

FLEX³HR user manual

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Introduction

Congratulations! You have just acquired the portable FLEX³HR High Resolution Flexo Analyzer manufactured by PERET GmbH. This device will allow you to control your high resolution Flexo plate making process. It measures the structures on LAMS mask, Film or Plate at at 43000 ppi (pixels per inch).

Important: *This manual describes the current version of the FLEX³HR hardware and software. Future enhancements or modifications are reserved.*

Safety Instructions

Warning

For safety reasons, it is absolutely necessary to read and understand the user's guide and all of the instructions it contains.

General safety rules

If the safety recommendations and instructions in this User Guide are not complied with, measurement errors or data loss or physical injury or property damage may result

- FLEX³HR is not intrinsically safe. Therefore, the device cannot be used in an environment with explosive vapors where there is a risk of spark ignition.
- FLEX³HR may not be used in an area with strong electromagnetic fields.
- Use the FLEX³HR in ambient temperatures between 10°C (50° F) and 40°C (104°F), and do not expose the FLEX³HR to direct sun light.
- Neither the FLEX³HR Sensor nor the FLEX³HR transmission light box should ever be opened as there are no user-serviceable parts. Doing so voids the guarantee. Contact your authorized dealer if repairs are necessary.
- To avoid incorrect handling, the FLEX³HR should only be used by trained personnel
- The FLEX³HR should only be used on dry measurement samples.
- The FLEX³HR should be protected against chemicals, corrosive vapors, strong mechanical vibrations and impacts.
- Use original FLEX³HR spare parts and accessories only.
- Use the original packaging exclusively when transporting.
- The FLEX³HR casing can be cleaned with a dry cloth.

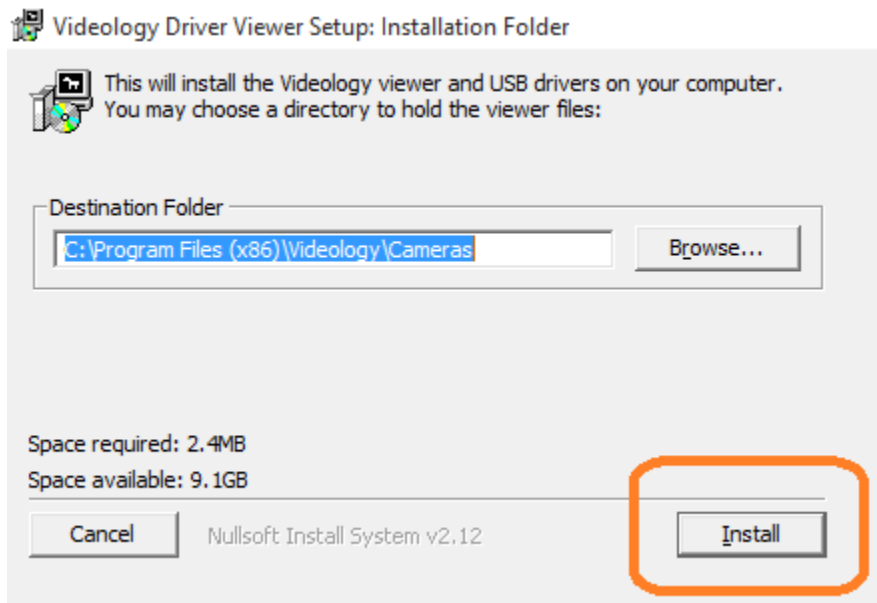
Installation

Start your Windows Computer and wait until all boot processes have terminated and your computer is ready to operate. **Do not plug the USB cables in at this time.**

Plug the FLEX³HR USB Memory Stick into a free USB Port and wait until Windows has recognized and registered the USB Stick as a Mass storage Device.

Run the setup_FLEX³HR_vxxx.exe to install the software. Follow the instructions of the installer.

Once the installer software is finished, the driver installation dialog will open automatically. Click Install to install the camera driver. If the FLEX³PRO Software is already installed on this computer you do not need to re-install the driver. Both devices use the same driver.

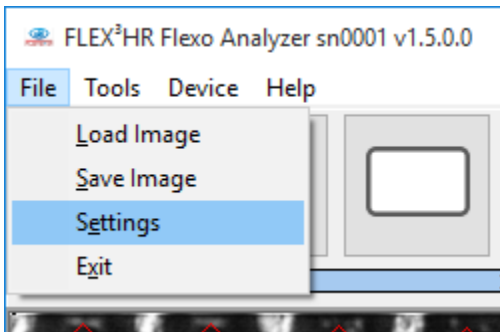


Now connect the USB cable of the FLEX³HR to a free USB2.0 port. Windows will automatically detect the driver and assign it to the device.

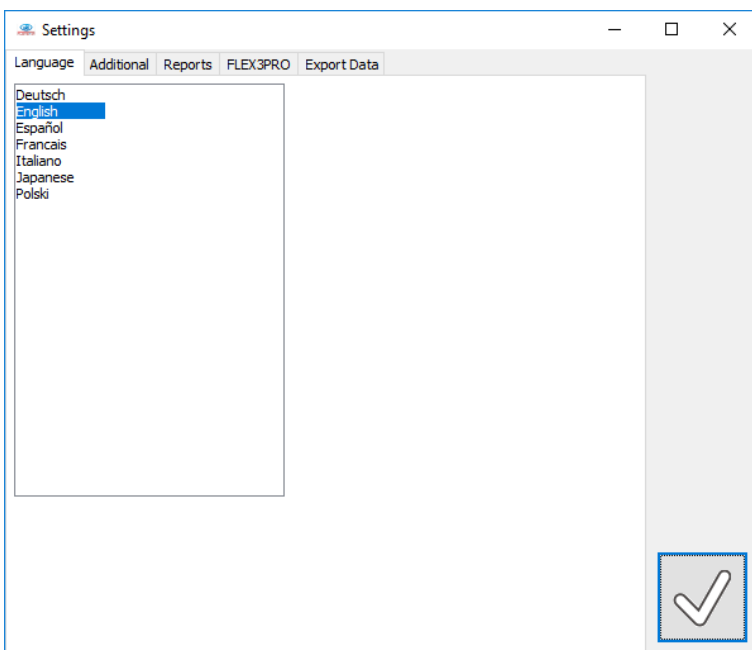
The software now is ready to use.

Configure the FLEX³HR Software according to your needs

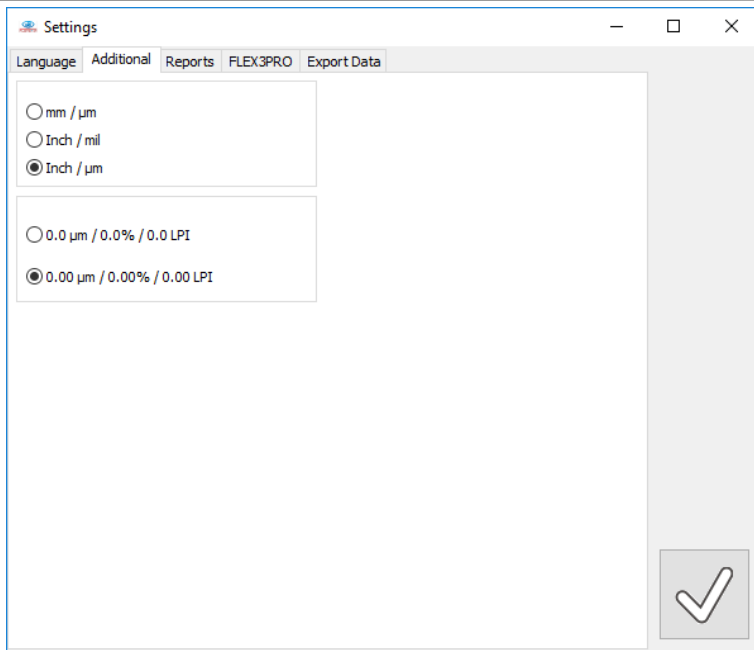
Select the Settings Item from the File Menu



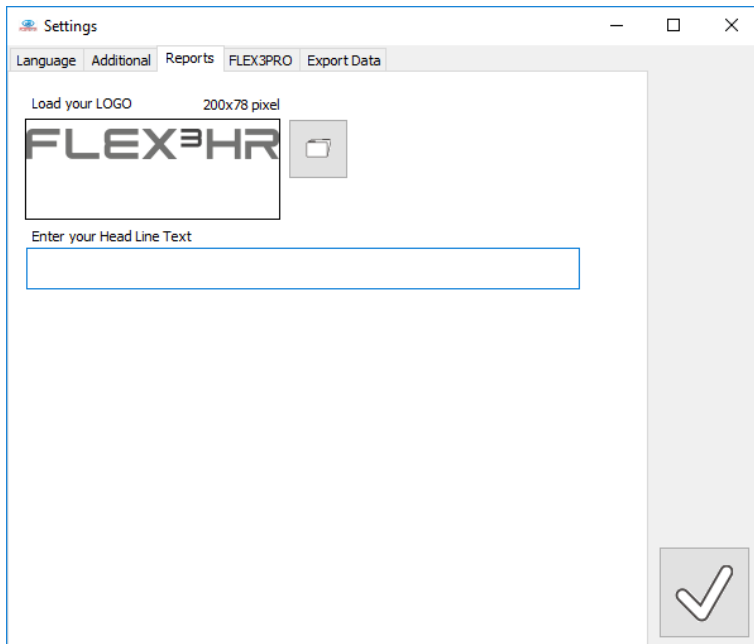
Select the language you prefer to use from the Language page.



Select the metric system, the imperial system, or the mixed units and the number of decimal places from the Additional page.

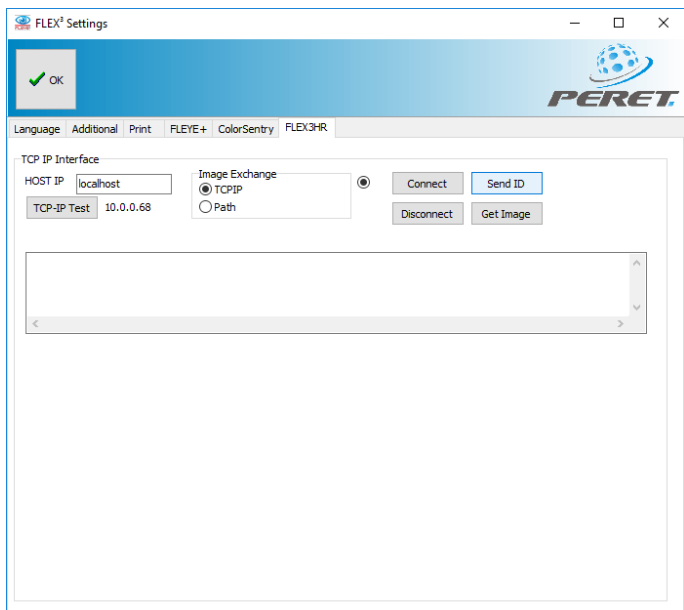
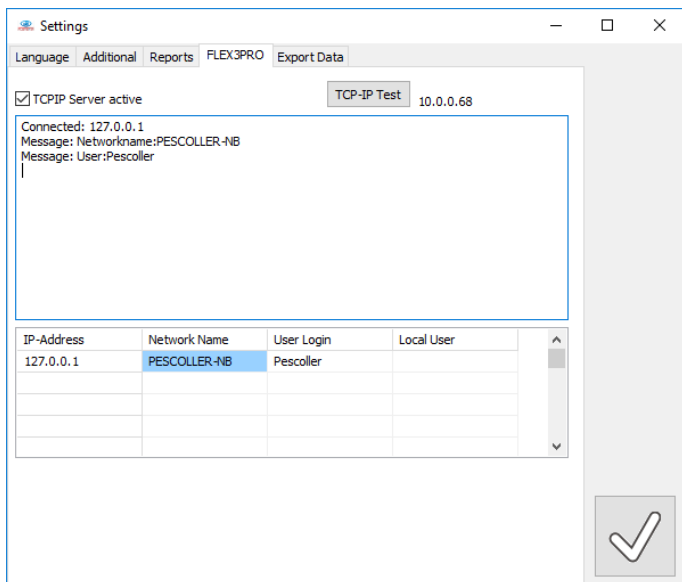


Upload your company logo and enter the head line text on the Reports page. This information will be printed on every report you create with the FLEX³HR Software.



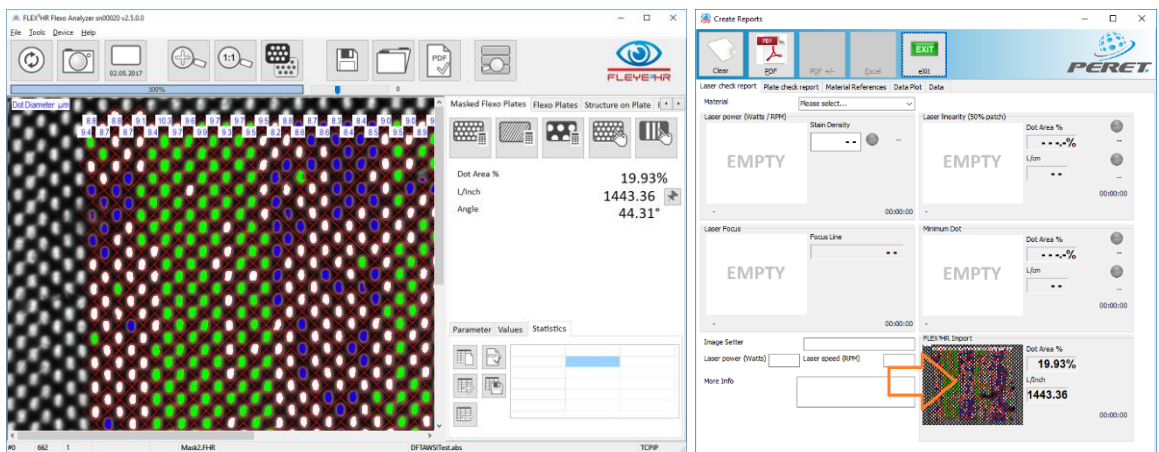
The FLEX³HR can be connected directly to the FLEX³PRO to collect measurement data in FLEYEplus reports.

