



CLEMEX intelligent microscopy



Vision PE & Vision Lite 6.0

Advanced Image Analysis

Intermediate-level Image Analysis





CLEMEX intelligent microscopy

A Commitment to Excellence in Imaging

For nearly 20 years, Clemex has been providing integrated solutions for Image Analysis in microscopy to meet the specific needs of customers worldwide. This is our expertise and our commitment.

Clemex is known for its reliability, its high-quality products, and its after-sales service. Customer satisfaction is important to us.

Clemex Vision PE and Clemex Vision Lite are the cornerstone of our reputation in image analysis. These two image analysis solutions offer both flexibility and ease-of-use in acquiring and measuring images, using pre-built analysis routines or by building your own.

Intelligent
Clemex Vision PE :

- > Unique Auto-calibration
- > Quality is the Difference
- > Automatic Exposure
- > Mosaic Feature
- > Multi-Layer Grab Feature
- > 3D Rendering
- > Multiple Field Automation
- > Virtual Joystick
- > Circular Pattern
- > Rapid Routine Development
- > Validate Results
- > Manage & Create Reports
- > Many Options Available

Research & Quality Control Solutions

Clemex Vision PE provides a powerful image analysis solution for automated microscopy. From measuring grain size to counting particles, Clemex's intuitive software empowers you to easily custom-make image analysis macros without writing a single line of code. Clemex Vision PE also allows you to choose and use existing application packages for frequently run applications or for teaching purposes.

Clemex Vision Lite, an abridged version of Clemex Vision PE, has a limited number of built-in imaging functions. When combined with application packages, Clemex Vision Lite offers intermediate-level solutions suitable for repetitive analyses or as an introduction to building customized image analysis routines.

> Intelligent software dedicated to scientific imaging

The Clemex Vision line of products fills a need in quantitative microscopy with its intelligent analysis features. From Research & Development to Quality Control laboratories, Clemex Vision Lite and Clemex Vision PE are the perfect software solutions for precise and repeatable results where it counts.

> Easy Routine Development

With Clemex Vision's intuitive interface, you can develop image analysis routines in a matter of minutes. Sequentially establish a list of image acquisition, processing, and measurement instructions by selecting them from the Toolbox and see them appear in the Routine window below. No programming required - just point and click.

> Automation of all analyses processes

From image acquisition to generating reports, Clemex Vision Lite and Clemex Vision PE have fully automated functions that simplify the most complex analyses. Auto-calibration, auto-exposure, and automatic multi-layer grabs are a small sample of the power available at the end of your fingertips.



From Basic Software to Fully Operational Turnkey System

When you need to acquire, quantify, and archive your images, choose from our complete line of digital imaging tools. Available in various configurations, from basic software to fully operational turnkey systems including hardware, software and on-site training and installation, you can choose the solution that's right for you today and add additional modules in the future as required.

From Clemex Vision Lite's basic analysis routine capabilities to Clemex Vision PE with its infinite possibilities, Clemex has the software and hardware that outperforms all others. Vista compatible and user-friendly, our software solutions are used in industry to increase productivity and yield reliable and repeatable results.



Intelligent Workflow

Clemex Vision PE and Clemex Vision Lite are the top-of-the-line automated image analysis solutions. In only 4 easy steps they go from capturing images to creating detailed reports, with images analyzed and results tabulated automatically.

By writing analysis routines with the easy-to-use Toolbox or by purchasing a ready-to-use Application Package, a broad scope of morphological measures can be extracted - no programming skills required. Results are tabulated automatically and reports can be created to your specifications.

STEP

1

Capture Images

A wide range of Monochrome or Color Digital Cameras can be used to capture images quickly and easily. Analyze your images using a live feed or save high resolution images for further analysis.

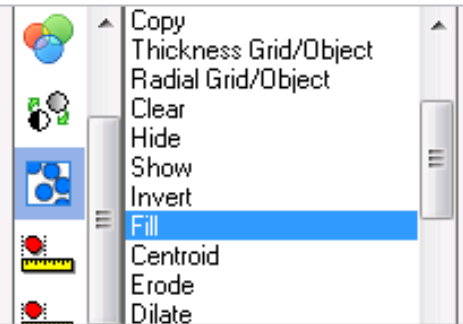


STEP

2

Quantify Images

Writing an analysis routine is just a click away, no programming required. Simply establish a list of actions taken from the Toolbox and your Routine writes itself.



STEP

3

Manage Results

Validate your results easily within the Data Browser where each measurement is directly linked to its corresponding feature on the image. You can then save them in Excel or binary format.

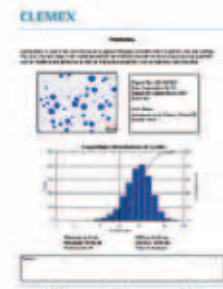
ObjNo	ObjId	Cal	Area	CircDiam	AspRatio
1	3	1	139.53	13.33	1.58
2	4	1	120.14	14.22	1.51
3	46	1	132.64	13	1.38
4	47	1	168.10	14.53	1.35
5	5	1	154.29	14.48	1.34
6	6	1	165.29	14.51	1.34
7	19	1	145.30	13.63	1.29
8	60	1	165.00	14.53	1.30
9	20	1	161.61	15.21	1.30
10	21	1	158.58	14.26	1.28
11	67	1	160.96	14.32	1.27
12	62	1	169.42	14.45	1.26
13	98	1	127.03	12.22	1.25
14	10	1	125.53	14.63	1.25
15	17	1	144.37	13.56	1.23
16	14	1	144.37	13.56	1.23
17	1	1	143.33	14.27	1.23
18	66	1	122.34	14.54	1.23
19	50	1	122.50	14.65	1.23
20	52	1	151.52	13.89	1.22
21	36	1	156.62	14.12	1.22

STEP

4

Create Report

Customize reports to your specifications quickly and easily. Produce secure printable reports or saved spreadsheet programs.



Unique Auto-Calibration (Patent Pending)

Calibration, the process of assigning a width to a pixel, is now fully automated with Clemex's unique Auto-Calibration feature. Using Clemex's NIST traceable micrometer, Clemex Vision (Lite & PE) assigns a different calibration setting for each objective or camera.

