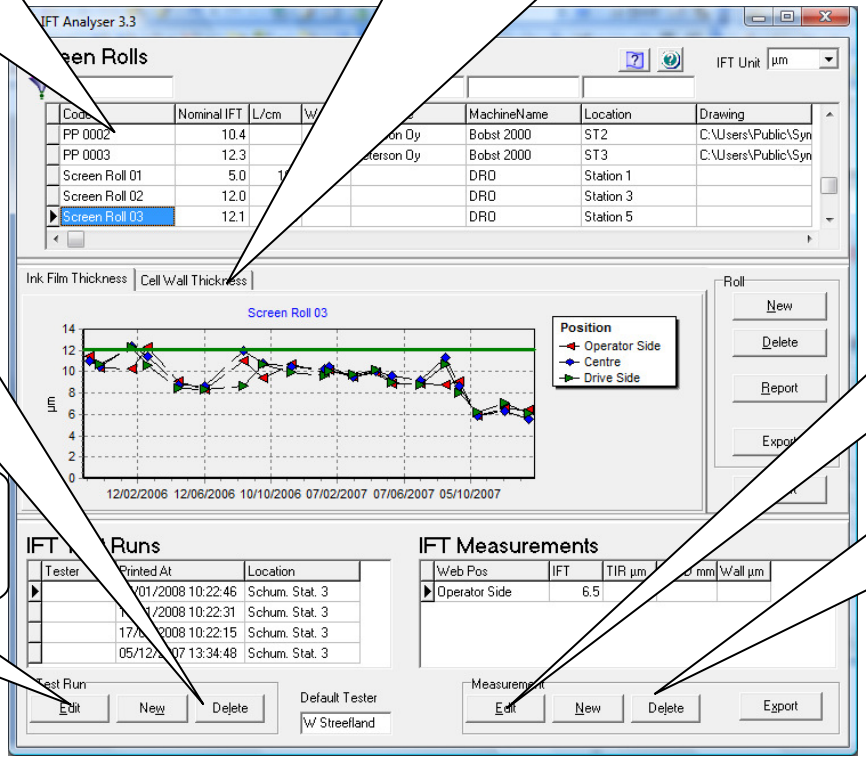
Tabs for IFT and Cell Wall Thickness chart