Run the FLEX³HR Software and run the FLEX³PRO Software. Open the settings Window in both systems. Select the TCPIP Server Active on the FLEX³HR Software. Select configure the HOSTIP of the System, where the FLEX³HR Software is running in the FLEX³PRO Software Settings Window. Select the TCPIP in the FLEX³PRO Software. Click Connect and Send ID.



The Settings of the FLEX³HR now will show the connection including IP-Address, Network Name, and User Login of the connected FLEX³PRO Software.

The FLEX³HR measurement can be imported in FLEYEplus reports of the FLEX³PRO Software by clicking inside the image frame of the FLEX³HR Section



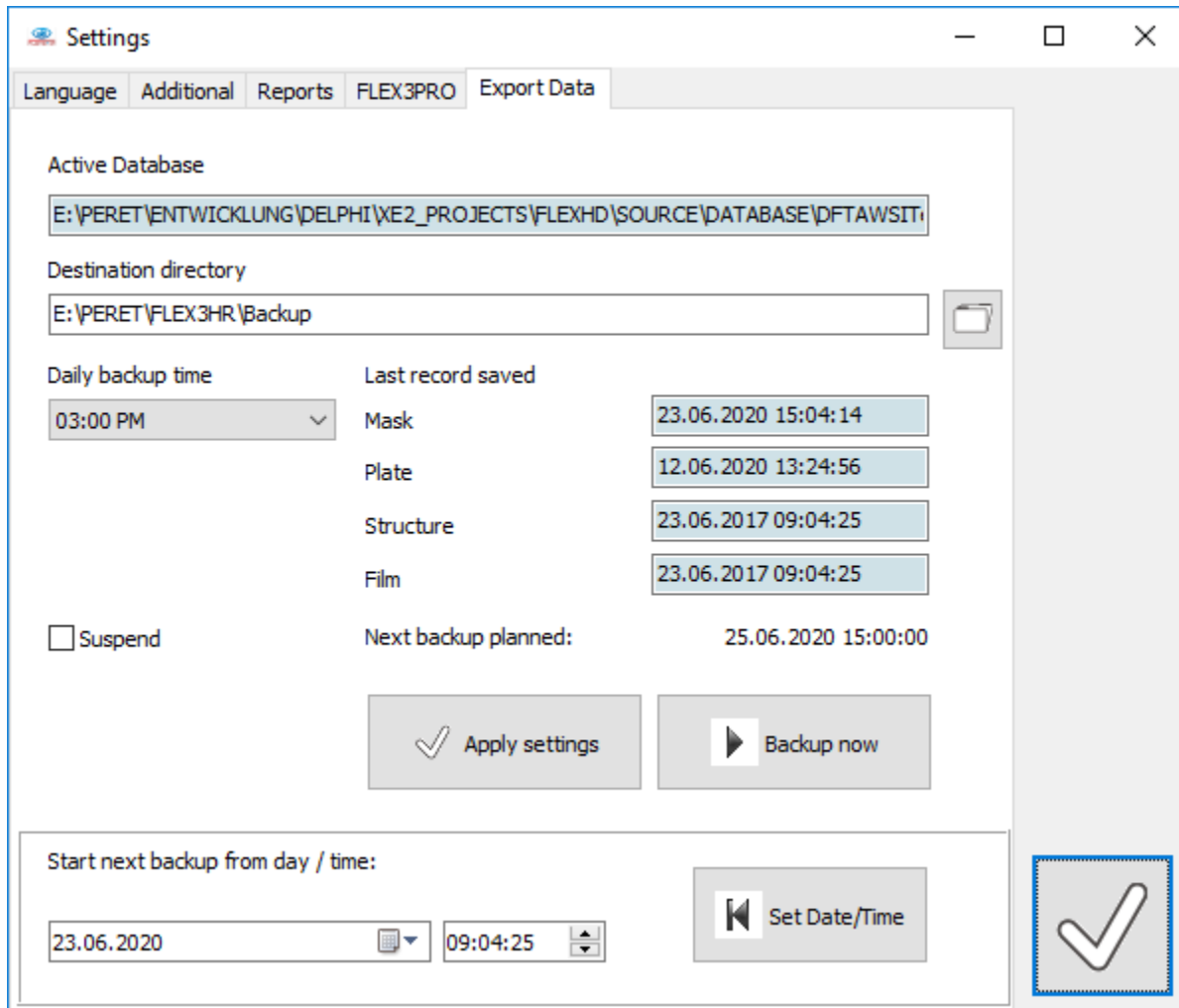
Both Systems can also run on the same PC.

The FLEX³HR Software supports automatic backup by exporting data from the **active** database to text files on a regular basis. The current active database is displayed in the Active Database field at the top.

Select the destination directory, where the exported text file should be stored, by clicking the open icon on the right hand. Select the time of the day, when the backup should be performed. If 'NEVER' is selected, no backup will be performed at all. You can also suspend the backup temporarily for any reason, such as network or storage problems. At program start, the suspend will always be disabled. Click Apply Settings to confirm the settings.

In case backup files are lost, you can set a start time for the next backup. Click Set Date/Time. The next backup will contain any measurements that have been taken after that date/time.

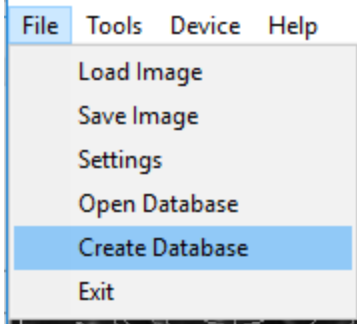
Finally you can create a backup immediately clicking the Backup now Icon.



Create and Open the Database

Measurement data and Reports are stored in a database. After installation, a database is created automatically. You can also create and subsequently open additional databases.

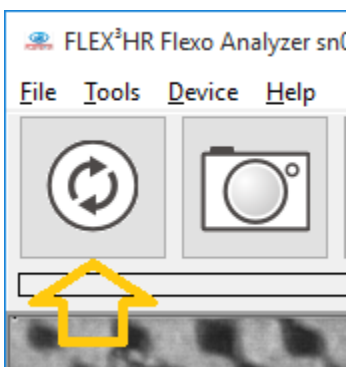
Chooses a database creation plan that fits your workflow; a database for every customer, a database for every press, a database for every photopolymer type, etc. Select the proper menu item.



Select or create the file name of the database from the dialogue that will open.

Preview and Capture Images

Start a live image preview by clicking the Preview Icon.



Adjust the image sharpness

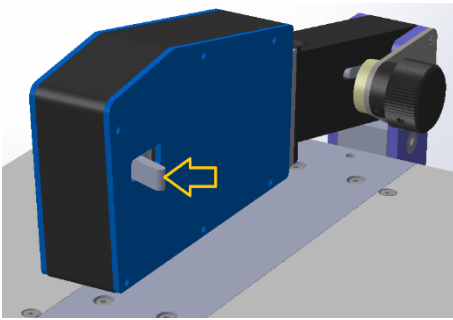
In Preview mode there will arise the image Sharpness Indicator next in the right top of the main Window.



Click the diamond icon to start the sharpness calculation in real time. The sharpness index is dependent on the type of image actually visible. Use a 50% patch or a structured solid surface area to set the sharpness of the device.



The sharpness is expressed by two values. The value on top should be maximized by adjusting the lever on the right front of the Sensor head. Depending on the sample below the aperture of the device the maximum can be a small number (450) or a large number (1500).



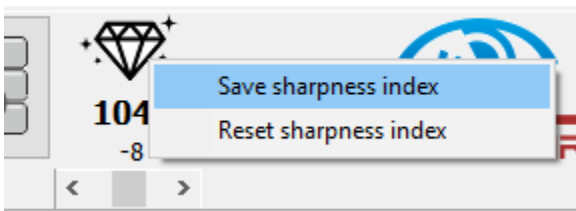
The smaller number at the bottom expresses the deviation from the best sharpness reached during the process and should be close to zero.

- Position a half tone patch (for example 50%) below the aperture
- Lower the sensor head
- Adjust the preview brightness if required using the slider below the sharpness index
- Click the preview icon to reset and recalculate the sharpness index
- Now carefully move the sharpness lever forward and backward until the sharpness index reaches its maximum and the smaller number is close to zero.

Because the sample to be analyzed is a 3D structure there can be several levels showing high sharpness indices. Make sure you focus on top of the printing dots.

In order to get the identical sharpness setting over time, prepare a test patch of your material (LAMS sample, Plate sample, Film sample). Setup the sharpness as described above.

Now click the right mouse button onto the diamond icon to open a pop-up menu.



Select 'Save sharpness index'. The sharpness index now is your reference for LAMS, Plate, or Film, depending on which measurement function Page is currently selected.

Select 'Reset sharpness index' to reset the index to default.

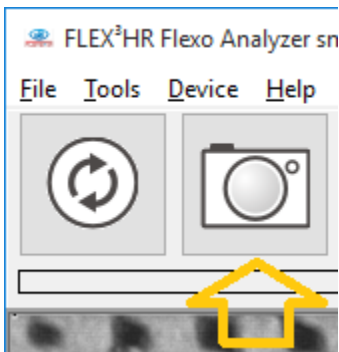
If a Sharpness index is available for the current function page (LAMS, PLATE, STRUCTURE, or FILM), you can use your reference sample to check if the sharpness setting is still OK.



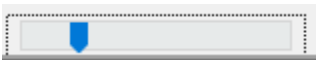
If your focus needs to be adjusted, the diamond icon will be displayed on red background. Move the lever carefully until the background becomes green.

Capture an Image

Position the Flexo plate properly so that the Pixel Pattern Patch is positioned below the aperture. Click the Capture Icon.



The FLEX3HR will capture and display a high dynamic range image. The exposure progress bar below the icons will show the high dynamic range image capture process.



Use the slider to adjust the image brightness to see more details. The adjustment does not affect the measurement results at all and is intended only for visual control.

Capture the ZERO Image

In order to get high quality measurement results the FLEX3HR needs to capture a zero reference image from time to time. Capture a ZERO image after the initial installation and approximately every two month thereafter.

- Clean the transmission light cover glass.

- Lower the Sensor Head without any plate or film between Sensor and transmission light source.
- Start a live image preview.
- Click the ZERO! Icon.



The ZERO image will be captured and saved automatically. This image will be used for the zero reference for all images captured until a new ZERO Image is captured.



After a successful zeroing the Date of the current Zero image will be displayed.

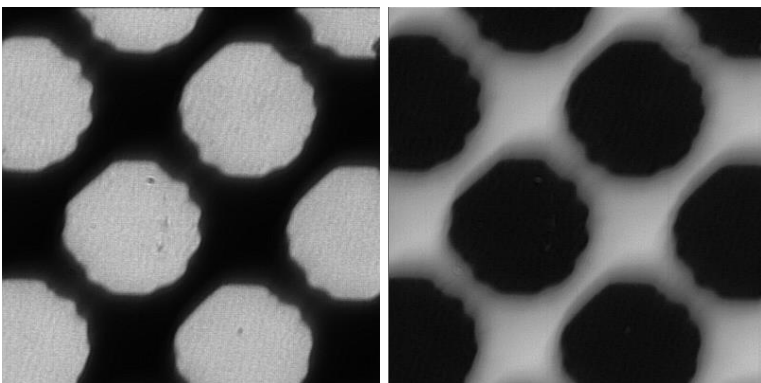
Zoom and UN-Zoom the current image

The image can be digitally zoomed or displayed at the original camera resolution at any time. Click the Zoom Icon or the 1:1 Icon.



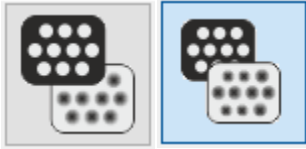
Density Display

The Density Display can be used to supply additional visual information about the sharpness of the dot edges produced by the Laser imaging process.



Because the Density Display is a logarithmic function, the visible brightness range differs from that of a linear image. The Density Display (above right) shows greater detail in dark areas where almost none of the light from the transmission light source reaches the camera. The Linear image displays greater detail in light areas where most of the light reaches the camera.

Click the Density Icon to toggle between Linear and Density image.



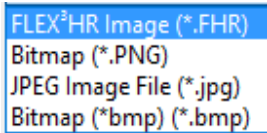
The Icon will toggle its appearance depending on the current display mode.

Save and re-load captured images

Any captured Image can be saved clicking the SAVE Icon.



Select the FLEX³HR (*.FHR) proprietary image format to save the original image. Only *.FHR formatted files can be re-loaded for later Analysis.



Select any other image format for reporting.

Click the LOAD Icon to re-load a previously saved *.FHR image file.



Create a PDF report of the current measurement results

A PDF report of the current measurement result can be created at any time.

Click the PDF report Icon to create the report.



You will be prompted to insert additional information about the Job.