Simply click on Calibration and follow the instructions when prompted. No need to stretch a caliper over a micrometer. It's easy and returns accurate, reproducible, and certified results that can be validated anytime.

Mag.	Horizontal	Length(µm)	µm/pixel	Uncertainty(µm)	Previous	Delta(µm)	Status
25x	2000	2000.3	2.778	0.0011	2.778	0.0000	OK: NIST Traceable
50x	1000	999.9	1.3795	0.00051	1.3797	0.00020	OK: NIST Traceable
100x	500	500.1	0.4983	0.00032	0.4983	0.00000	OK: NIST Traceable
200x	200	200.05	0.3415	0.00017	0.3415	0.00000	OK: NIST Traceable
400x	100	99.98	0.13777	0.000099	0.13777	0.000000	OK: NIST Traceable

Serial Number: CL-4320006

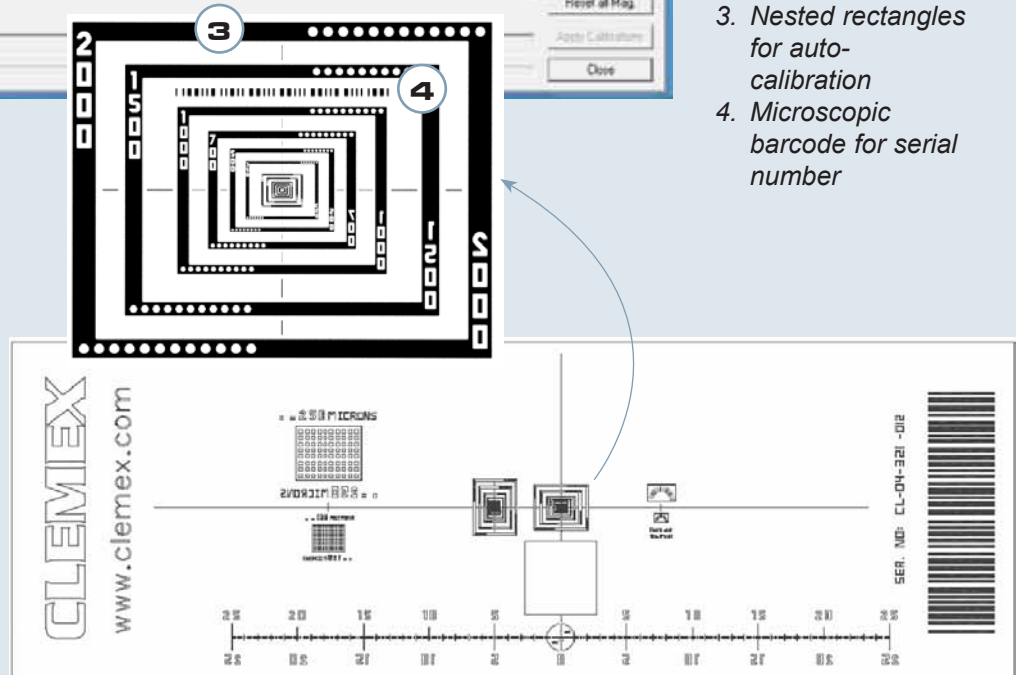
Slide Orientation:
 Vertical
 Horizontal

Buttons: Calibrate All Mag, Calibrate 400x Mag, Save, Reset All Mag, Apply Calibration, Close

Status: Ready for Auto Calibration at 50x

Auto Calibration:

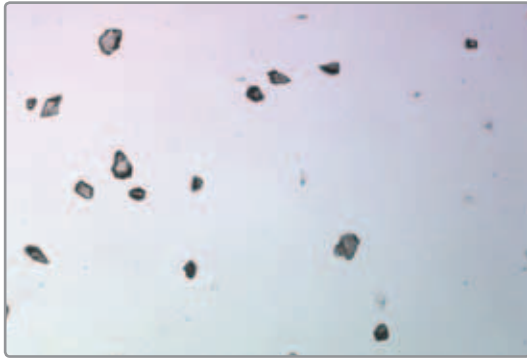
1. Automated calibration factors for all magnifications
2. Confirmation of traceability
3. Nested rectangles for auto-calibration
4. Microscopic barcode for serial number



Quality Is the Difference

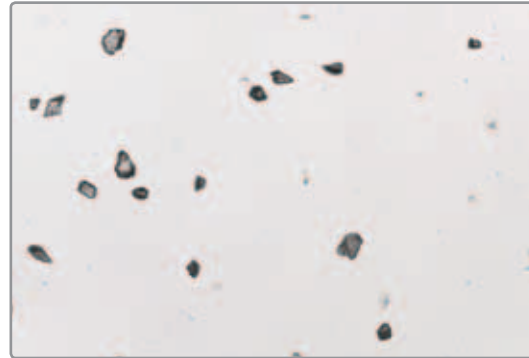
Uneven illumination is often a source of poor image quality. Clemex Vision's Shading Corrector eliminates these adverse effects to produce a high quality image. Applied on the live image, the Shading Corrector allows even lighting for every field of the sample ensuring seamless mosaic images.

Before applying shading corrector



Diamonds at 100X

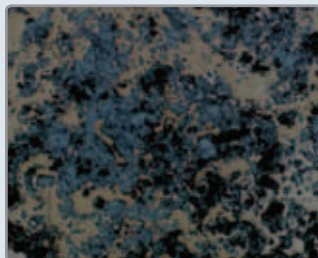
After applying shading corrector



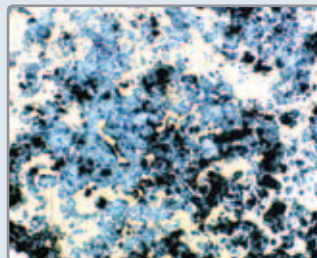
Automatic Exposure

With our new Auto-Expose feature, no need to adjust the shutter speed slider or the illumination...ever! Click on Auto, and voila! Once done, all settings are automatically saved for each objective and you never have to worry about manually adjusting your lighting conditions. Whatever the original illumination, click on the Auto-Exposure button to automatically adjust the image for perfect illumination.