Click here to add a Test Run

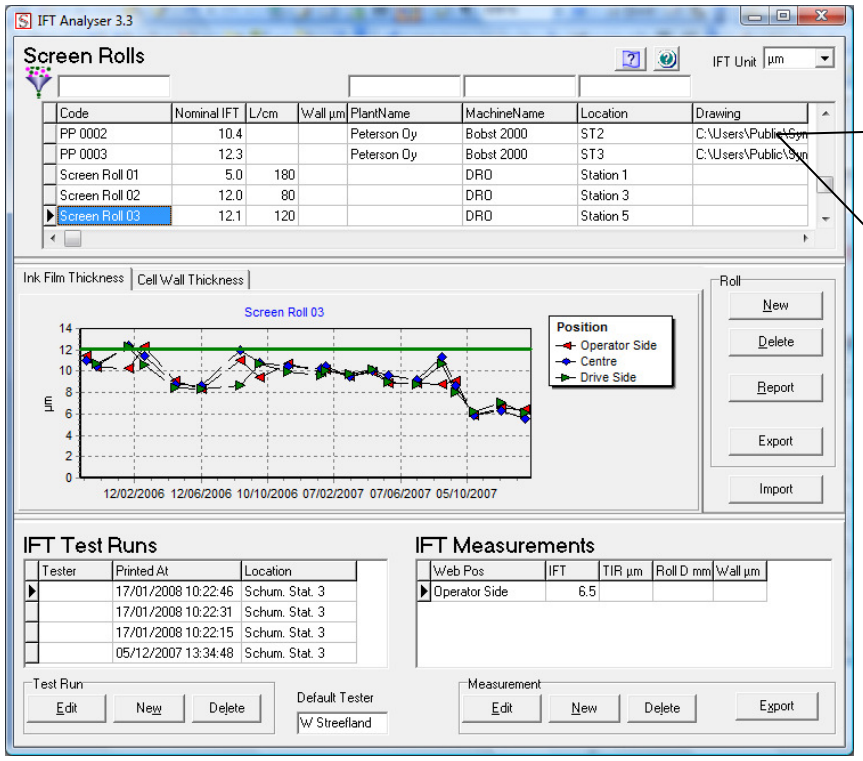
Click here to edit a measurement

Click here to edit a Test Run

Click here for a new measurement after selecting or creating a roll



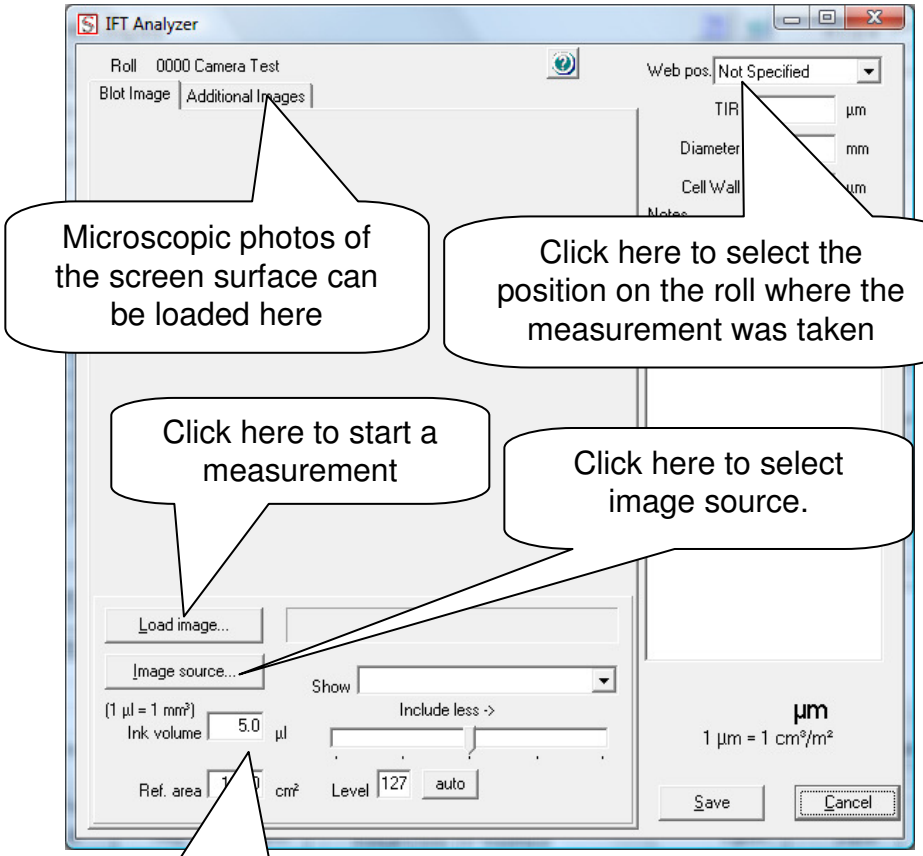
Add screen roll drawing



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



Microscopic photos of the screen surface can be loaded here

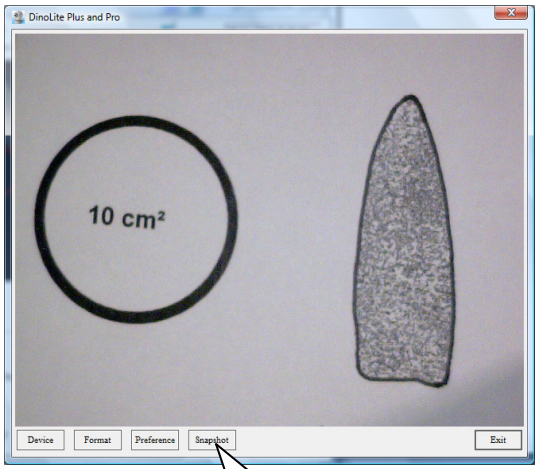
Click here to select the position on the roll where the measurement was taken

Click here to start a measurement

Click here to select image source.

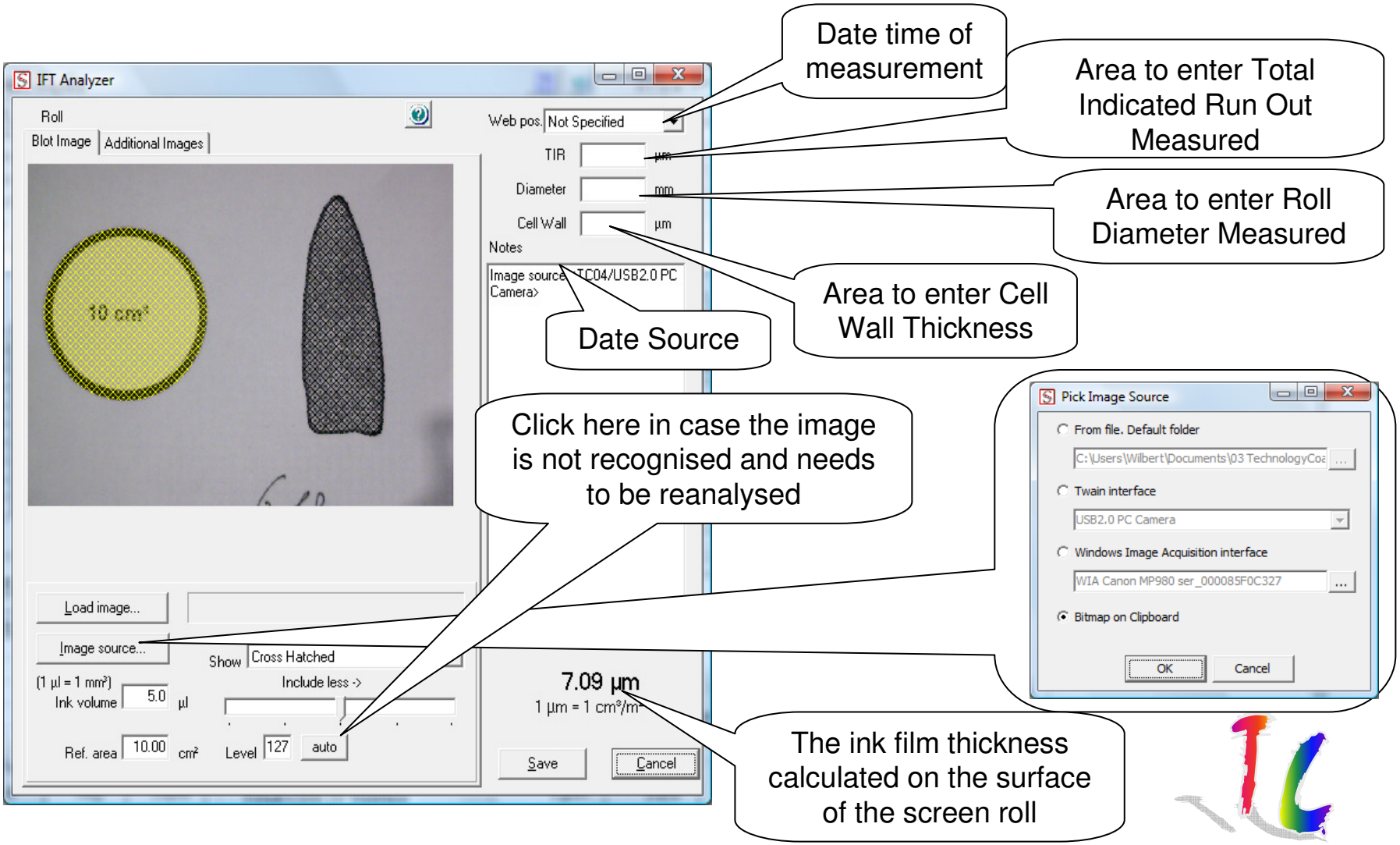
Check here if the ink volume indicate is the volume applied and if the size of the reference label is correct.

