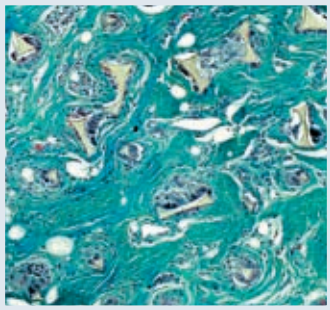
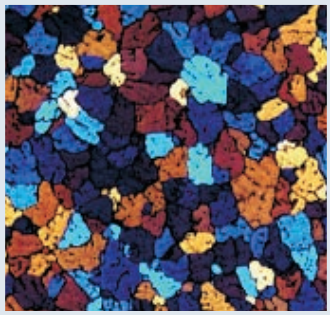
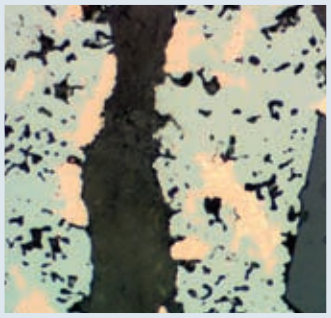
CLEMEX intelligent microscopy

Vision PE 5.0

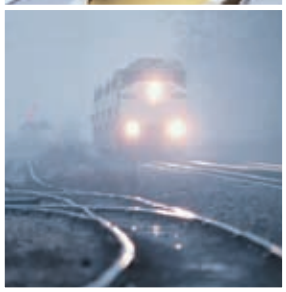
Advanced Image Analysis







Experience in **Image Analysis**



Research and Quality Control Solutions

With Vision PE, Clemex provides a powerful image analysis solution for automated microscopy. From measuring grain size to counting particles, Clemex Vision PE'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 PE is the high level solution that is suitable for research and specialized analysis!

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.

Intermediate VS **Advanced** Solution

Features	Vision Lite	Vision PE
Acquisition		
Manual and Automatic* Multi-Layer Grab	x	x
Reconstruction of Mosaic Image	x	x
Software Controlled Stage Focus	x	x
3D Rendering*		x
Support Hot Stages *		x
Analysis		
Application Packages*	x	x
Grain and Cell Sizing*	x	x
Layer Thickness*	x	x
Phase Analysis*	x	x
Particle Sizing*	x	x
Instantaneous Object Tracking	x	x
Flexibility in Results Management	x	x
Save and Retrieve Results	x	x
Histograms with Logarithmic Scale	x	x
Statistics (Percentiles)	x	x
Support of USB 2.0 High Resolution Cameras	x	x
Control of Input Parameters Settings	x	x
Camera	x	x
Light Intensity	x	x
Image Amendement Functions	limited	extented
Automated Microscope Control*		x
Image Analysis with Robotic Control*		x
Results		
Clemex Report Generator*	x	x
Clemex R'Kive Explorer*	x	x

* Are Optional

Modular Solution

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.

Rapid Image Analysis

Step by Step

1 Capture Images

Large 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.

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.

3 Manage Results

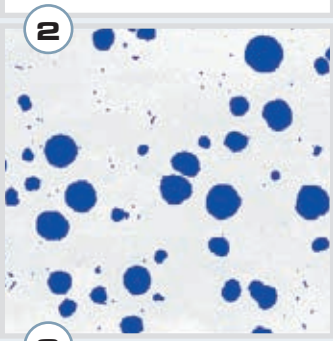
Validate your results easily within the Data Browser where each measurement is directly linked to its corresponding feature on the image. You can then save them in Excel or binary format.

4 Create Report

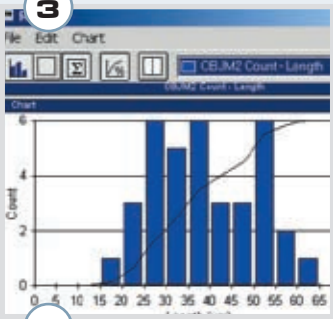
Customize reports to your specifications quickly and easily. Produce secure printable reports or saved spreadsheet programs.