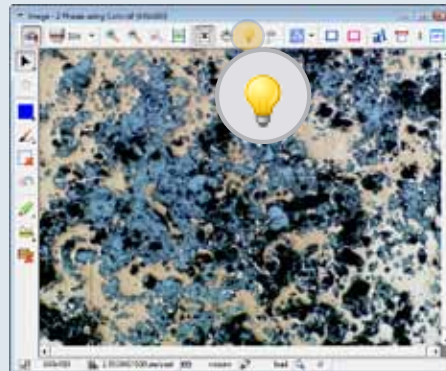
Underexposed



Overexposed



Perfect illumination after auto-exposure

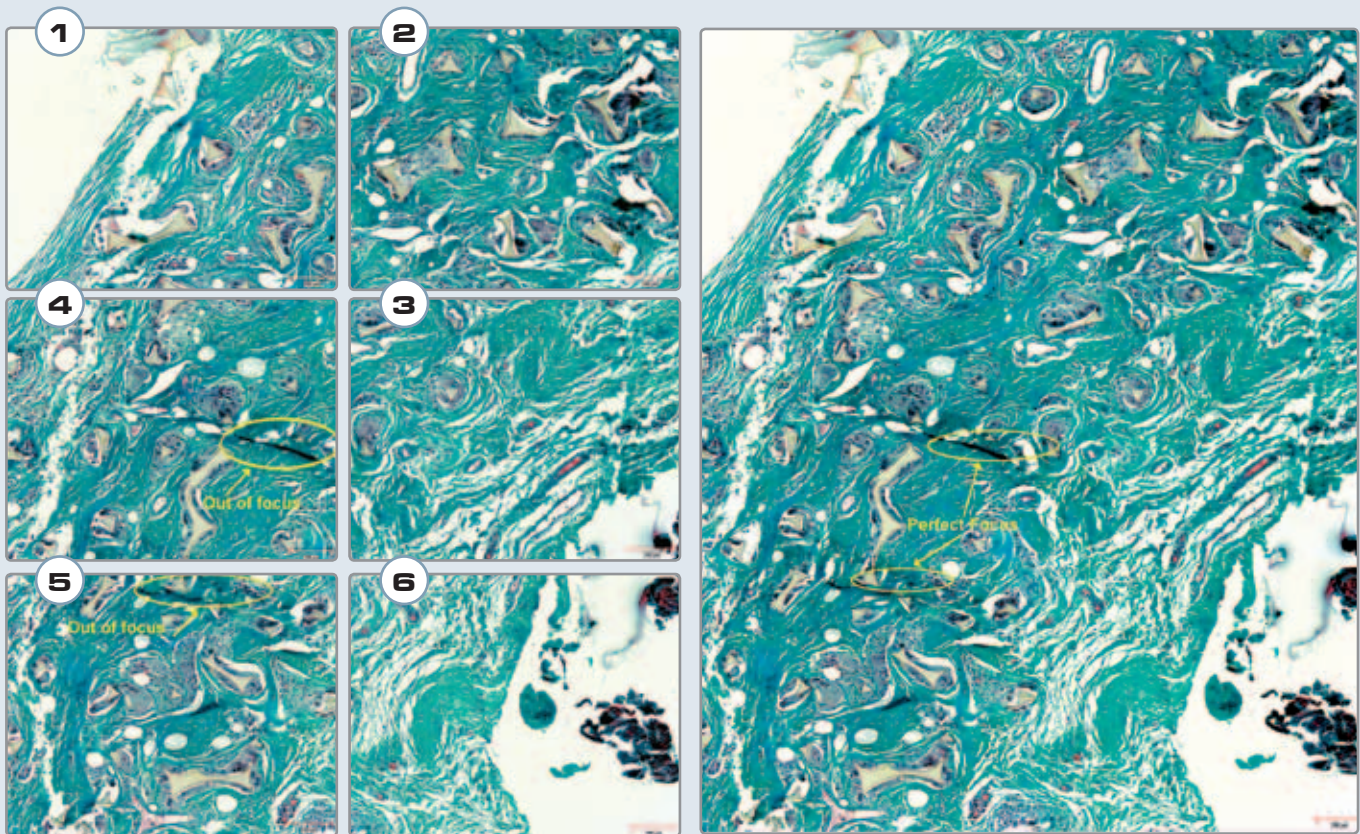


Porosity and oxide in metal

Mosaic Feature

With the Build Mosaic feature, Clemex Vision (Lite & PE) automatically stitches multiple fields to form a large image of unlimited resolution. This example demonstrates a Silicon Implant magnified at 100X with six stitched fields.

- + Use with a manual or motorized stage
- + For uneven surfaces, combine the multi-layer grab function with the Build Mosaic feature (requires optional auto-focus kit)
- + When running in manual mode, positioning arrows allow you to accurately stitch multiple fields
- + Control the number of fields to stitch, starting points, and more...



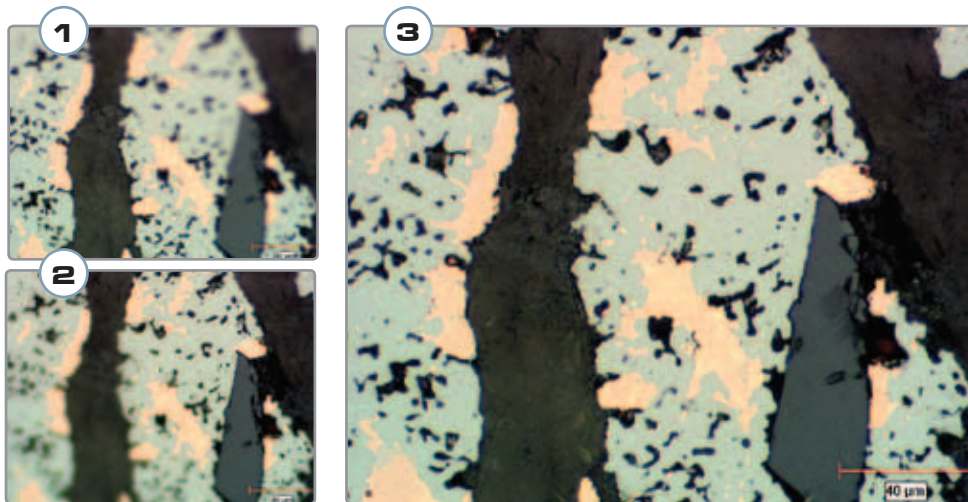
Images 1 to 6 captured at a magnification of 100x