- Job Identification Number
- Plate Type
- User
- Additional information

There is also an option to preview the PDF after creation.



Click the Cancel Icon to abort the operation.



Click the PDF Icon to create the PDF report. The measurement will automatically be saved to the database.



Click the Database Icon to save only the data into the database without creating a PDF report.

Measure Mask, Plate, and Micro Structures on Plate

Masked Flexo Plates Flexo Plates Structure on Plate

The FLEX³HR Software offers measurement functions for three different applications.

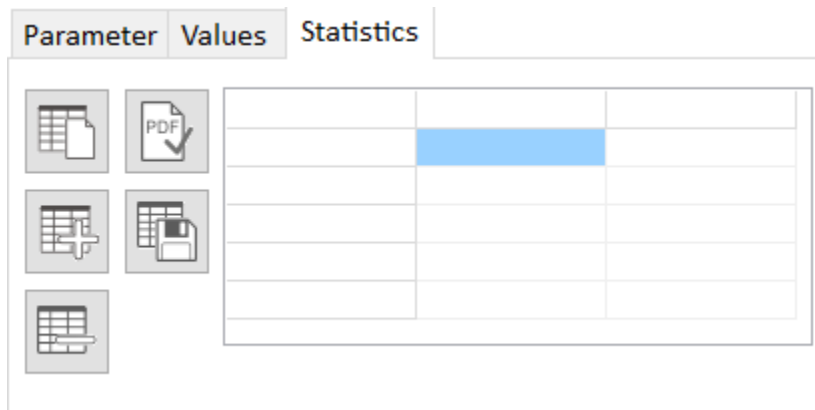
Select the *Masked Flexo Plates* Page to measure dots, lines and structures on engraved LAMS before washout.

Select the *Flexo Plate* Page to measure dots and lines on a finished flexo plate.

Select the *Structure on Plate* Page to measure the micro structures on flexo plate surfaces.

Ad-Hoc Statistics

Every page offers a Statistics area to collect measurements and to calculate average and standard deviation.



Before you can start to collect measurements, the statistics needs to be initialized by clicking the New Statistics Icon.

Now take the first reading. Click the preview Icon to get the live Image. Position the sample properly. Click the Capture Icon to capture the image. Click the Analyze Icon for the analysis you would like to perform.

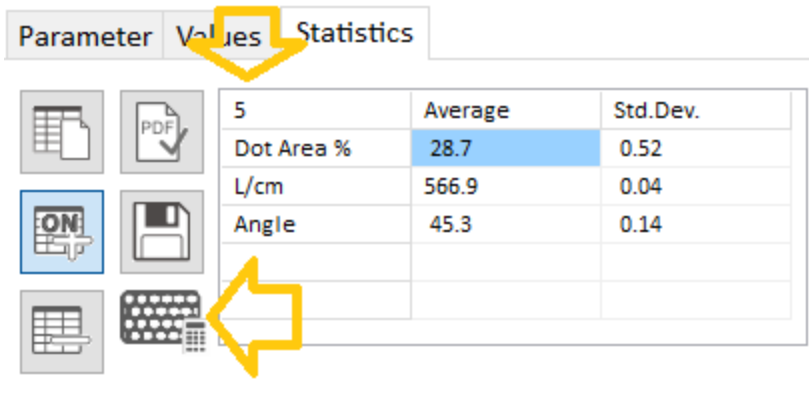


Click the ADD Icon to start adding data to the statistics. The current measurement will be the first entry and determine the measurement function type.



The Icon will now change and display that data collection is now active. Any subsequent measurement of the same function type will automatically be added to the statistics until a maximum of 100 measurements is reached or collection is stopped by clicking the ADD Icon again.

Measurements using a function type other than the initially selected one will be ignored and not added to the statistics.



5	Average	Std.Dev.
Dot Area %	28.7	0.52
L/cm	566.9	0.04
Angle	45.3	0.14

The current function type is expressed by the Function Icon on the statistics page. The number of measurement actually performed is displayed in the right top corner of the table. Average and Standard deviation are calculated in real time and displayed.



Any measurement can be deleted from the statistics. Click the Delete Icon to delete the most recent measurement. In case of Dot Analysis selecting an Alternative result, the proper measurement data will be automatically replaced. No explicit deletion is required in this case.



A PDF report based on the statistical data can be created. The report will automatically be added to the database. The average measurement values will be added to the database record.



The Measurement data can be exported to a tab delimited text file.

Check historical data in the database

Any report created will add a record to the database containing all current measurement data. Open the database Window by clicking the Database Icon.



Database functions are explained later in this document.

Check High Resolution Patterns on MASK

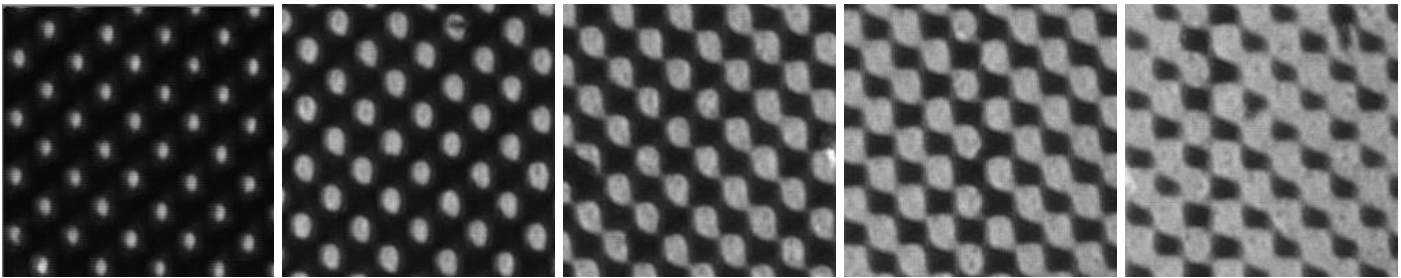
High Resolution Patterns imaged in the LAMS create a Flexo plate surface intended to improve the ink transfer resulting in higher densities on print.

Select the Masked Flexo Plates tab



Pixel Patterns

This technology engraves a High Resolution checkerboard pattern into the LAMS. The Laser Power, Laser Focus and Laser Adjustment settings will have a significant impact on the characteristics of the imaged pixels.



The mask engraving results shown above will lead to different structures on the finished plate and which will lead to different ink transfer characteristics and print quality. The best pattern is identified during a fingerprint press run. This pattern is then measured and the corresponding spot size should be maintained for subsequent jobs.

In multi-beam Laser Image setters it is critical that the individual beams are adjusted to engrave similar spot sizes. If this is not the case, the ink transfer will vary within a multi-beam set resulting in a stripe defect in the print. This effect is minimized by a beam calibration process performed by the manufacturer.

The FLEX³HR is the ideal system to control the overall spot size and the homogeneity of the single columns engraved by each Laser out of a multi-beam set.

Setup Analysis Parameters

Select the Parameters Page on the right bottom of the main window.

Parameter	Values
Dot Size Tolerance	10 % <input checked="" type="radio"/> Dot Diameter
Pixel Pattern L/cm	564 <input type="radio"/> Dot Surface Area
Density Threshold	2.0 <input type="radio"/> Dot Area %
Line length	500 μm

- **Dot Size Tolerance:** Setup the tolerance for displaying the measurement result graphically. Dots with average size will be colored white, dots with dot sizes below this tolerance will be displayed in blue, dots with dot sizes larger than this tolerance will be displayed in green. This helps to easily identify variations in dot size.
- **Pixel Pattern L/cm:** Select the approximate screen ruling of your pixel pattern. It does not need to be the exact value.
- **Dot Diameter, Dot Surface Area, Dot Area %:** Select which parameter should be displayed at the top of each column. Different Laser manufacturers may use different parameters to describe, measure, and control their systems.

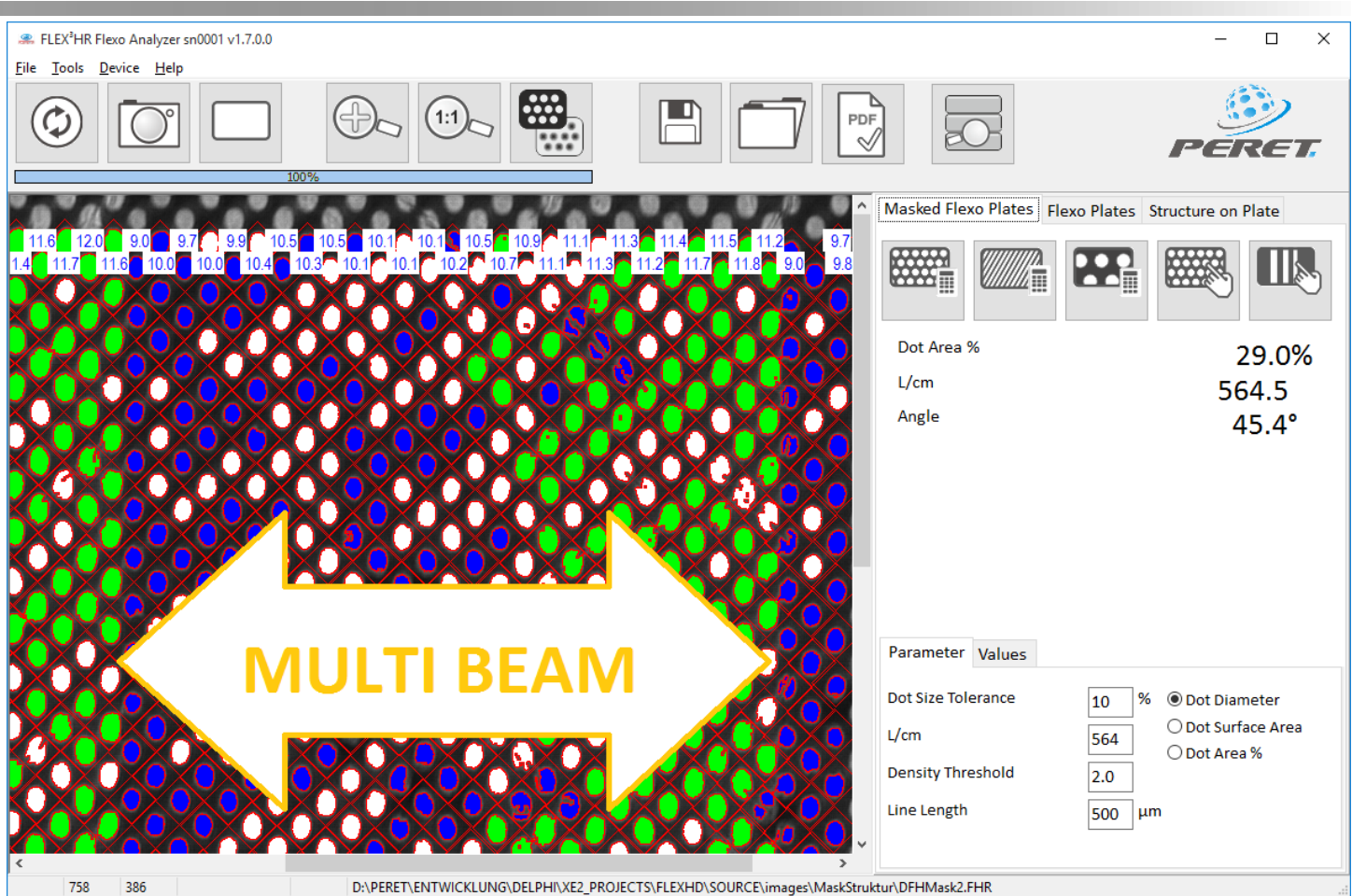
Analyze the Pixel Pattern Image

Click the Pixel Pattern Analysis Icon from the tool bar.

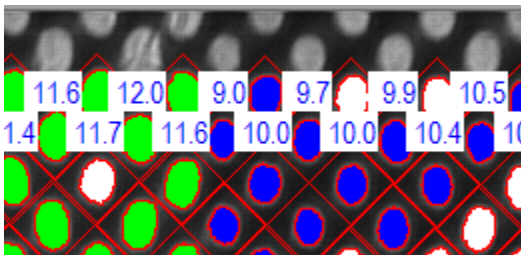


All dots are measured and sorted by size. Small dots are displayed in blue, large dots in green and average dots in white. The best result is obtained when there are a majority of white dots. The Dot Size Tolerance setting sets up the range of acceptable values for white dots. This tolerance needs to be determined during the fingerprint process.

The image below shows large (green) dots at the left edge, immediately adjacent to small (blue) dots, coming back to green dots at the right hand. These results indicate that the Laser Power of the left-most Laser is lower than the Laser Power of the right-most Laser of this Multi-beam device.



The average dot size is displayed at the top of each column. Depending on the selection on the Parameter page this can be expressed as Dot Diameter, Dot Surface Area or Dot Area%.



Once the Laser is setup properly and the average dot sizes in each column are balanced and in tolerance, the absolute Dot area % of the pixel pattern needs to be set and monitored. The measurement results are displayed on the right side of the Main Window.

Masked Flexo Plates Flexo Plates Structure on Plate

Dot Area % 29.0%

L/cm 564.5

Angle 45.4°

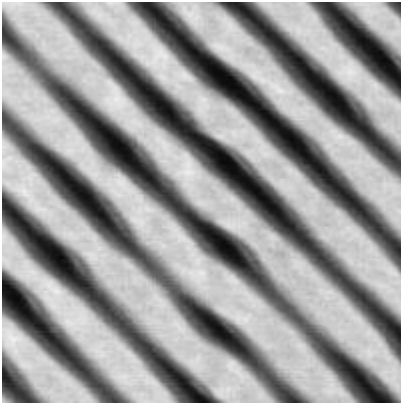
Select the Values Page on the bottom right to display more details about the measurement result.