1

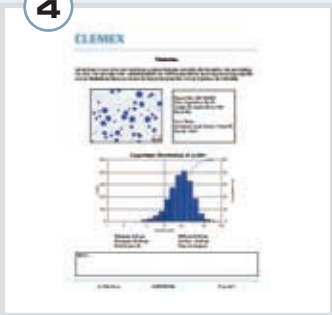
2



3



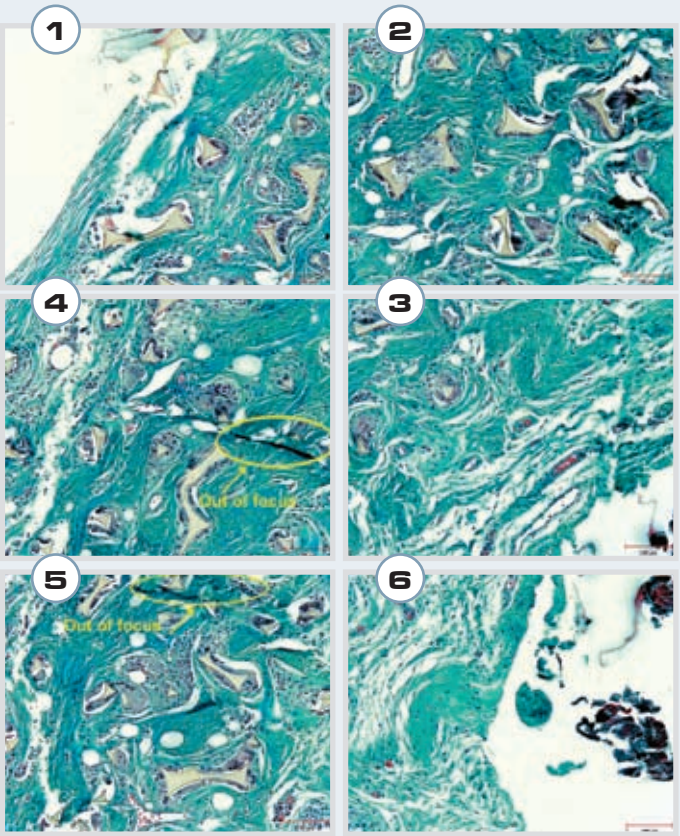
4

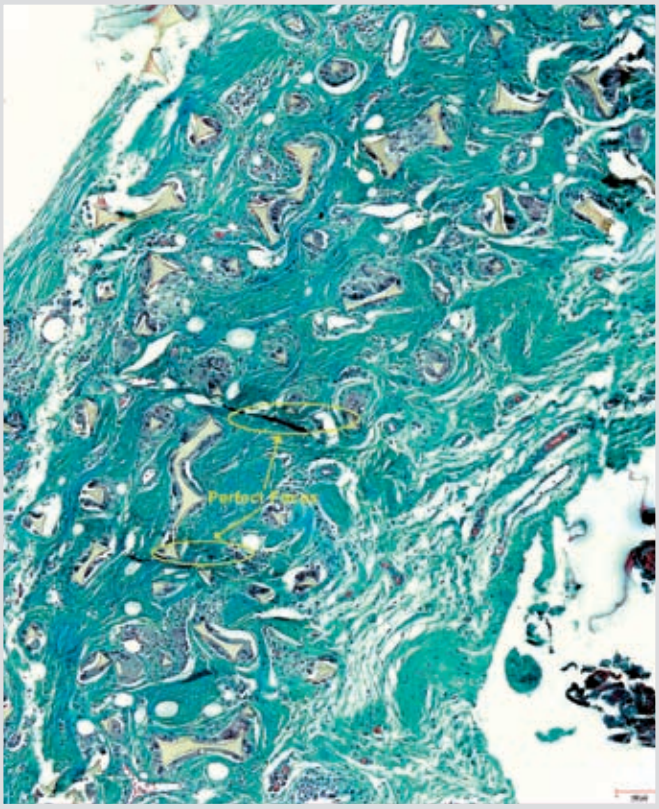


Mosaic

Forget tape and scissors! With the *optional* mosaic feature, Clemex Vision 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 mosaic feature (requires optional autofocus 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…