Perfect stitching 2x3 composite image of Silicon Particles in Implant Sample with total resolution of 7.89 MegaPixels

Multi-Layer Grab Feature

Extended Depth of Field

Focusing on uneven surfaces can be troublesome. With the Automatic Multi-Layer Grab function, intelligent software slices your image at varying Z-intervals to reconstruct a completely focused image. If image input device systems do not have a motorized focus, the Manual Multi-Layer Grab instruction generates a sharp composite image based on multiple planes acquired continuously as the user is turning the microscope focus knob.



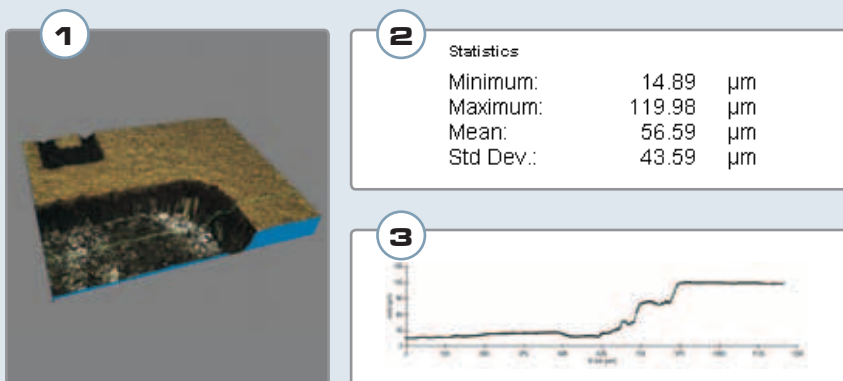
Metallic Brake Shoe Pad at 200X

1. Layer 1 (200x)
2. Layer 5 (200x)
3. Reconstructed final image (15 layers @ 200x)

* Note: Focused through image and generate instant reconstructed image in 5 seconds

3D Rendering

Using the focus motor, the stage controller and the new Advanced Multi-Layer Grab, this Clemex Vision PE optional package renders 3D topography of a sample in as many as 256 layers. New measurements for 3D topographic images include Solid Volume, Void Volume, Z (Depth) Average, Minimum and Maximum values. (Topography Filter, Save 3D Model, Build 3D Model)



1. 3D Rendering of chip with Z (depth) measurement along green line
2. Statistic Results for Depth Measurements
3. Graph of Depth of chip along green line

Multiple Field Automation

Stage and Auto-Focus Kit

For high throughput environments, the optional motorized stage and auto-focus kit is highly recommended. Adaptable to all major microscope brands, you can significantly increase your productivity while taking advantage of some key software features such as image stitching, 3D image reconstruction, 3D rendering, and object tracking.

Software Controlled Stage & Focus

Simplify the analysis of multiple fields with stage and focus automation tools. Highly flexible, you can determine sample origin, set the number of fields to analyze, establish specific auto-focus fields or opt for a linear focus for sloping samples.

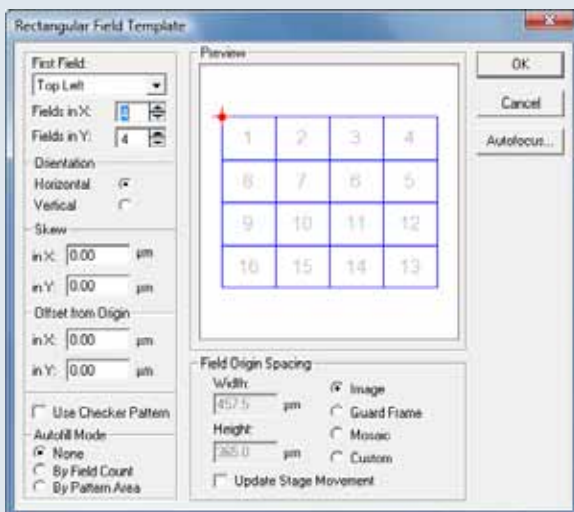
- + Set up multiple simultaneous stage patterns
- + Control field origin spacing
- + Move stage patterns
- + Save patterns