Parameter	Values			
		Count	Dot Diameter	Dot Surface Area
○ Average		740	10.77 μm	91.05 μm^2
● > + Tol		144	11.79 μm	109.27 μm^2
● < - Tol		148	9.63 μm	72.84 μm^2
Std Dev.			1.02 μm	16.55 μm^2

Maintaining the Dot Area % value within narrow tolerances is a critical factor in maintaining a consistent process.

Line Patterns

This technology engraves a High Resolution Line pattern into the LAMS. The Laser Power, Laser Focus, and Laser Adjustment will have a significant impact on the characteristics of the imaged Lines.



Line patterns typically will not be of homogeneous width. This is not a problem for the print quality as long as the line width variations are kept constant over time. The Line width and the resulting Image Coverage % determine the ink transfer characteristics of the solid patch.

Analyze the Line Pattern Image

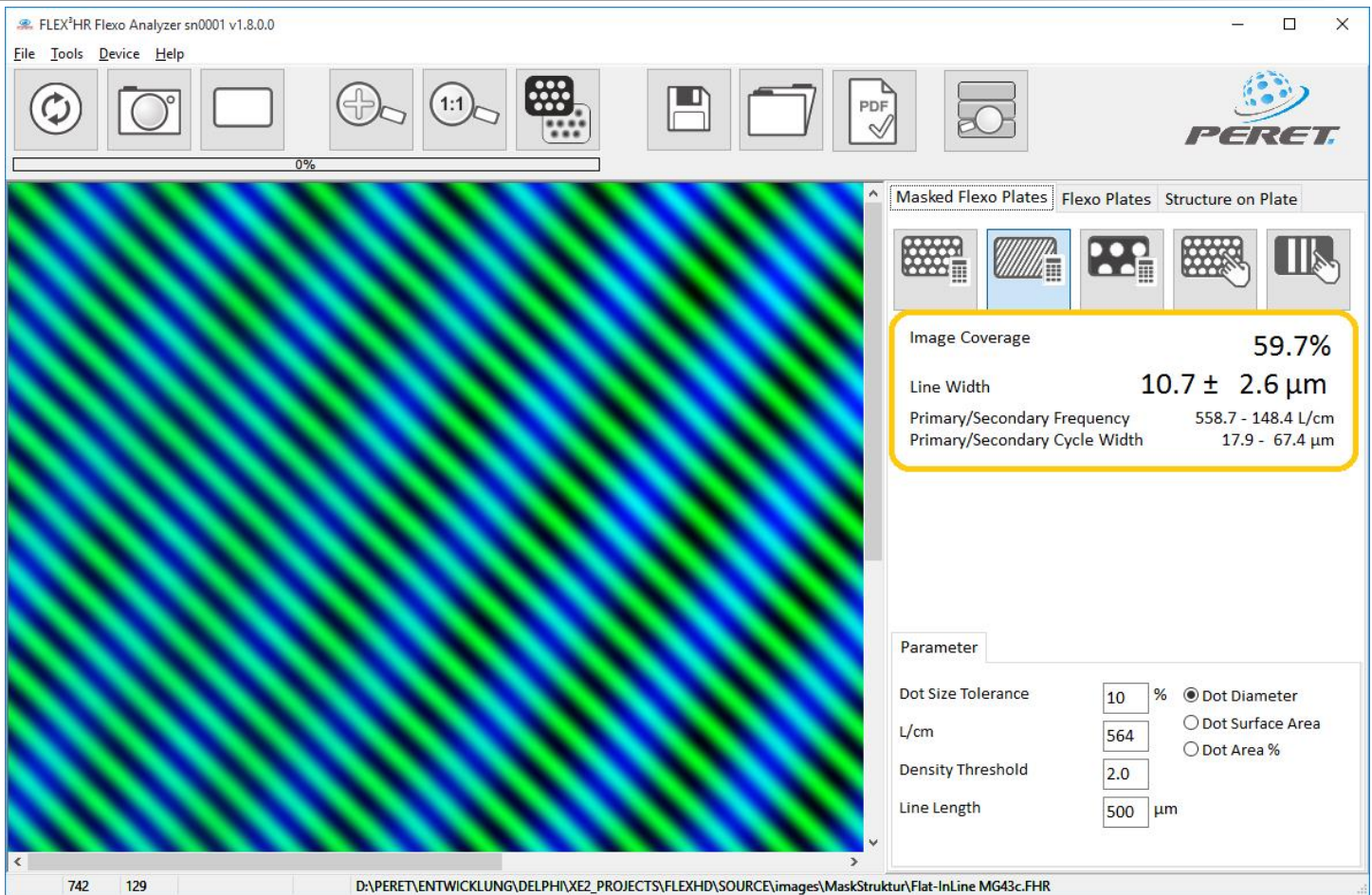
Click the Line Pattern Icon to analyze the line pattern image.



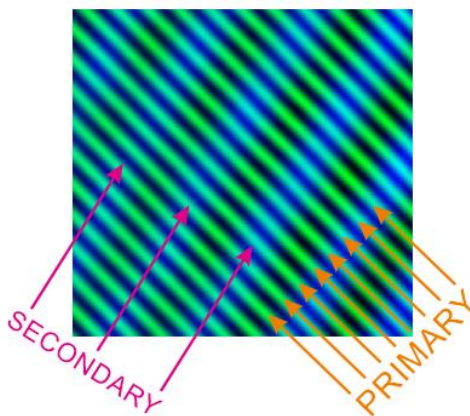
The algorithm will detect the primary frequency of the lines and the secondary frequency of the line width variations.

The measurement results are displayed on the right side of the Window.

- Image Coverage % of engraved area (white area). The engraved area is the printing area.
- Line Width and Line Width Variation of the engraved lines
- Primary frequency (screen ruling) and secondary frequency (variations in line width)
- Primary Cycle Width and secondary Cycle Width.



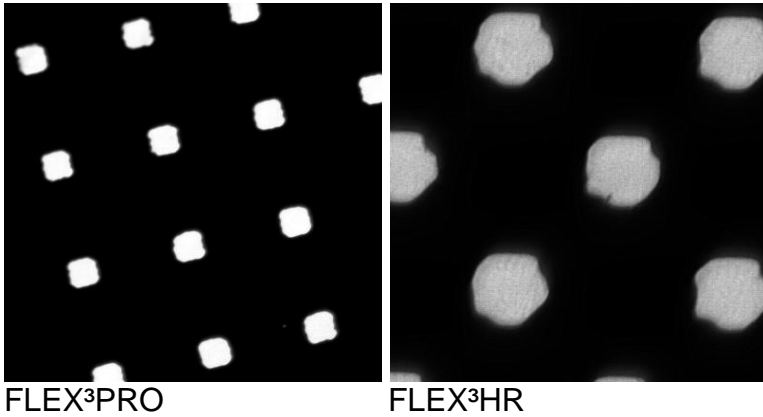
Primary and secondary Frequencies and Cycles are highlighted in green and blue colors respectively.



Keeping these numbers within narrow tolerances is a critical factor in maintaining a consistent process.

Dot Area % Measurement on MASK

The FLEX³HR measures Dot Area and Screen Ruling in the same manner as FLEX³PRO device. Due to the higher resolution camera extremely high screen rulings can also be measured.

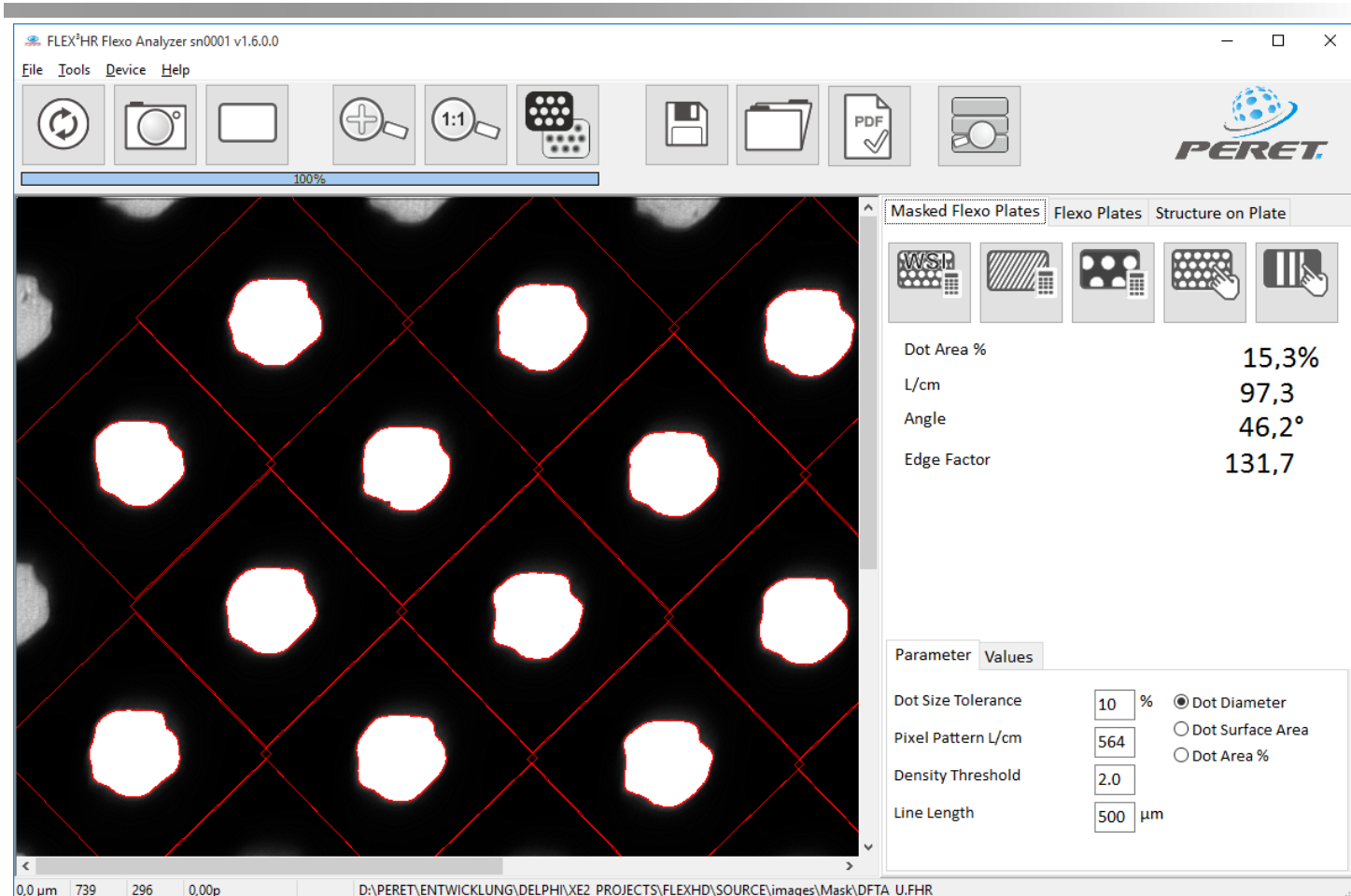


Analyze the Dot Area %, the Screen Ruling and Edge Factor

Position the test patch below the aperture of the FLEX³HR and capture an image. Click the Dot Area Analysis Icon to analyze the Dot Area image.



The algorithm will automatically detect the dots and measure the Dot Area, Screen Ruling, Screen Angle, and Edge Factor.



Dot Gain on the print takes place at the edge of the printing area. The more edge length per mm², the more sensitive the plate will be to variations in printing pressure or ink viscosity. Therefore, the total edge length of printing areas should be kept small to reduce dot gain variations during the printing process. The Edge Factor is the measurement representing the ratio between the actual edge length of the dots and the circumference of theoretical dots formed of perfect circles.

High screen rulings have longer total edges compared to low screen rulings. For this reason, it is even more important to check the Edge Factor for high screen rulings.

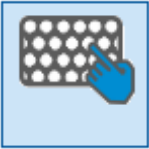
Select the Values Page to display additional information about the measurement.

Manual measurement of Dots on MASK

Click the Manual Measurement Icon.



The Hand will turn blue telling you the manual selection mode now is active.



Select the dots you would like to be used to measure the Dot Area %.

The measurement data will be updated in real time. As soon as two dots have been selected, Dot Area%, Screen Ruling, Screen Angle and Edge Factor are calculated and displayed.

Select more than two dots to improve the accuracy and repeatability of the results.

FLEX³HR Flexo Analyzer sn0001 v1.6.0.0

File Tools Device Help

90%

Masked Flexo Plates Flexo Plates Structure on Plate

Dot Area % 15,2%

L/cm 97,1

Angle 48,5°

Edge Factor 132,5

Parameter	Values
Dot Size Tolerance	10 % <input checked="" type="radio"/> Dot Diameter
Pixel Pattern L/cm	564 <input type="radio"/> Dot Surface Area
Density Threshold	2.0 <input type="radio"/> Dot Area %
Line Length	500 μm

0,0 μm 458 370 0,00p D:\PERET\ENTWICKLUNG\DELPHI\XE2_PROJECTS\FLEXHD\SOURCE\images\Mask\DFTA_U.FHR

Click the Manual Icon again to terminate the manual measurement mode.