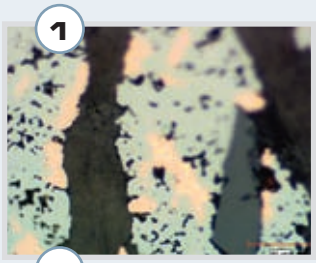


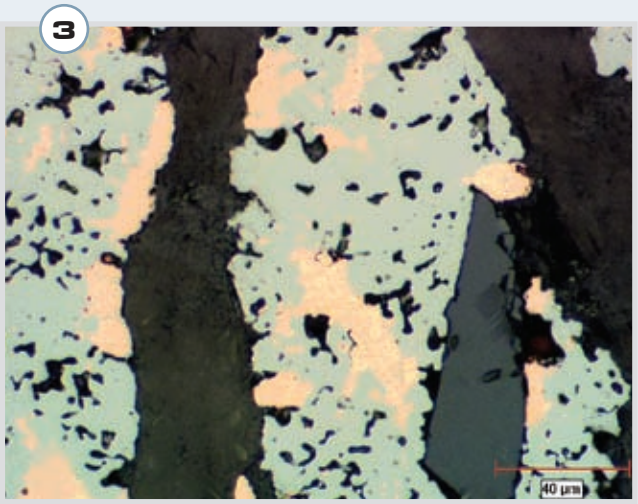
Images 1 to 6 captured with a Clemex 1280 Color Firewire Camera at a magnification of 100x

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

Multi-layer Grab

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.

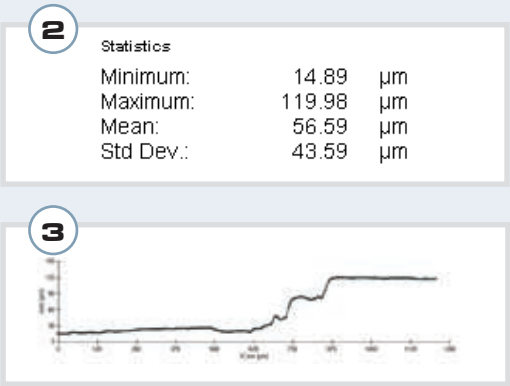




1. Layer 1 (200x)
2. Layer 5 (200x)
3. Reconstructed final image (15 layers @ 200x)

3D Rendering

Using the focus motor, the stage controller and the new Advanced Multi-Layer Grab, this new function 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.