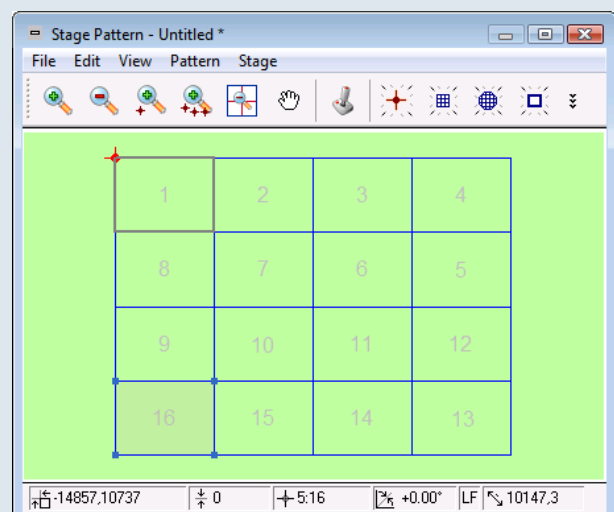
Clemex Joystick and Controller



Motorized Stage



Define number of fields needed



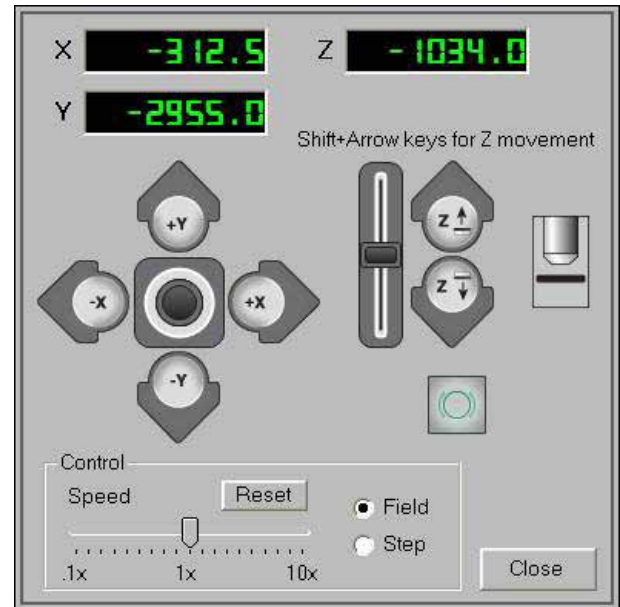
See stage move with this window

Virtual Joystick

Move the stage sideways or up and down without a physical joystick with Clemex Vision (Lite & PE)'s simple and user-friendly Virtual Joystick which allows you to control the motorized stage directly from the screen.

Controlled through the Stage Window, the Virtual Joystick allows you to move the stage in all directions, to focus manually or to trigger auto-focus events. The graphical interface shows the X, Y, and Z positions in microns, the speed, the Z movement, whether you have an upright or inverted microscope.

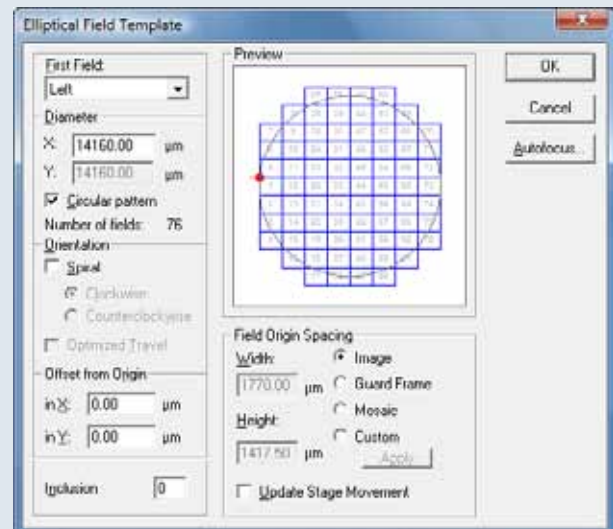
With its intuitive user interface, the new Virtual Joystick is the perfect stage control solution.



Circular Stage Pattern

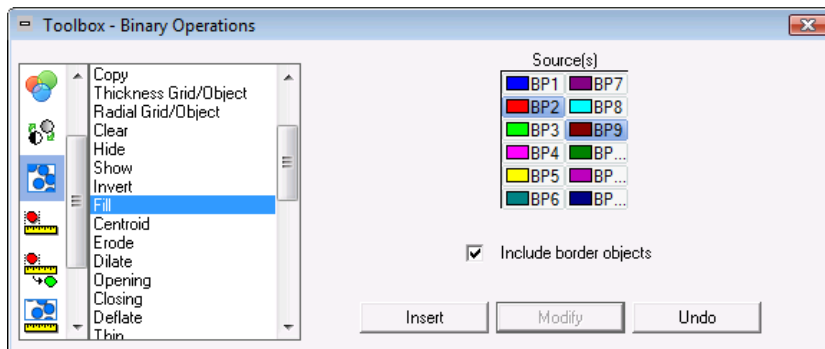
Clemex Vision PE's unique Elliptical Field Template allows you to create circular stage patterns in one simple step, saving both time and energy!

Perfect for Filter Analyses, this new template can also be used for elliptical samples. Customizable parameters allow you to determine the size of the pattern, its shape, its analysis sequence, and which portions of the circle or ellipse will be included in the Field Pattern.

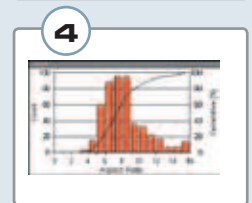
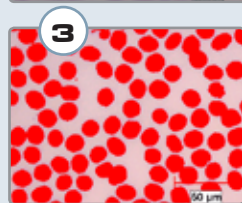
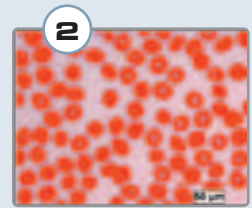
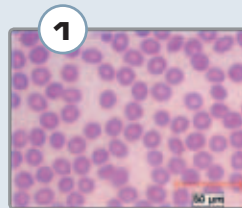
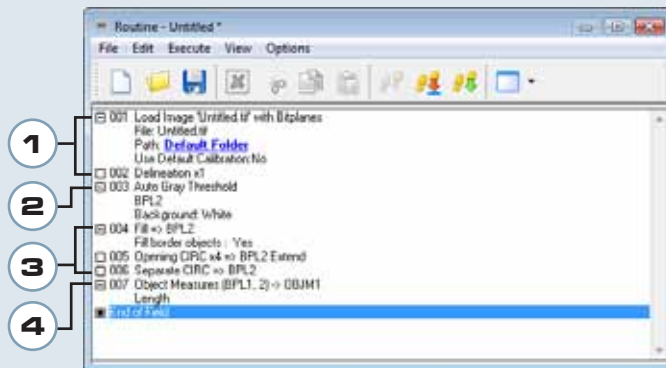


Rapid Routine Development

With Clemex Vision PE and Clemex Vision Lite's intuitive interface, you can quickly develop image analysis routines in a matter of minutes. Sequentially establish a list of image acquisition, processing, and measurement instructions by selecting them from the Toolbox and see them appear in the Routine window below. No programming required whatsoever! Just point and click.



From Blood Cells to Cast Iron Nodules



1. Image Input

Loads image and applies a Delineate filter in order to enhance object edges.

2. Threshold

Performs an Autothreshold according to grey levels to separate phases and assigns a Bitplane color.