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”

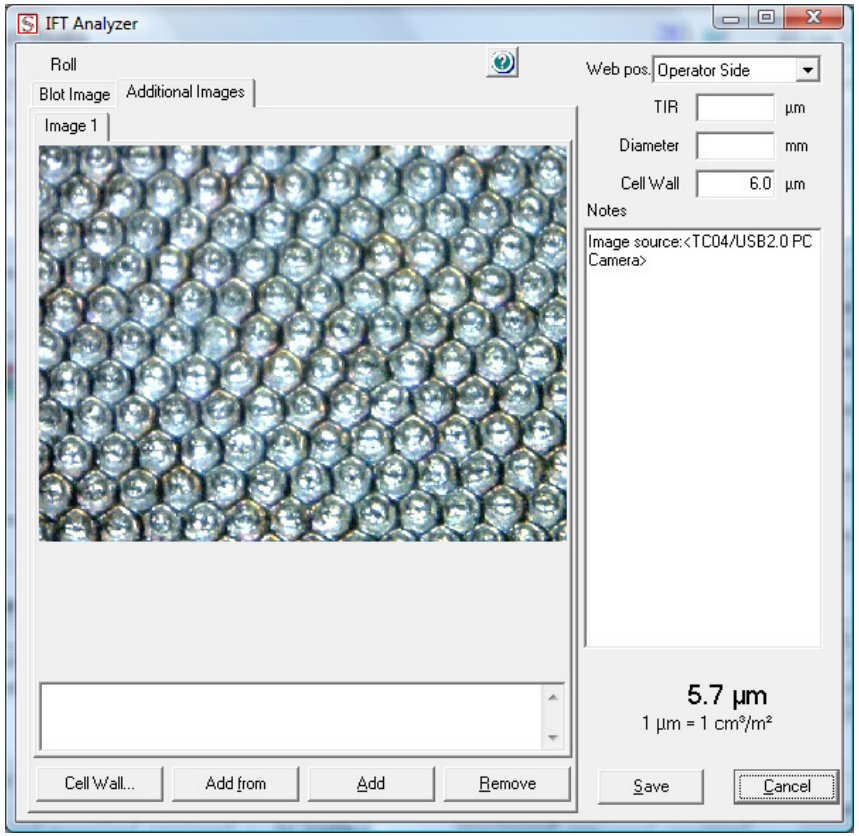


“Snapshot”

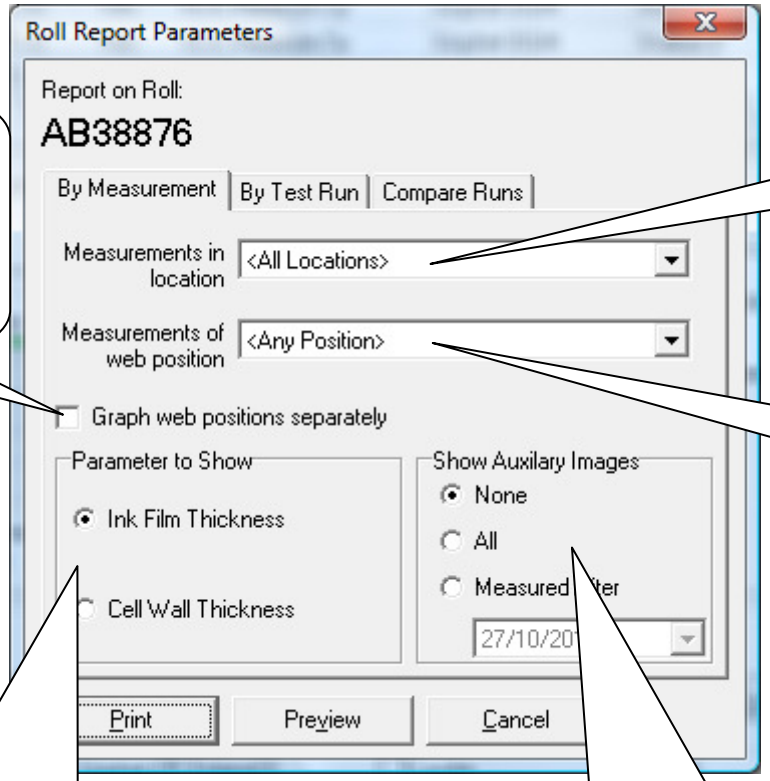
View result and save data



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



History Screen Roll Report (1)



Graph showing data by measured web position

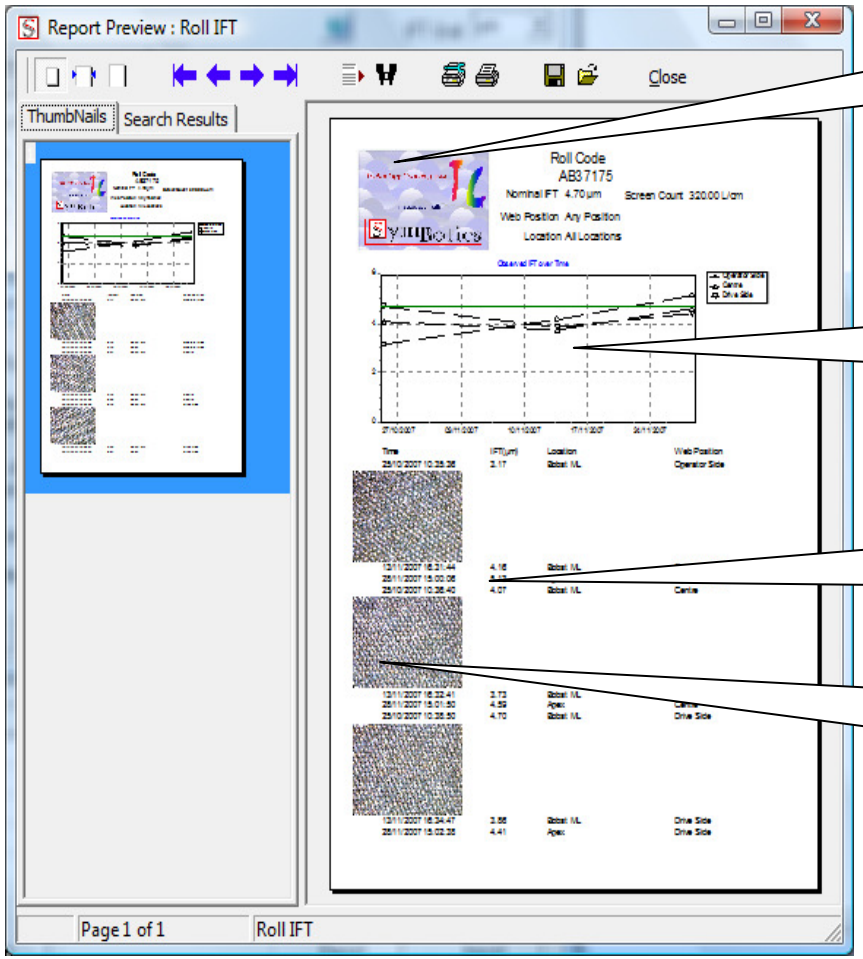
Select measuring location

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)