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

Multiple Field Automation

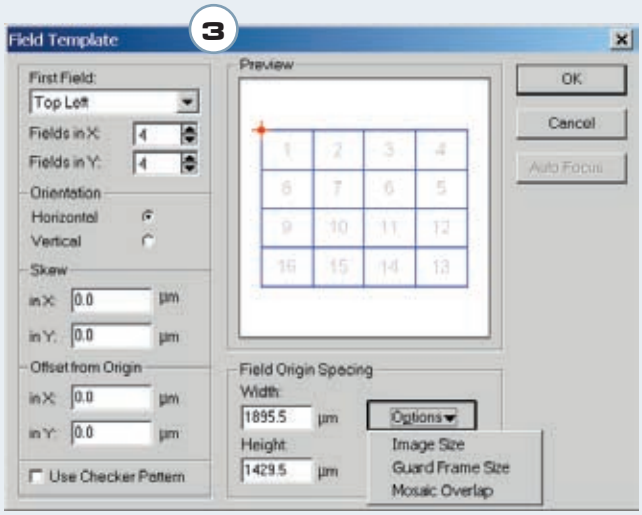
Stage and Auto-Focus Kit

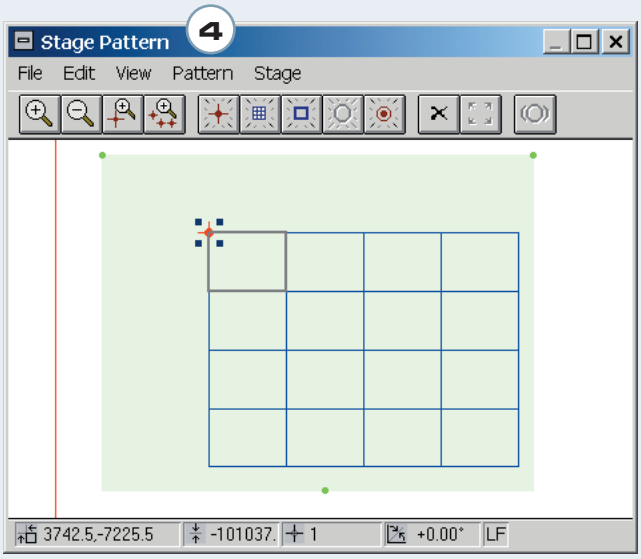
For high throughput environments, the optional motorized stage and auto-focus kit is highly recommended. Adaptable to all major microscope brands, you can significantly increase your productivity while taking advantage of some key Clemex Vision software features such as image stitching, 3D image reconstruction,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

Software Controlled Stage and Focus

Simplify the analysis of multiple fields with Clemex Vision's stage and focus automation tools. Highly flexible, you can determine sample origin, set the number of fields to analyze, establish specific autofocus 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

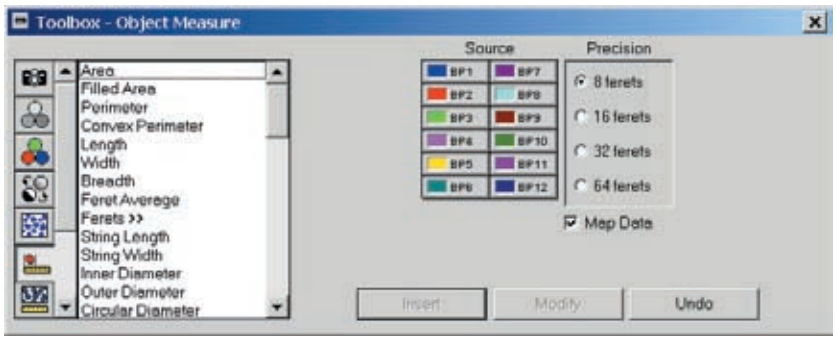




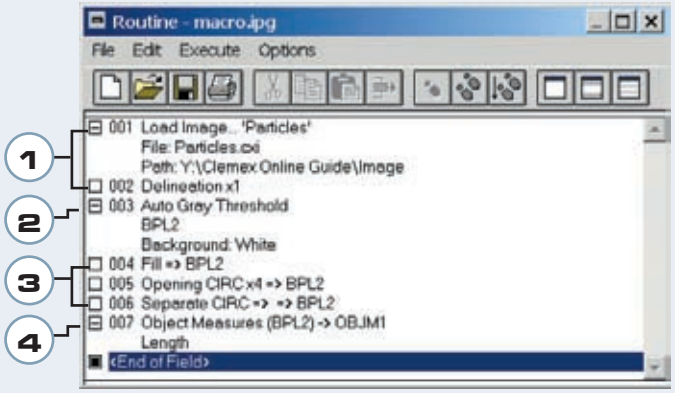
1. Clemex Joystick and Controller
2. Motorized Stage
3. Define number of fields needed
4. See stage moves with this window