3. Binary Transformations

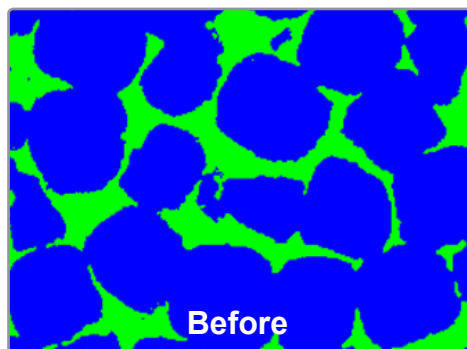
Fills holes, removes small features and bumps from larger objects and separates objects.

4. Measures

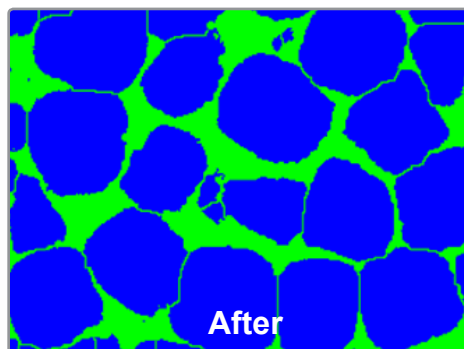
Measures length of individual circular features.

Automatic Object Separation

There was a time when you needed a series of instructions to separate objects that were touching or slightly overlapping one another. Now Clemex Vision PE allows you to easily separate these compact binary objects in a single step.



Before



After

Acicular Separation

Even when fibers or particles are properly dispersed on a slide, overlapping objects still remain. With the Split Long Objects function, Clemex Vision PE provides an easy way to separate these fibers. Better precision of results is achieved because fibers are measured individually rather than in agglomerates. Isolating acicular objects, by assigning different bitplanes to overlapping fibers, makes the Split Long Objects function an important tool for precise and reliable statistical results.



Source Image
of Carbon fibers



Binarization onto
blue bitplane



Fiber separation with the
Split Long Objects tool.

Magnifying Glass Tool

The Magnifying Glass Tool highlights the area at the tip of the mouse to show accurate detail. It is integrated in the image window as a child window, constrained to move with the mouse.

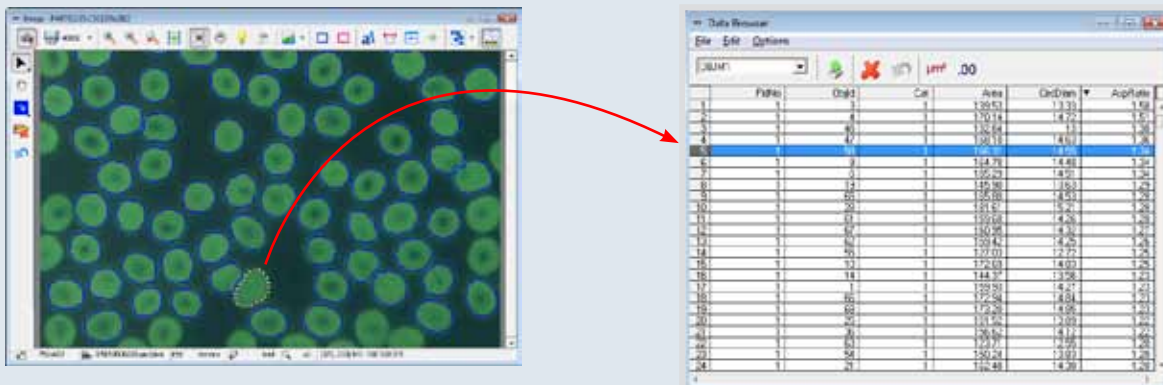
1. By right clicking, choose magnification
2. Move arrow where needed



Porosity in solder joint at 25X

Validate Results with Ease

Use the Data Browser tool to validate measurements and eliminate artifacts from results. The Data Browser tool is a spreadsheet of measurements linked to the outlines of each particle. Because the automated stage remembers the positions of all analyzed features, clicking on any given measurement returns the user instantly to the corresponding field of view.

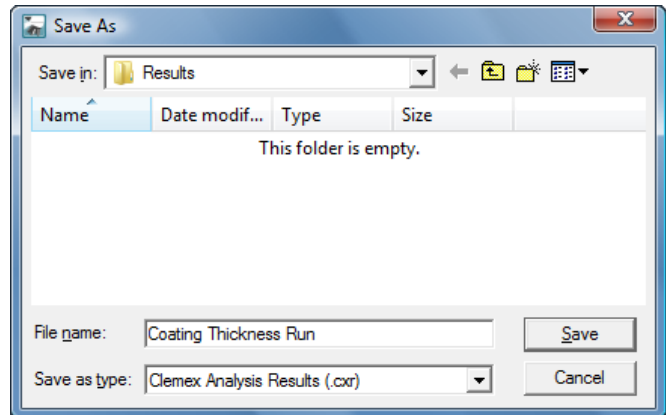


Clicking on any particle highlights the corresponding measurements (on the left) in the Data Browser (on the right)

More Flexibility in Results Management

Save and Retrieve Results

Image analysis results can be saved in a raw format in addition to the existing export function that allows data to be saved in Excel format. Saving results in binary format guarantees authenticity of data as required by 21 CFR Part 11 rules of the FDA. Results can also be retrieved in Clemex Vision PE for further analysis of saved data.



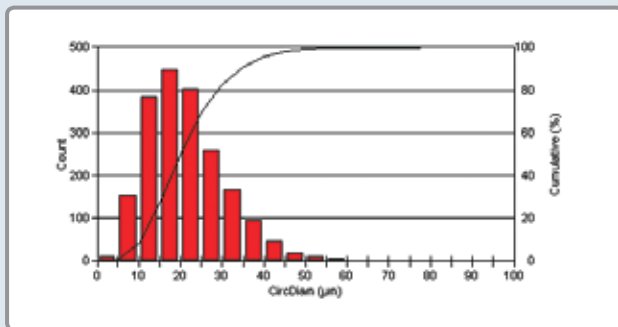
Results are saved in .CXR format

Histograms with Logarithmic Scale

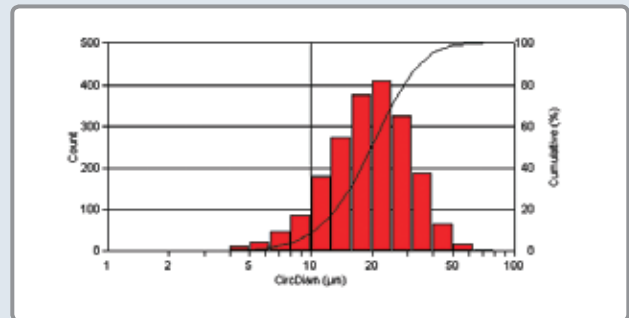
Histograms can now be displayed in logarithmic scale, in addition to the linear scale and user defined scale.