Line Width measurement on MASK

The FLEX³HR implements a quick and accurate line measurement function. Laser engraved lines are never perfectly smooth but are built up by Laser ON/OFF cycles. Therefore, the line width is

measured as an average width of the line over a certain length. Specify the Line Length on the Parameter page. Use the longest possible line lengths to get better averaging and more repeatable results.

Parameter	Values
Dot Size Tolerance	<input type="text" value="10"/> % <input checked="" type="radio"/> Dot Diameter
Pixel Pattern L/cm	<input type="text" value="564"/> <input type="radio"/> Dot Surface Area
Density Threshold	<input type="text" value="2.0"/> <input type="radio"/> Dot Area %
Line Length	<input type="text" value="500"/> μm

Place the test patch below the aperture of the FLEX³HR and rotate it such as the lines are approximately vertical. Capture an image.

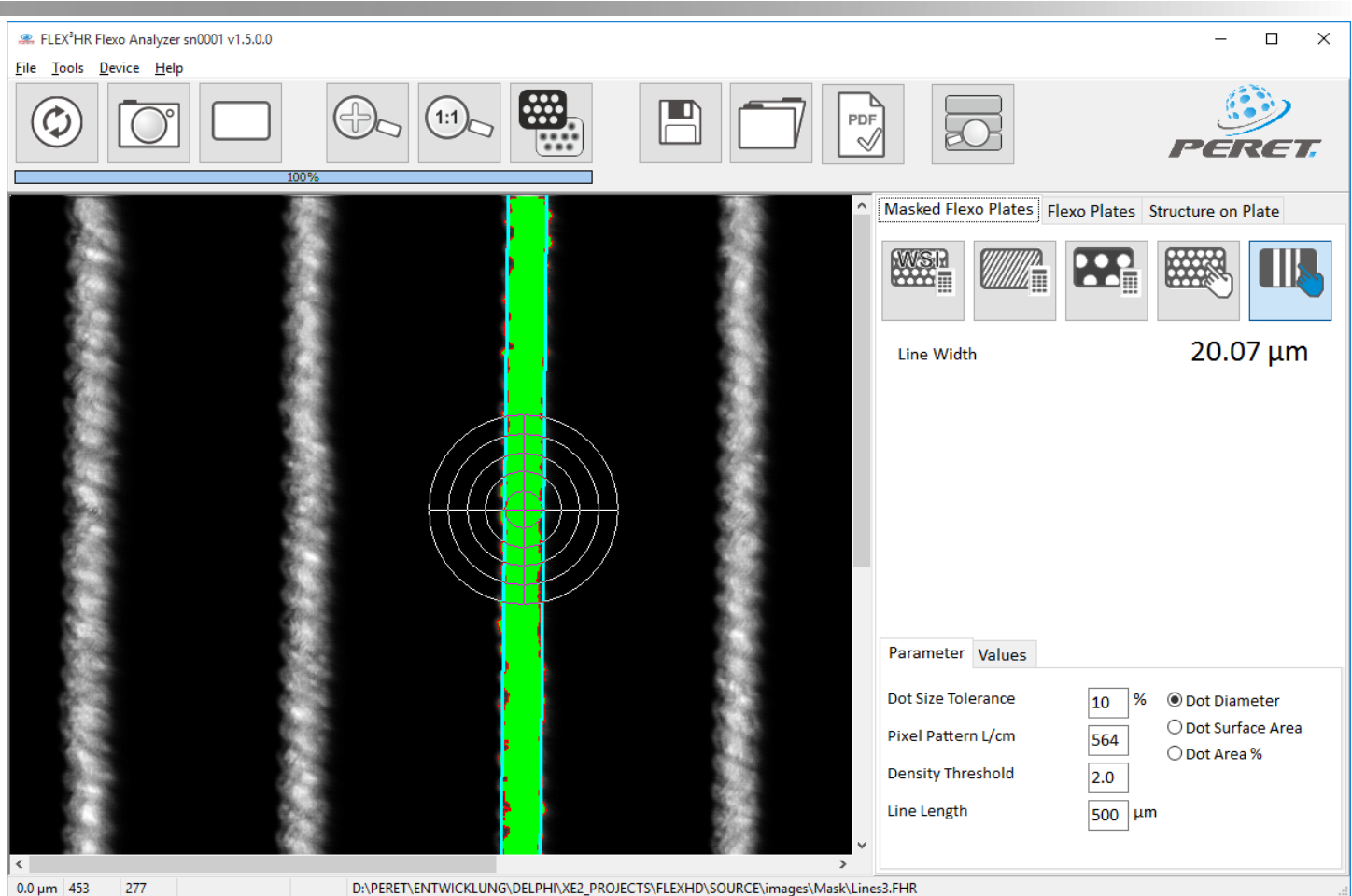
Select the Line Measurement Icon to start the Line Measurement Mode.



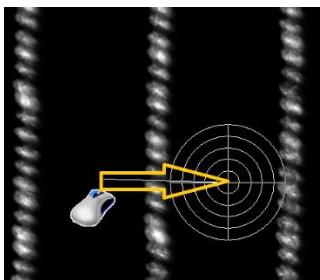
The Icon's Hand will turn blue to show that the Line Measurement Mode is now active.



Click inside the line to select the line and to obtain the Line Width measurement result.

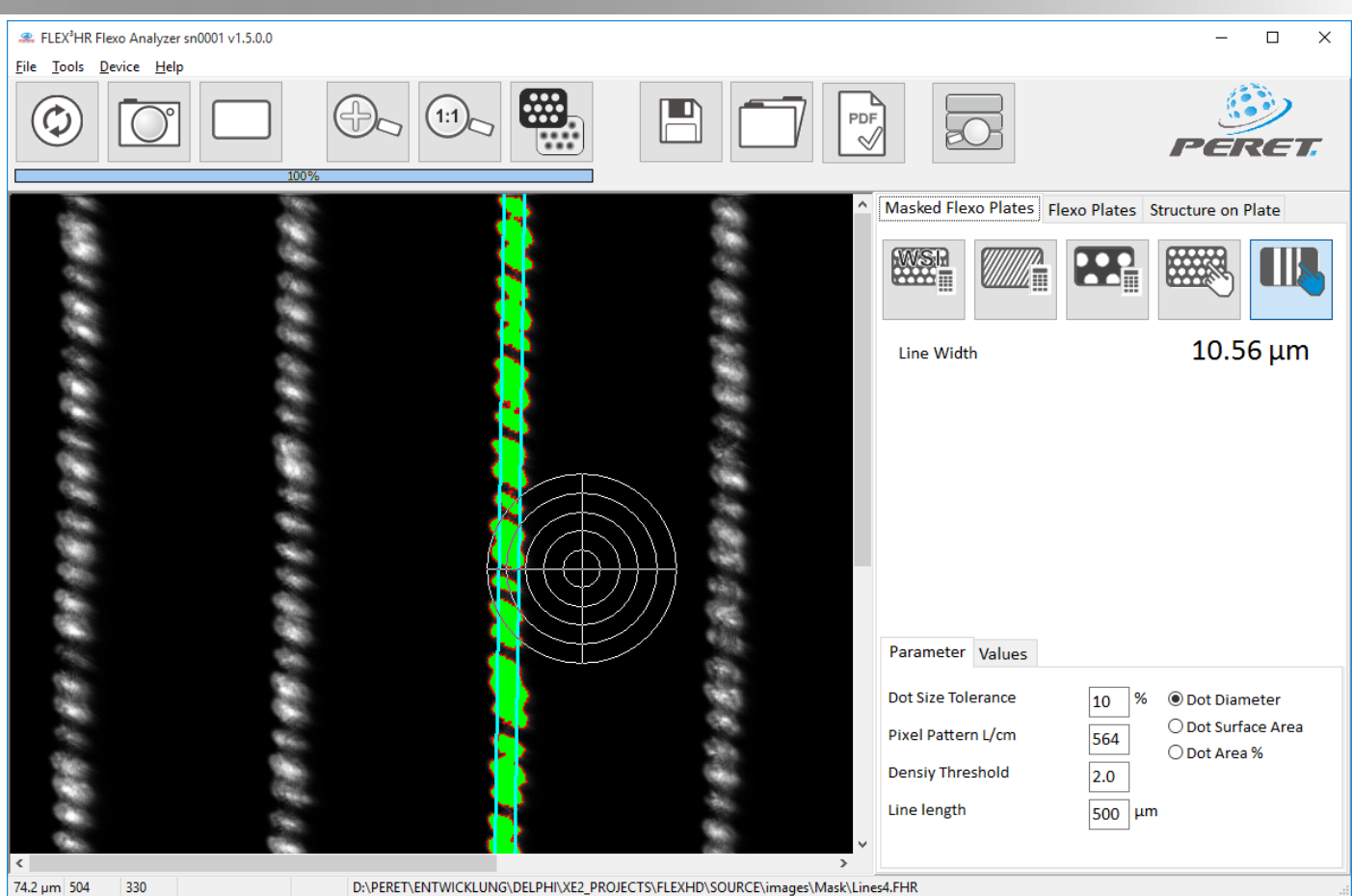


This procedure works only for lines that are perfectly connected over their length. If this is not the case, use the following procedure:



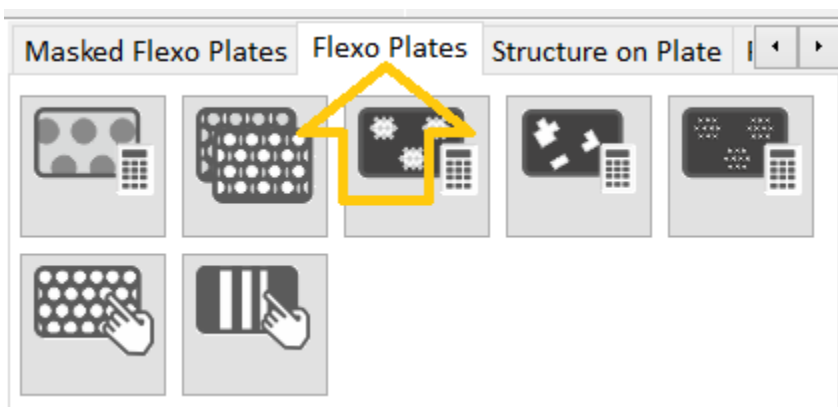
- Move the mouse pointer to the left side of the Line.
- Press the left mouse button down and keep it depressed until the end of the procedure.
- Drag the mouse pointer past the right side of the line.
- Release the left mouse button.

The line width will be calculated and displayed.



Measure the finished FLEXO PLATE

The FLEX³HR implements the standard functions to measure transparent Flexo plates. Select the Flexo Plates tab.



Position the test patch below the aperture of the Sensor head, lower the sensor head and capture an image.

Dot Area Measurement

Click the Dot Area Icon to measure the halftone dot area of the printing surfaces.



Parameter	Statistics
Dot Area %	16.03%
L/Inch	201.01
Dot Diameter	57.09 μm
Angle	36.65°
Edge Factor	131.41
Std Dev.	1.07 μm

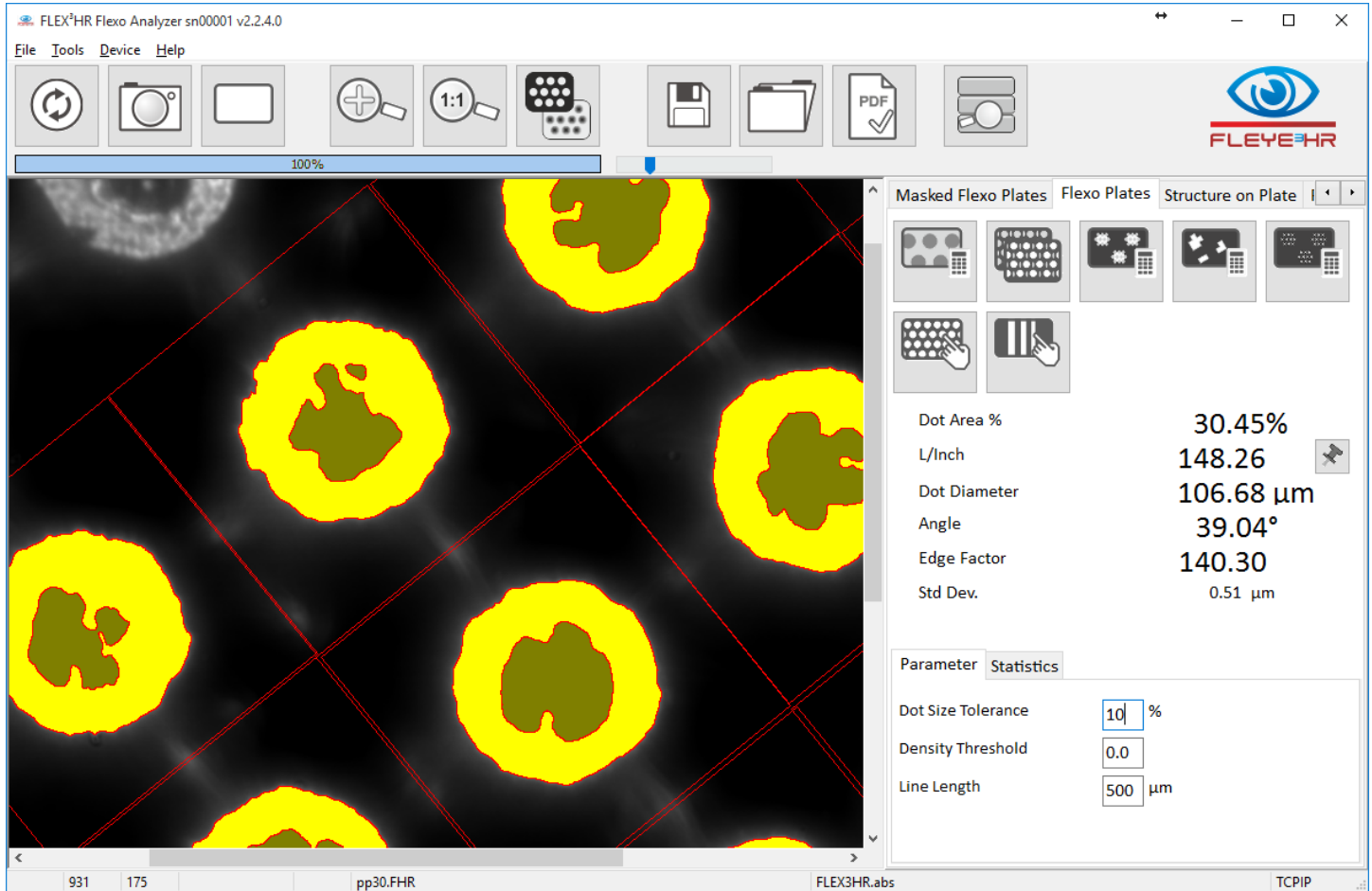
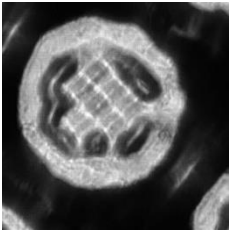
Parameter Statistics

Dot Size Tolerance	10 %
Density Threshold	0.0
Line Length	500 μm

The Dot area % is the ratio of the flat dot surface area excluding the shoulder in relation to the indicated cell size.