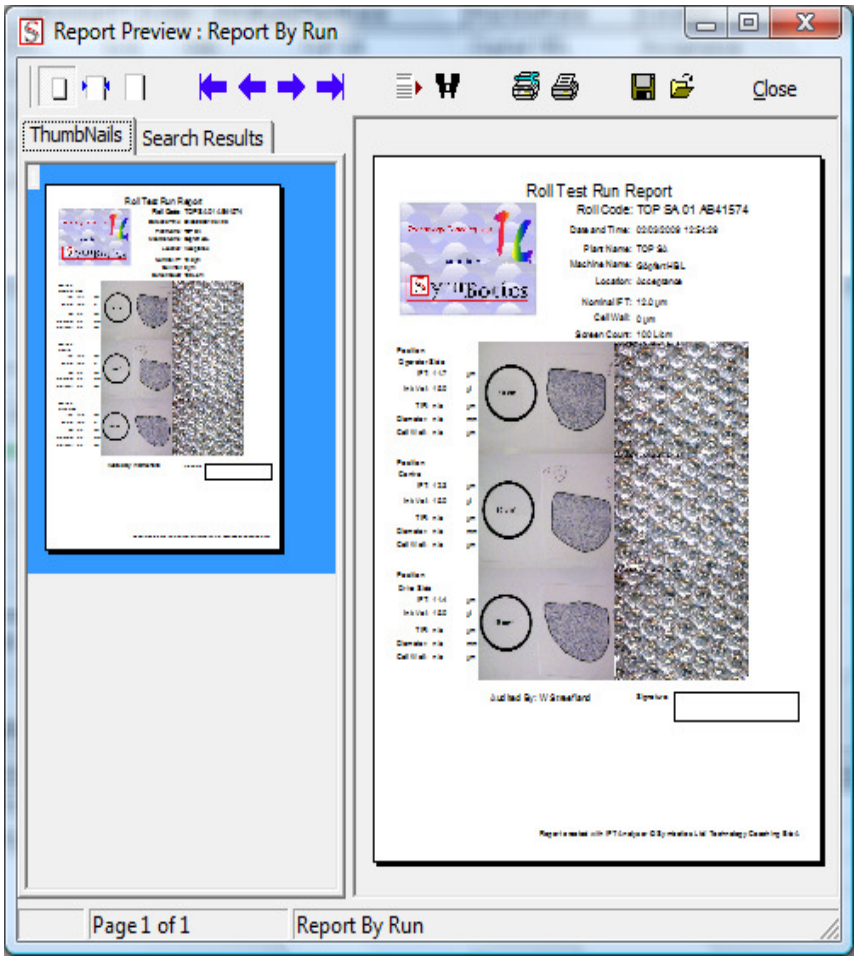
Any logo can be applied

Graph of measured data over time

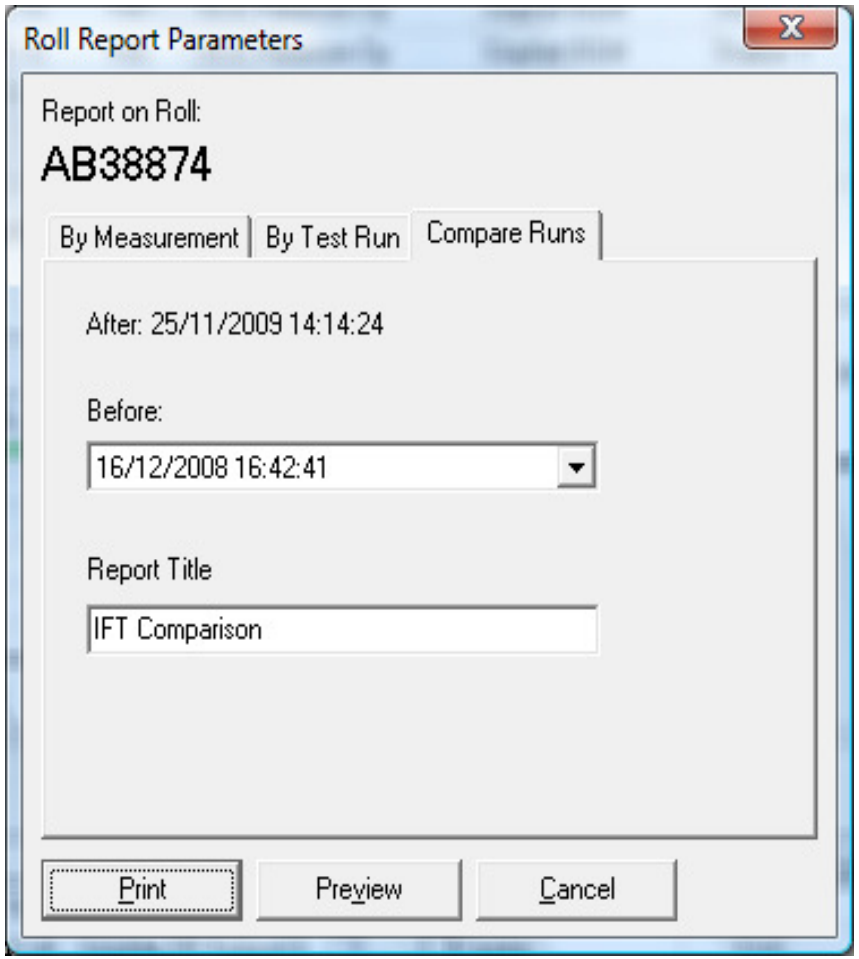
Measuring data included in the report

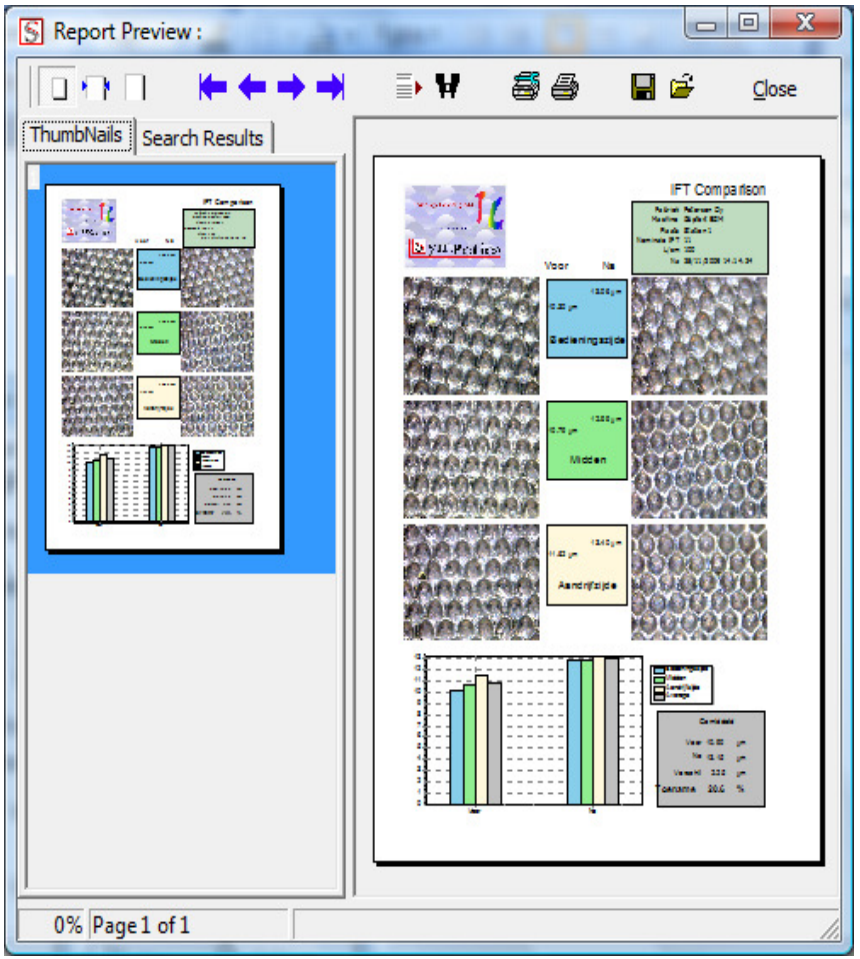
Images included in the report

QA Screen Roll Report

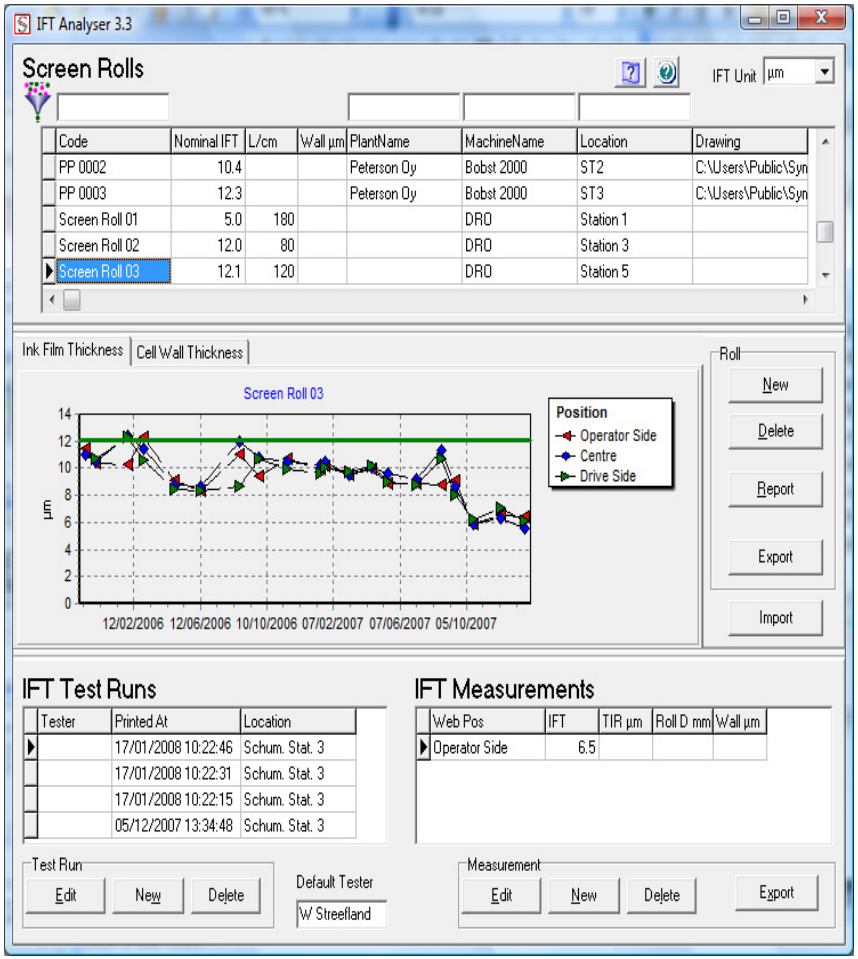


Compare Runs Report

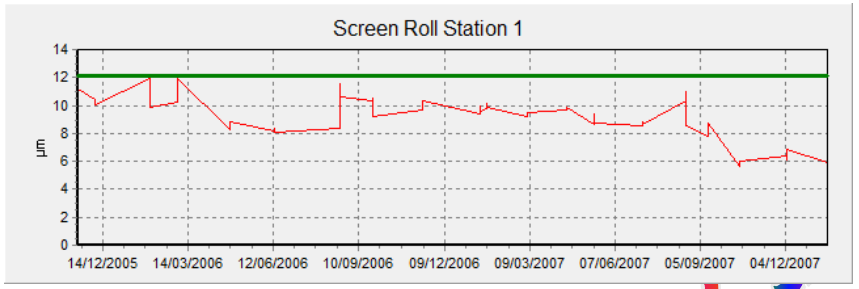