Percentiles Statistics

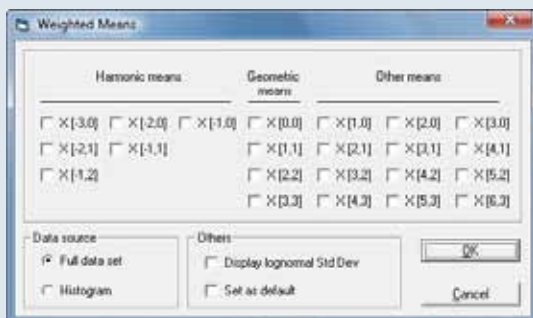
Specifically for particle size, Clemex Vision PE automatically calculates the percentiles for any size distribution. This is particularly useful in particle size analysis.



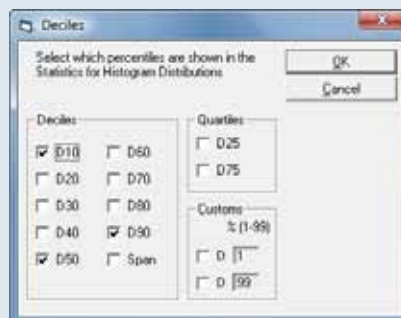
Results in Linear Scale



Results in Logarithmic Scale



Weighted Means Window

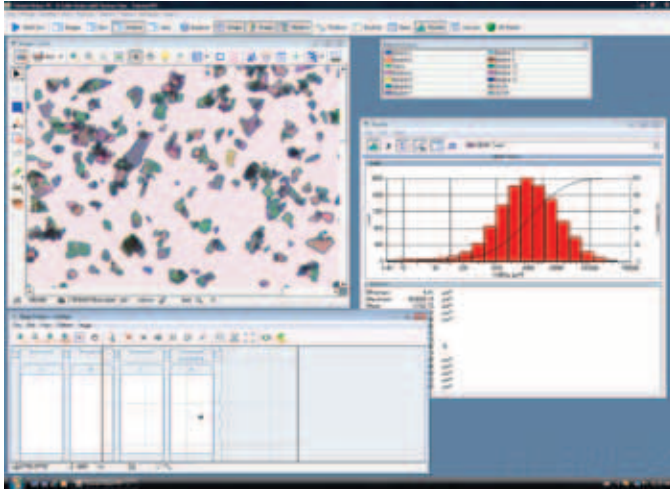


Other Statistic Menu Window

Statistics		
Minimum:	4.41	µm
Maximum:	78.86	µm
Mean:	21.48	µm
Std Dev.:	9.60	µm
Sum:	42907.97	µm
Count:	1998	
Under:	0	
Over:	0	
Accepted:	100	%
Field Count:	16	
Field Area:	289401.73	µm ²
Total Area:	4630427.61	µm ²
D10:	10.62	µm

Statistical Results with D10 Percentiles selected

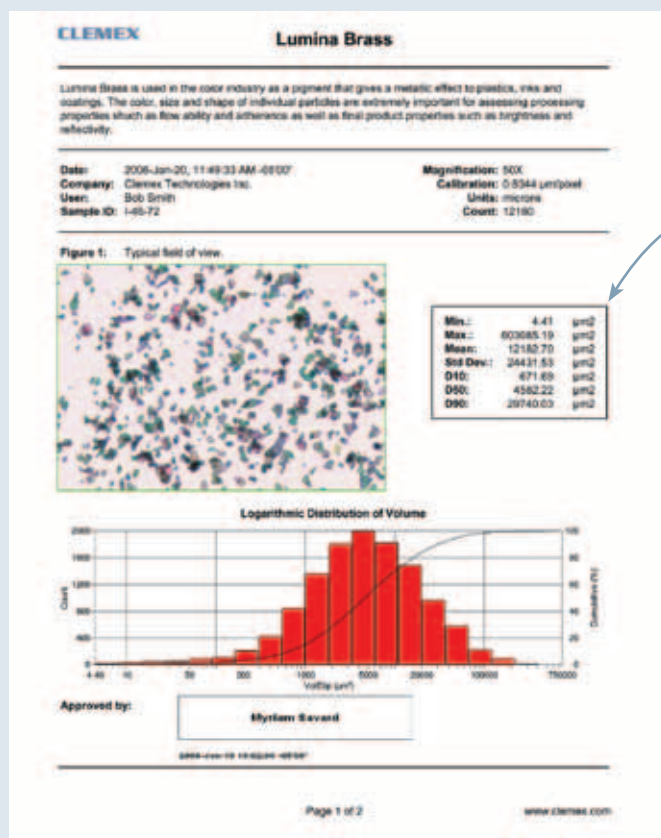
Create Reports



Results as they appear on the screen

Everyone has special needs that distinguish their business. We know this and we cater to those needs by providing the *Clemex Report Generator*, a quick and easy way to customize reports and create report templates.

Reports can be tailored to user specifications to produce either a secure printable report for distribution and review, or to save to a spreadsheet program for further analysis and calculations. Once the templates are defined, reports are generated by inserting a single *Generate Report* instruction into the routine, assuring seamless integration with the run.