Measure Dots with Pixel+

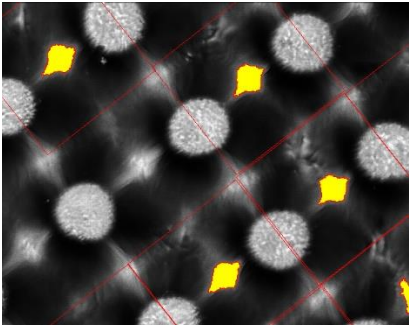
The software automatically detects cells inside a dot. The area of the cell that is totally surrounded by the dot perimeter will be added to the dot area.



Display Alternative results

Flexo plate measurement in transmission mode is the most accurate technology. Collimated light is sent through the plate. On flat areas it will pass straight through while on non-flat areas the light will be refracted. This results in a high contrast image showing the dot surface and valley at the floor of the plate as bright areas while shoulders appear black or dark gray.

The FLEX³HR algorithm looks for potential result interpretations. Sometimes the valley areas are incorrectly selected.



Click the ALTERNATIVE Icon to display a correct result.



Fixed Screen rulings

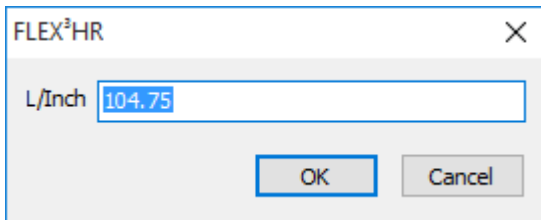
The screen ruling will be detected automatically. You can also pre-select the screen ruling.

L/Inch

104.75



Click the PIN Icon. The Software will prompt to input the screen ruling.



Click OK.

L/Inch

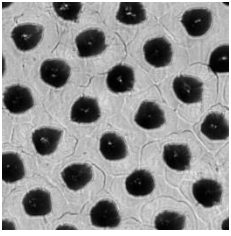
104.00



The 104L/Inch is now used in the Dot Area calculation until you click the PIN Icon again.

Measure 16p Surface structures.

Due to its high resolution camera the FLEX³HR can measure dot areas with extremely high screen rulings.



The 16p Surface Structure is basically a shadow tone value with screen ruling of 200L/cm (500L/inch) or higher.

Use the standard Dot Area Measurement Function to measure these areas.



FLEX³HR Flexo Analyzer sn00001 v2.2.4.0

File Tools Device Help

100%

Masked Flexo Plates Flexo Plates Structure on Plate

Dot Area %	68.32%
L/Inch	528.63
Dot Diameter	30.52 μm
Angle	37.95°
Edge Factor	--.-
Std Dev.	0.78 μm

Parameter Statistics

Dot Size Tolerance	10 %
Density Threshold	0.0
Line Length	500 μm

920 77 NyloFlex ACE M16p.FHR FLEX3HR.abs TCP/IP

Measure MC2x3N surface structures



The MC2x3N surface Structure is basically a highlight tone value with screen ruling of 370L/cm (940L/inch) or more. Use the standard Dot Area Measurement Function to measure these areas.

In order to pick the largest number of the dots set the Dot Size Tolerance to 50% or higher.

Dot Size Tolerance %



FLEX³HR Flexo Analyzer sn00001 v2.2.4.0

File Tools Device Help

100%

Masked Flexo Plates Flexo Plates Structure on Plate

Dot Area % 19.08%

L/Inch 958.47

Dot Diameter 13.06 μm

Angle 44.44°

Edge Factor 107.97

Std Dev. 1.35 μm

Parameter Statistics

Dot Size Tolerance %

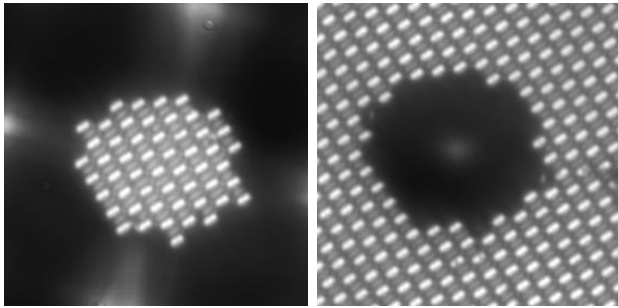
Density Threshold

Line Length μm

896 537 NyloFlex ACE MC2x3N.FHR FLEX3HR.abs TCP/IP

Measure Dot Area with surface structures

In some cases, a surface structure is applied on dot surfaces which could interfere with the dot detection algorithm.



In this case use the 'Dot Area with Surface Structures' Measurement Icon designed to ignore the surface structure.



FLEX²HR Flexo Analyzer sn00001 v2.2.4.0

File Tools Device Help

100%

Masked Flexo Plates Flexo Plates Structure on Plate

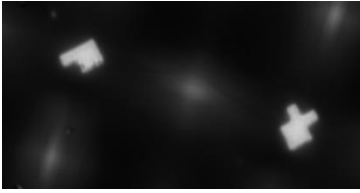
Dot Area %	23.41%
L/Inch	148.37
Dot Diameter	93.46 μm
Angle	76.74°
Edge Factor	140.02
Std Dev.	0.18 μm

Parameter Statistics

Dot Size Tolerance	10 %
Density Threshold	0.0
Line Length	500 μm

1086 39 s4.FHR FLEX3HR.abs TCPIP

Measure 'square dot' dot area



Dot areas based on square dots can be composed of Dots with different size and shape. Analyze this type of patch using the Analyze Square Pixel Dot Area Function

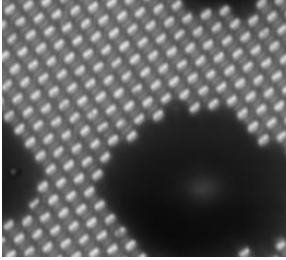


Due to the differences in the size of single dots the tolerance needs to be set appropriately large.

Parameter	Value
Dot Area %	1.96%
L/Inch	149.46
Dot Diameter	26.84 μm
Angle	72.31°
Edge Factor	143.81
Std Dev.	1.10 μm

Parameter	Value
Dot Size Tolerance	200 %
Density Threshold	0.0
Line Length	500 μm

Analyze Dot Surface Cell Structure on plate



Use the Cell Structure function to analyze the cell structure on solid areas.



Parameter	Statistics

Manual measurement of Dots on PLATE

Click the Manual Measurement Icon.



The Hand will turn blue indicating that the manual selection mode now is active.



Select the dots you would like to be used to measure the Dot Area %.

The measurement data will be updated in real time. As soon as two dots have been selected, Dot Area%, Screen Ruling, and Screen Angle will be calculated and displayed. Select more than two dots to improve the accuracy and repeatability of the result.

This feature is very helpful for example when controlling concentric screening dots

FLEX3HR Flexo Analyzer sn00001 v2.2.4.0

File Tools Device Help

100%

Masked Flexo Plates Flexo Plates Structure on Plate

Dot Area % 13.53%

L/Inch 207.95

Dot Diameter 50.70 μm

Angle 39.49°

Edge Factor 134.61

Std Dev. 0.62 μm

Parameter Statistics

Parameter	Statistics

191 630 DuPont DFS45 30 80L.FHR FLEX3HR.abs TCP/IP

Line Width measurement on PLATE

The FLEX³HR implements an easy and accurate line measurement function. Lines on Flexo plates are never perfectly smooth. Therefore, the line width is measured as the average width of the line over a certain length. Specify the Line length on the Parameter Page. Use the longest possible line length to obtain better averaging and repeatability.

Parameter	
Dot Size Tolerance	<input type="text" value="10"/> %
Density Threshold	<input type="text" value="2.0"/>
Line Length	<input type="text" value="500"/> μm

Place the test patch below the aperture of the FLEX³HR and rotate it so that the lines are nearly vertical. Capture an Image.

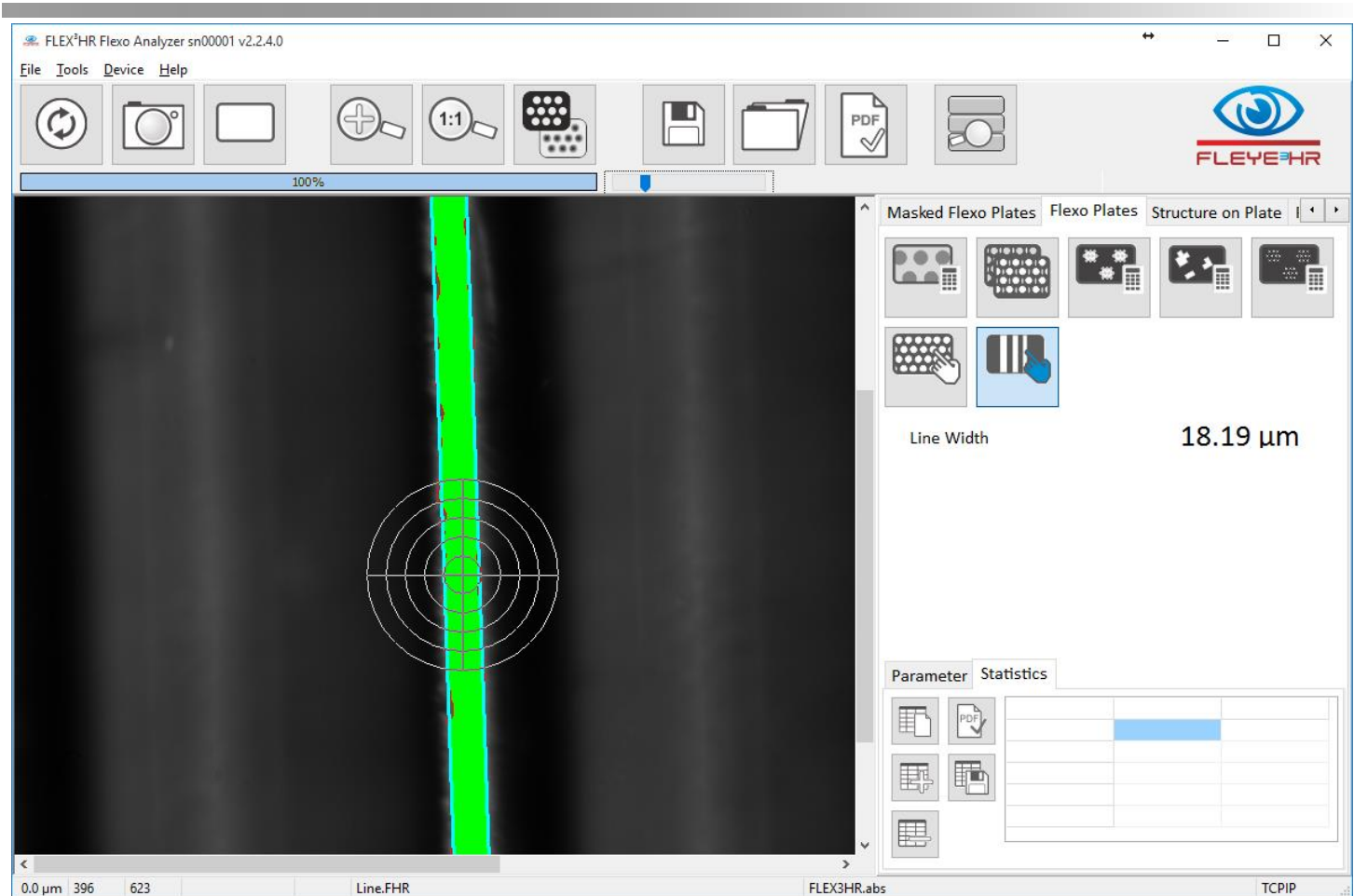
Select the Line Measurement Icon to start the Line Measurement Mode.



The Icon's Hand will turn blue to show that the Line Measurement Mode is now active.



Click inside the line to select the line and to obtain the Line Width measurement result.