Copying the IFT result Graph to a document

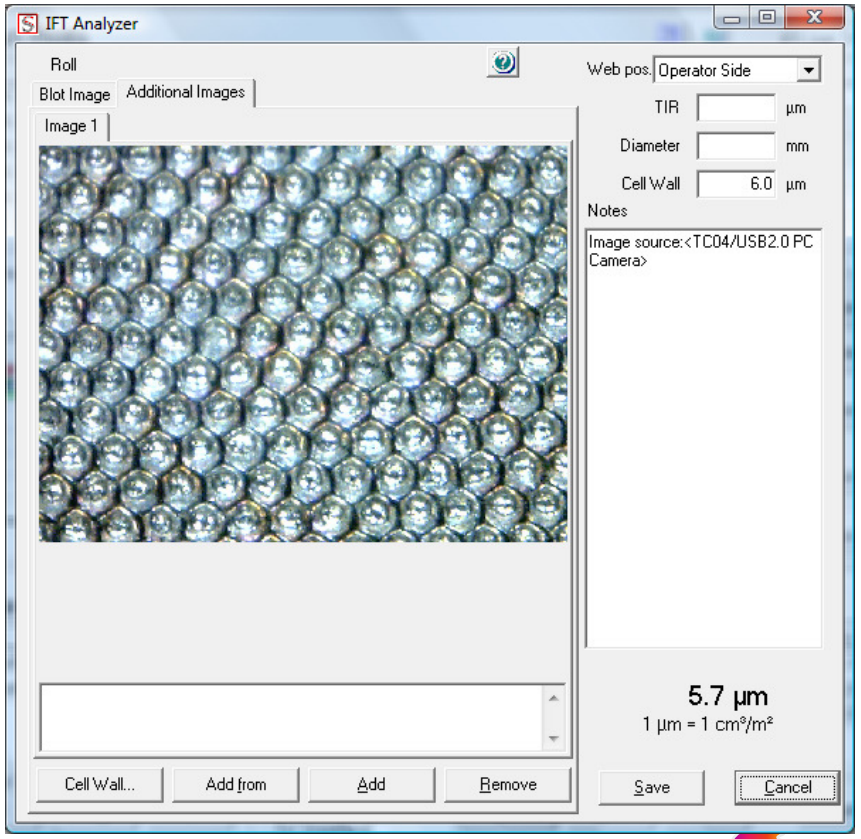


1. Select the screen roll from which you want to copy the graph;
2. Select if you want to copy the IFT or Cell Wall Thickness graph;
3. Use the right mouse button to click on the graph and click on “Copy;
4. Open the document you want to copy the graph to;
5. Paste the graph in the document (ctrl C).