Final custom report in PDF format and D10, D50 and D90 results close up in the circle above

Min.:	4.41	μm^2
Max.:	603085.19	μm^2
Mean:	12182.70	μm^2
Std Dev.:	24431.53	μm^2
D10:	671.69	μm^2
D50:	4582.22	μm^2
D90:	29740.03	μm^2

High Throughput

The optional *Clemex Maestroscope* manages multiple samples without operator intervention, providing labs and manufacturing facilities with valuable walk-away time. The system can operate unattended and process up to 280 slides in one run. Advanced slide screening increases throughput, ensuring accuracy of measurements. Bar code scanning of each slide automatically generates filenames used for reporting and data saving.

"The Clemex Maestroscope allows us to process many samples quickly and efficiently. Its nice to know that our analysis can be performed without supervision and we can return knowing our results are accurate"

*Geert Rombaut,
INVE*



Clemex Maestroscope selects sample holder from hotel (glass slides or microplates)



Bar codes are scanned for sample identification



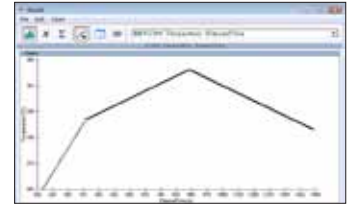
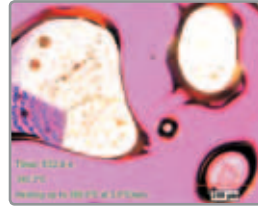
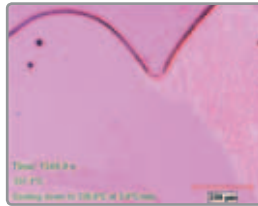
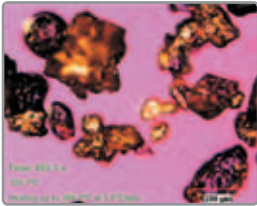
Clemex Maestroscope positions sample holder in stage plate



Clemex Maestroscope places the samples in analysis position

Hot or Cool Stages

Within Clemex Vision PE, a temperature profile can be created and the temperature can be read as a measurement parameter. The user can acquire time sequences of images showing the evolution of temperature related phenomena.

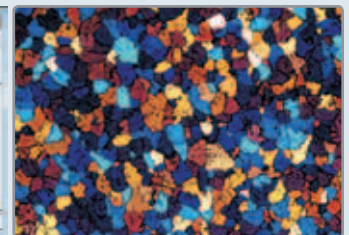
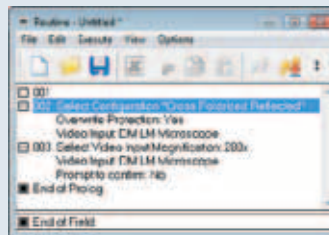
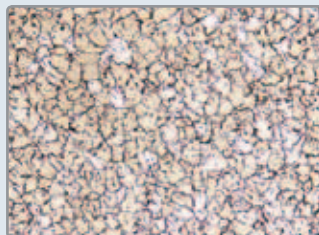
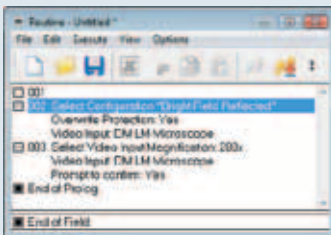


Control of Microscope Parameters Settings

This set of functions allows the user to control the configuration parameters by software. Camera and Light Intensity settings can be modified within a routine as well as microscope parameters such as objective lens change for a motorized nosepiece.

Camera and Microscope Configuration Instruction

By inserting a Select Configuration instruction into the prolog of a routine, the user tells the system to load a specific set of camera and microscope settings to match the corresponding image analysis application. This is particularly useful when performing analyses requiring special illumination techniques, such as polarization, fluorescence or DIC. This instruction allows parameters such as objective magnification, white balance and shutter speed to be preset in order to avoid user manipulation errors.



Routine Window showing the Select Configuration instruction for Bright Field and the Select Magnification Instruction.

Grains as seen with Bright Field Illumination at 200X. (Anodized aluminum)

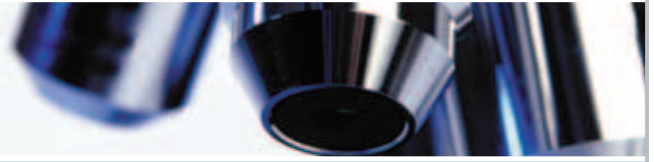
Routine Window showing the Select Configuration instruction for Cross Polarization.

Same grains viewed in Cross-Polarized Illumination after a Microscope Configuration change performed by Routine instruction.

Clemex Vision Lite and Clemex Vision PE Comparison Chart

Clemex Vision comes in two standard configurations. Clemex Vision Lite suits your intermediate image analysis requirements with a flexible yet affordable solution. Application Packages such as Grain Sizing and Phase Analysis can also be added, enhancing Clemex Vision Lite's capabilities. Our Professional Edition, Clemex Vision PE, is an intuitive software that allows you to easily develop custom analysis routines.

Features	Vision Lite	Vision PE
Acquisition		
Auto-Calibration	X	X
Auto-Exposure	X	X
Contrast Thresholding	X	X
Manual Multi-Layer Grab	X	X
Reconstruction of Mosaic Image	X	X
Virtual Joystick	X	X
Automatic Multi-Layer Grab	optional	optional
Auto-Focus	optional	optional
3D Rendering	-	optional
Support Cool or Hot Stages	-	optional
Analysis		
Combine two or more bitplanes	X	X
Separate Objects Manually	X	X
Calculate Main Length for rectangular objects	X	X
Application Packages (Grain and Cell Sizing, Layer Thickness, Phase Analysis, Particle Sizing)	optional	X
Remove incomplete objects (Border Transfer)	optional	X
Thickness Grid per Object (for curved layers)	optional	X
Calculate String Length for long thin objects	-	X
Separate connected objects (Bridge Removal)	-	X
Acicular Separation (overlapping needles)	-	X
Conditional instructions based on generated statistics	-	X
Run Excel Macros directly from Clemex Vision PE	-	X
Focus on an area within a mask	-	X
Estimate Volume based on 2D image	-	X
Results		
Report from the Routine	X	X
Clemex Report Generator	optional	optional
Clemex R'Kive Explorer	optional	optional



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