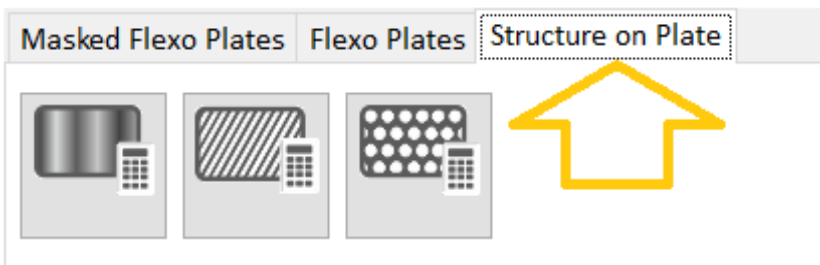


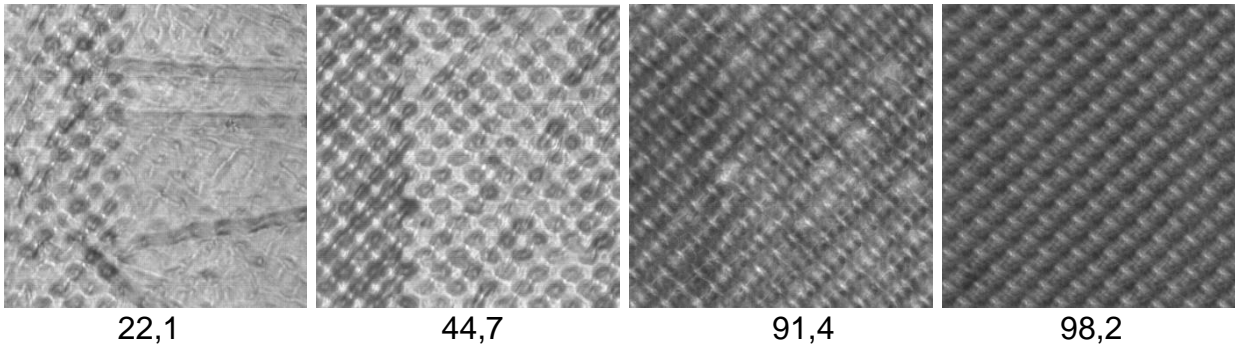
The click and drag function described in Mask mode for discontinuous lines is also available in Plate mode.

Analyze Pixel Patterns on Plate

Based on the imaging quality and the exposure and wash out process the imaged pixel pattern will create structures on the plate surface.

Select the 'Structure on Plate' Page.





It is obvious that the different surfaces will result in different ink transfer and ink laydown during printing.

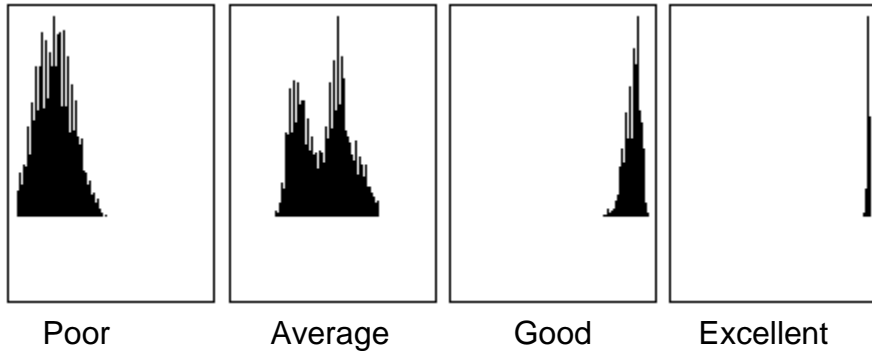
The FLEX³HR can be used to visually control the surface structure. A surface structure index can be calculated by clicking the Surface Icon.



A high 'Structure on Plate' value close to 100 indicates a high-quality surface structure on the Plate.

At the bottom of the Window a histogram will be displayed. The width and shape of the Histogram can also be used as an indicator of the quality of the surface structure on Plate. Narrow Histogram graphs on the right end of the frame indicate high quality surface structures.

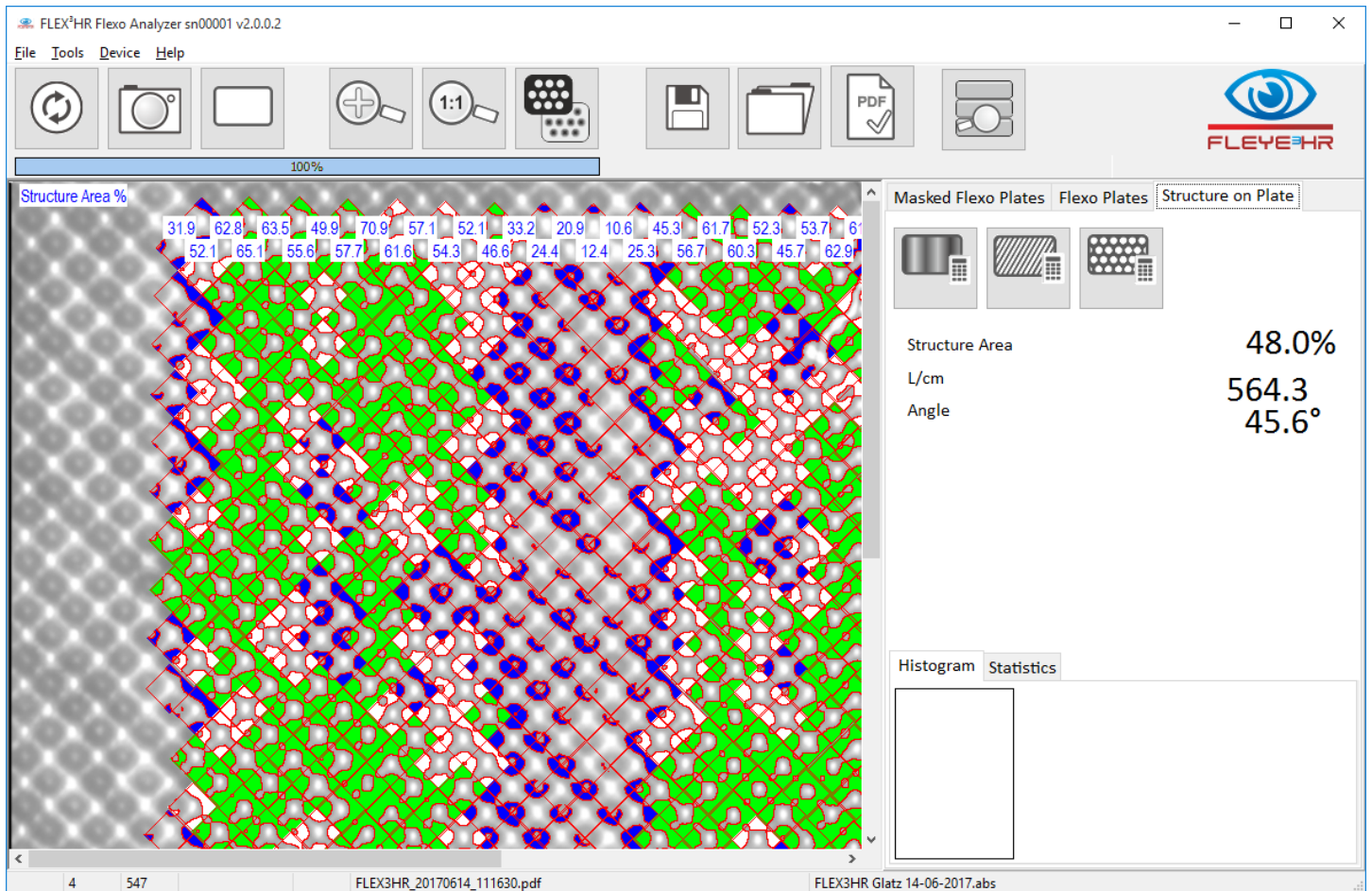
Example:



In case your surface structure is a regular structure, you can use the pixel pattern analysis function to evaluate the local strength of the structure on the plate surface.

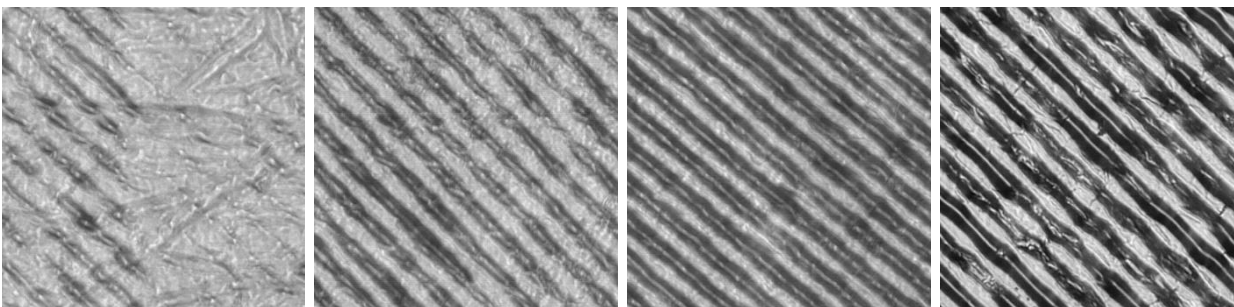


Stripes on LAMS will be propagated to the finished plate as you can see in below image.

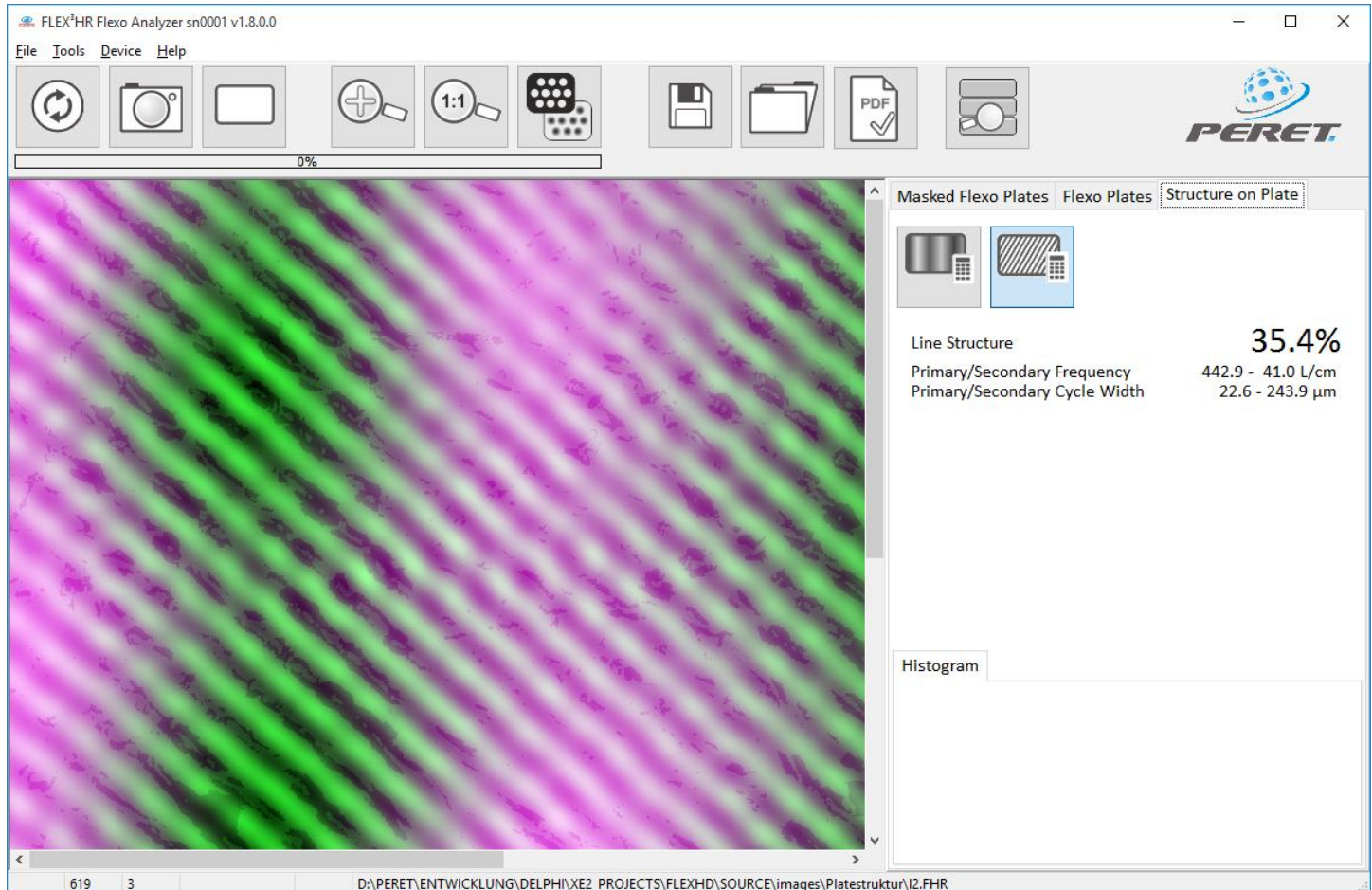


Analyze Line Patterns on Plate

Micro-lines engraved during the imaging process will result in tiny lines on plate with minimum depth. Depending on imaging, exposure, and washout the resulting line structure on plate can vary.



Click the Line Structure Analysis Icon to analyze a line structure image.



The Line Structure value is an indicator of the quality of the line structure on the plate surface.