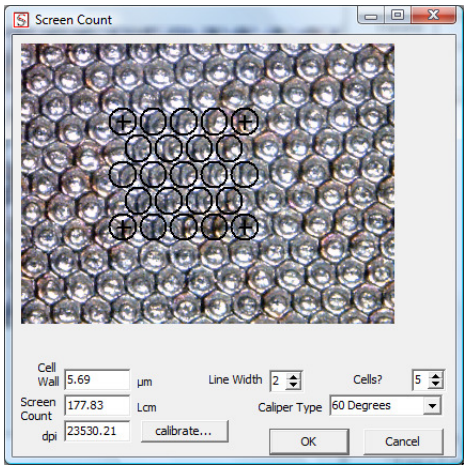


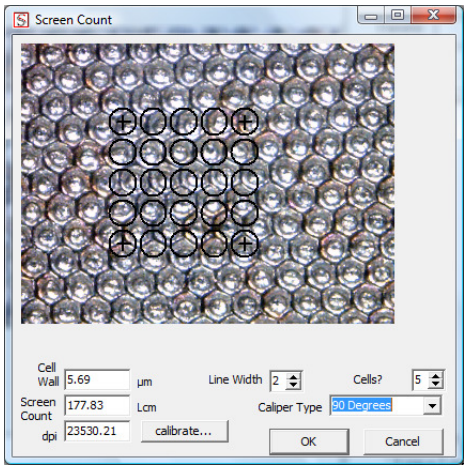
Cell Wall Thickness / Screen Count

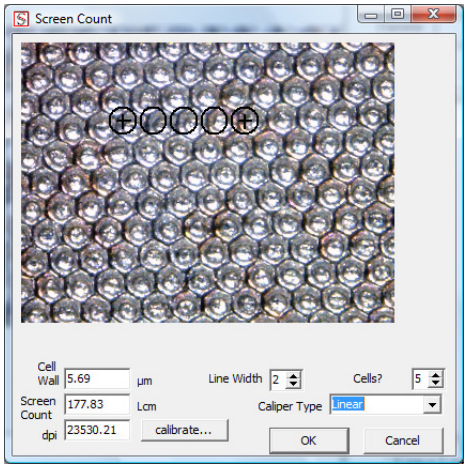
- Cell wall thickness can be measured clicking the bottom left button: “Cell Wall..”
- The next slide will show the 3 options for aligning a grid with the cells on the surface of the screen roll.



Cell Wall Thickness and Screen Count Grid Option



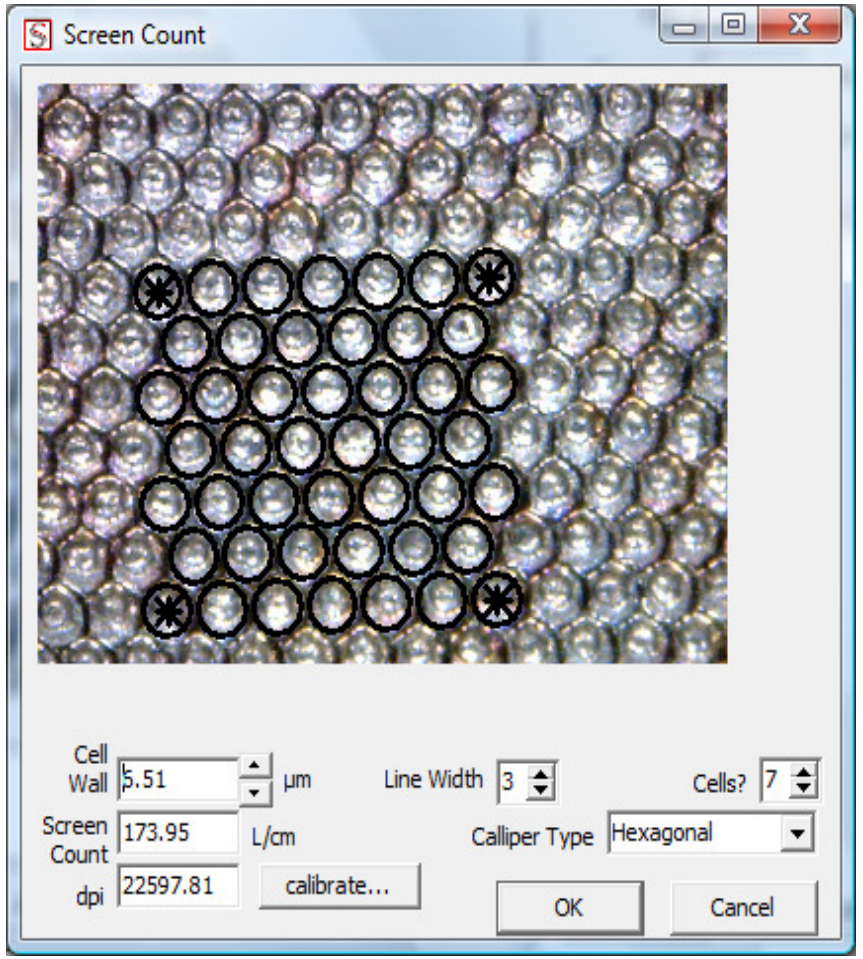




- Top Left: Hexagonal Pattern
- Top Right: Square Pattern
- Left Linear pattern

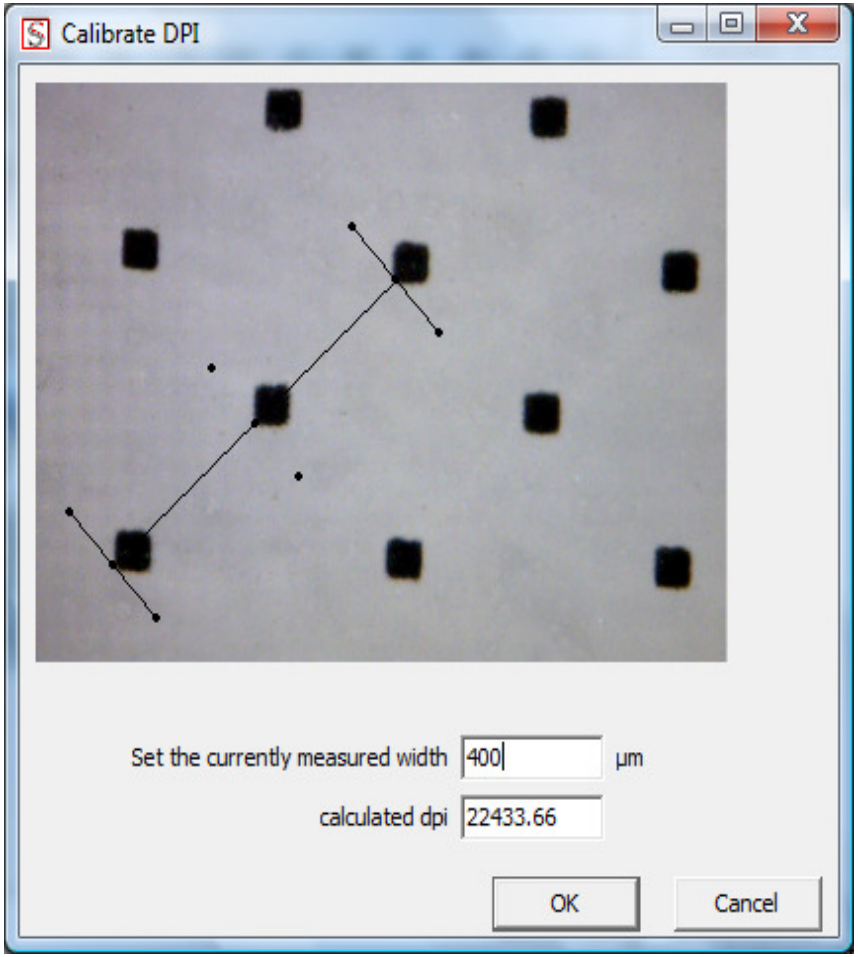
Cell Wall Thickness and Screen Count Grid Option

- 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.

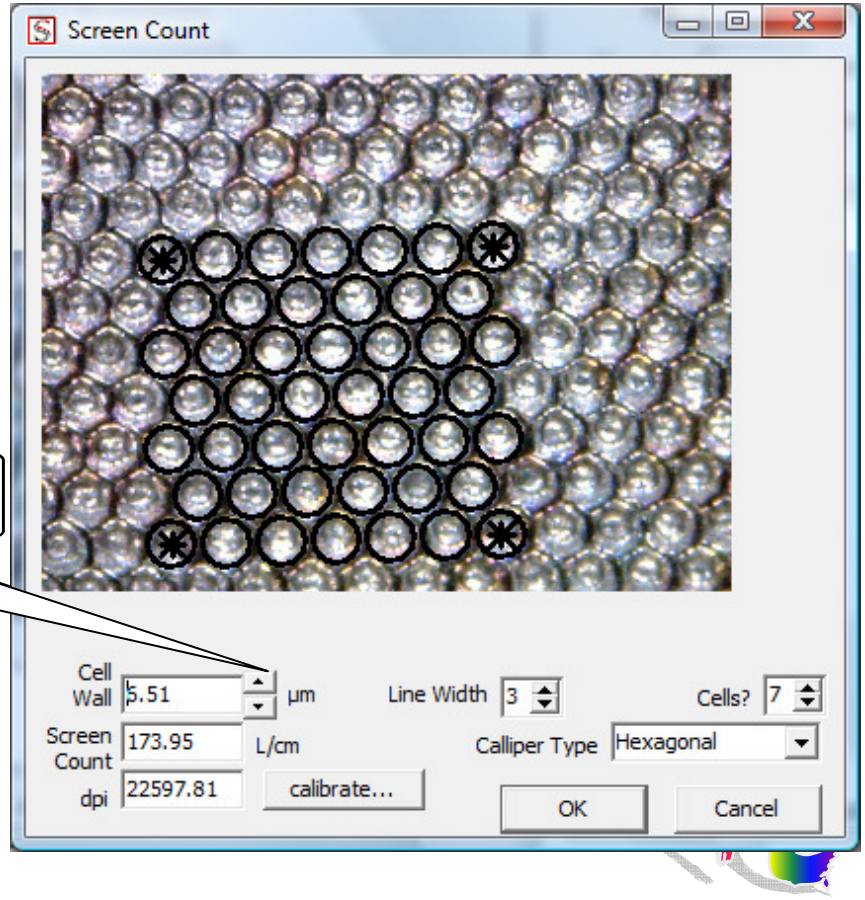


Calibration Screen

- 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



Nudge buttons for adjusting cell wall thickness in steps of 0.1 µm.