Line Structure **35,44%**

The example above shows the areas highlighted in pink as poorly structured, while areas in green are well structured. The Line Structure value is a function of the relative size of the pink area and the line structure intensity. High values (100%) indicate well-formed line structures.

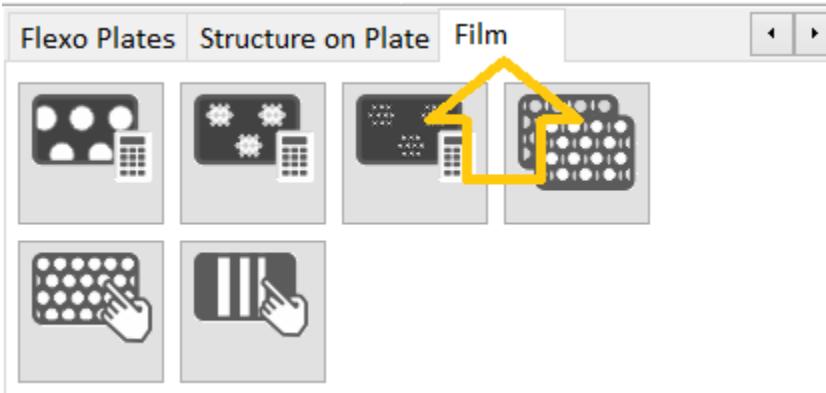
The FLEX³HR Software calculates and displays the primary line frequency and the secondary line frequency and the corresponding Cycle Widths.

Primary/Secondary Frequency	442.9 - 41.0 L/cm
Primary/Secondary Cycle Width	22.6 - 243.9 μm

These numbers can be used to determine if the resulting structure matches the target structure resolution.

Analyze Flexo Film

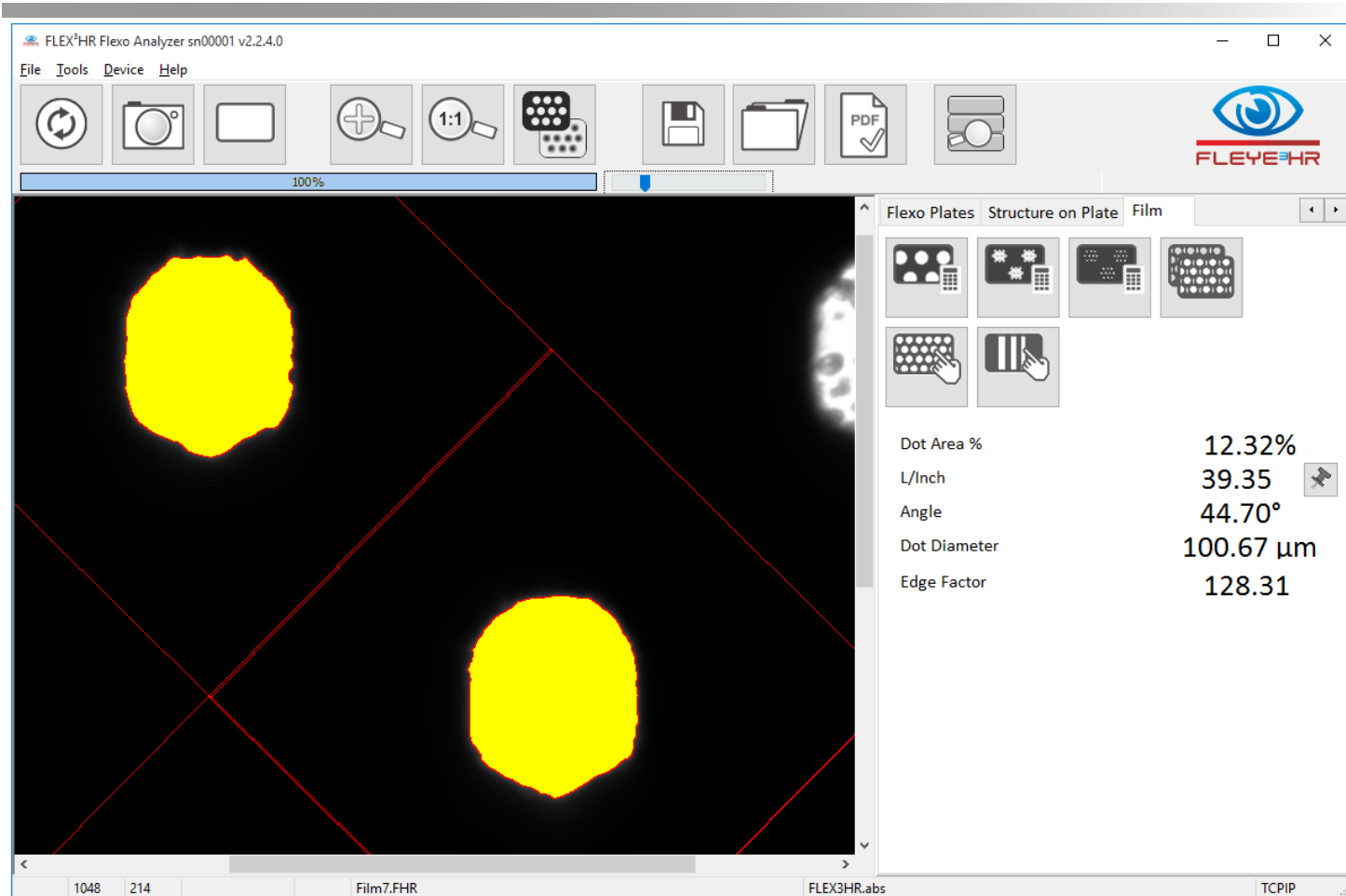
High resolution positive film can be analyzed selecting the Film Pos. page.



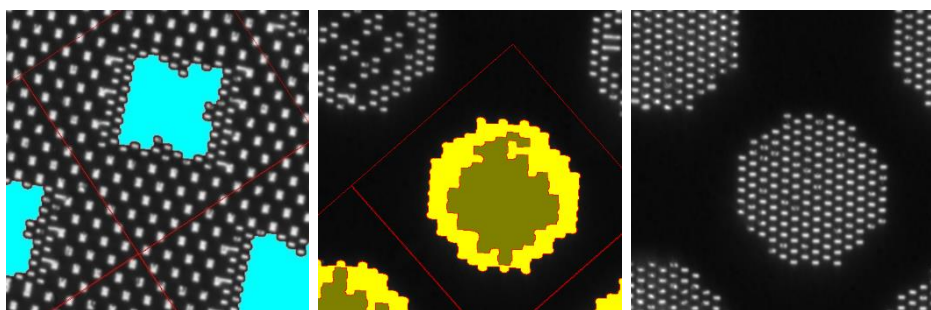
Measure Standard Film



Click the Dot Analysis Icon to measure standard dots on film.

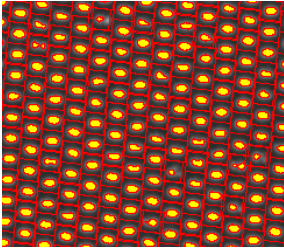


Measure high resolution dots based on mini dot clusters



Click the Dot Cluster Icon to measure a dot Cluster.

Measure Mini Dots on Film



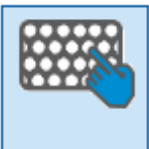
Click the Dot Cluster Analysis Icon to measure the dot size built by small spots.

Manual measurement of Dots on Film

Click the Manual Measurement Icon.



The Hand will turn blue indicating that the manual selection mode now is active.



Select the dots you would like to be used to measure the Dot Area %.

The measurement data will be updated in real time. As soon as two dots have been selected, Dot Area%, Screen Ruling, and Screen Angle will be calculated and displayed. Select more than two dots to improve the accuracy and repeatability of the result.

Line Width measurement on FILM

The FLEX³HR implements an easy and accurate line measurement function.

Place the test patch below the aperture of the FLEX³HR and rotate it so that the lines are nearly vertical. Capture an Image.

Select the Line Measurement Icon to start the Line Measurement Mode.



The Icon's Hand will turn blue to show that the Line Measurement Mode is now active.



Specify the Line length on the Parameter Page. Use the longest possible line length to obtain better averaging and repeatability.

A screenshot of a software interface. At the top left, there is a tab labeled "Parameter". Below the tab, the text "Line Length" is displayed. To the right of "Line Length", the value "500" is entered in a text box, followed by the unit "μm".

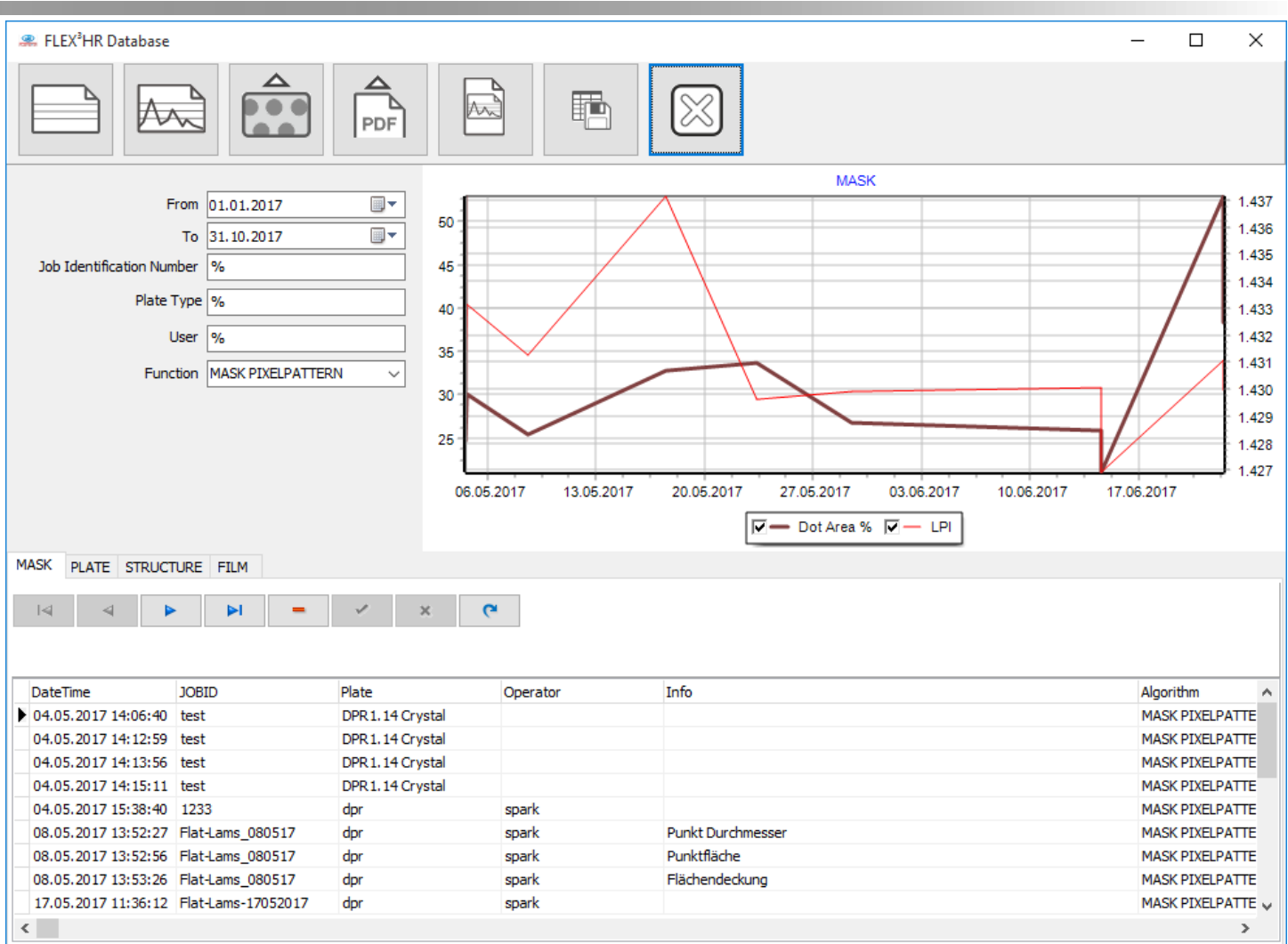
Click inside the line to select the line and to obtain the Line Width measurement result.

The FLEX³HR Database

All reports and the associated measurement values are stored automatically into the FLEX³HR Database.

Open the Database Window by clicking the Database Icon.







Plot a graph based on data in the database

Clear the graph and reset all Filters to the database by clicking the Clear Graph Icon.



Specify the data to display.

From	01.01.2017	
To	12.04.2017	
Job Identification Number	%	
Plate Type	%	
User	%	
Function	MASK PIXELPATTERN	

- Select the time frame you would like to analyze by selecting a From date and a To date.
- Select the Job ID number.
- Select the Plate Type.
- Select the User.
- Select the Measurement Function that has been applied during analysis.

The '%' character is used as a wild card character.

Example:

% Selects all Items in general

JOBID% ... Selects all Items starting with JOBID

Click the Plot Graph Icon based on data in the database filtered as specified.



Reload an Image from a previously saved report

Click the Upload Image Icon to reload an Image from the database.



The Image of the current selected record will be uploaded to the main screen. This image can be analyzed.

Open the PDF Report of the currently selected record

Click the PDF open Icon to open the PDF report of the current record.



Create a PDF Report based on database information

Click the Data Plot Report Icon to create a PDF based on the currently drawn graph.



Export Data from the Database

Click the Export Icon to save database data into a file.



The data can be saved to a tab-delimited text file or as an alternative to an EXCEL file.

Close the Database Window by clicking the Close Icon.