Selecting the right screen roll for the job

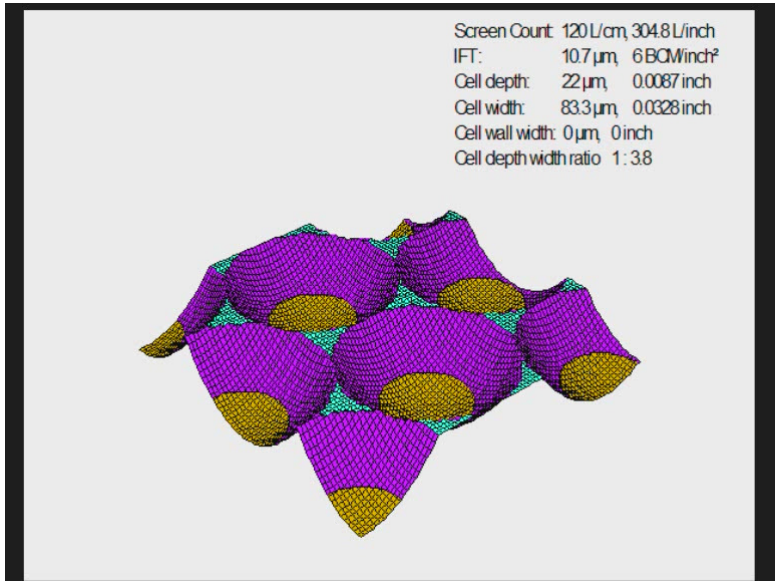
- Who is involved in the selection of the screen roll:
  - Printer;
  - Substrate supplier;
  - Ink Supplier.
- What determines the screen roll specification:
  - Substrate;
  - Ink;
  - Printed image.
- What needs specifying:
  - Ink Film Thickness;
  - Cell wall thickness between cells;
  - Cell depth 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 µm (5.9 BCM/inch²);
  - Your ink supplier advices 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 µm (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.



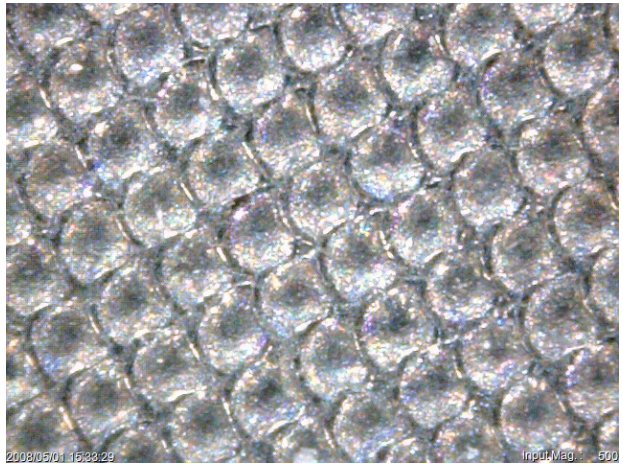
Click on the image to start the video

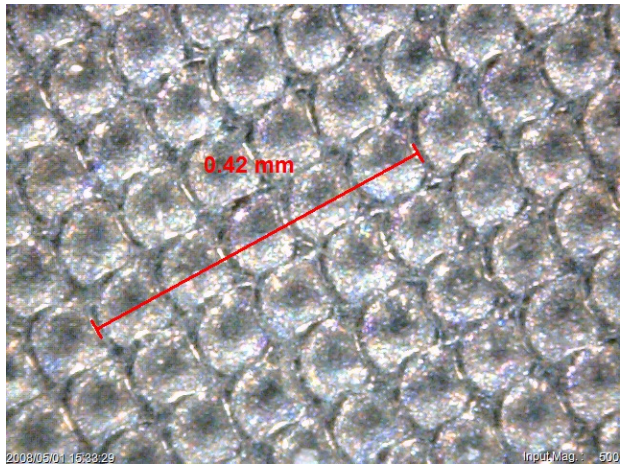
Checking the screen roll specification (2)

- 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 µm 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

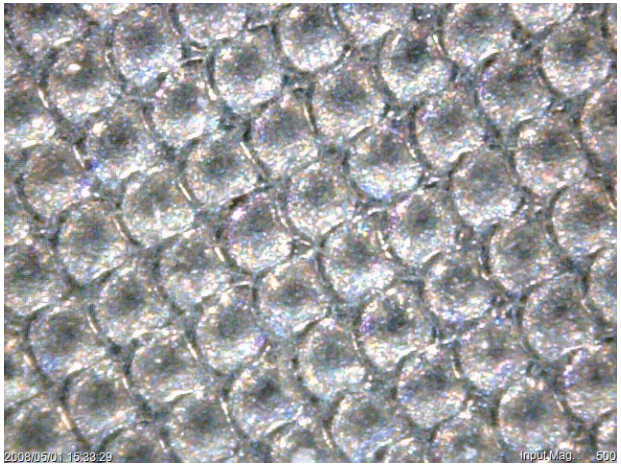
- Using the USB print microscope 500x magnification makes it easy to measure the screen roll line count;
- Take an image of the screen roll (Top image);
- Open the image and set the magnification on: 500x
- Select the option of measuring using a line;
- Draw a line over a number of cells as shown in 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 x 10 / 0.42 = 118 Lines/cm

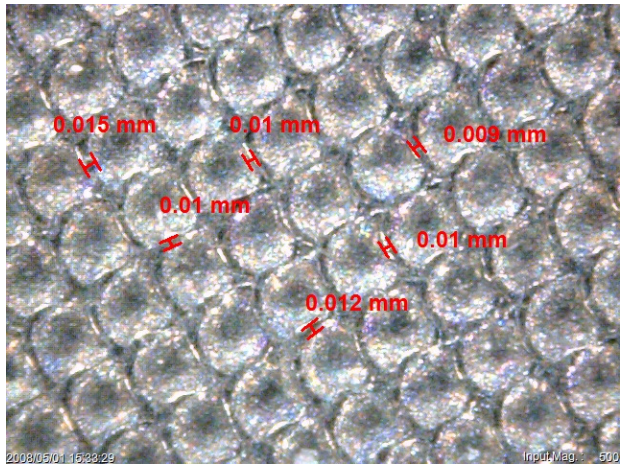




Measuring Cell Wall Width using the USB Print Microscope

- 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 µm.





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

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