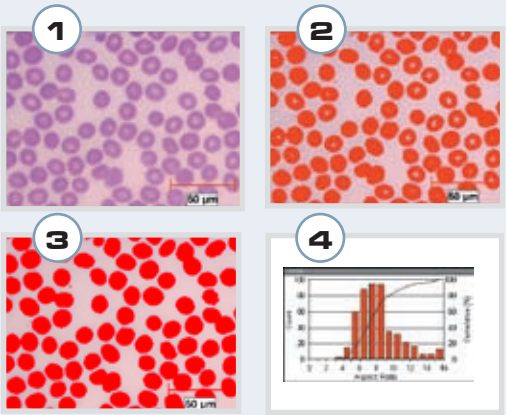
Rapid Routine Development

With Clemex Vision'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





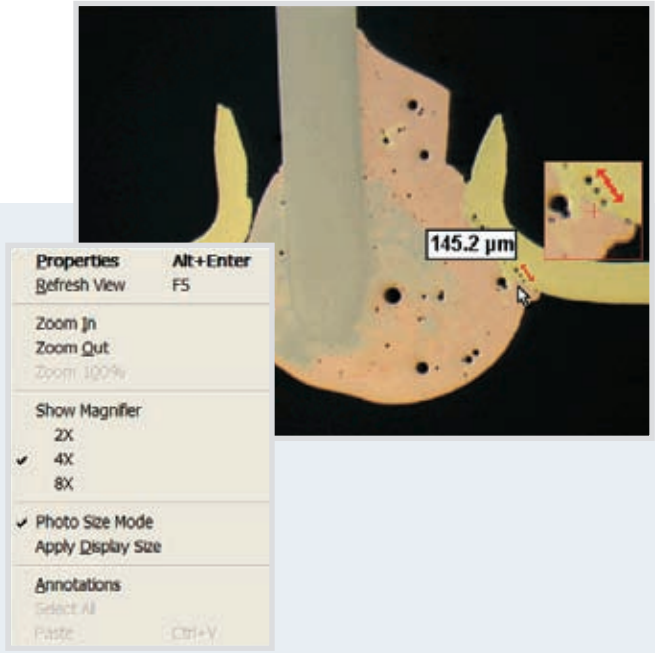
1. **Image Input**
   Loads image and applies a Delineate filter in order to enhance object edges.
2. **Threshold**
   Performs an Autothreshold according to grey levels to separate phases and assigns a Bitplane color.
3. **Binary Transformations**
   Fills holes, removes small features and bumps from larger objects and separates objects.
4. **Measures**
   Measures length of cast iron nodules.

Manage Results

step 3

Magnifying Glass Tool

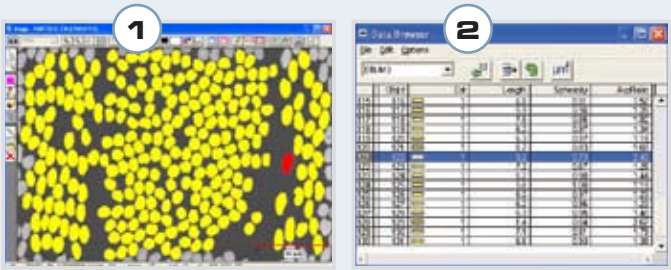
The Magnifying Glass Tool highlights the area at the tip of the mouse to show accurate detail. It is integrated in the image window as a child window, constrained to move with the mouse.



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

Validate Results with Ease

Use the Data Browser tool to validate measurements and eliminate oversize particles or artifacts from invalidating 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.



1. Clicking on any particle highlights the corresponding measurements in the Data Browser in Figure **2.**

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 for further analysis of saved data.

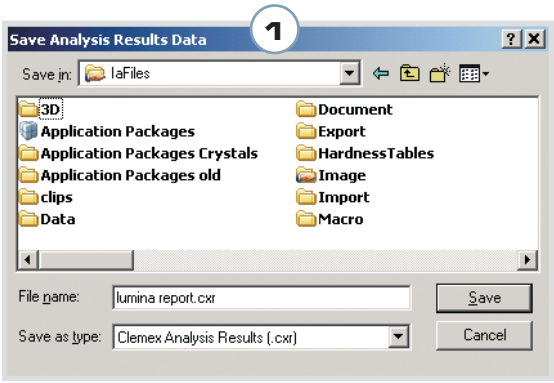
Histograms with Logarithmic Scale

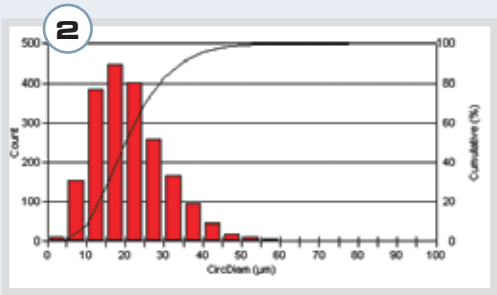
Histograms can now be displayed in logarithmic scale, in addition to the linear scale and user defined scale.

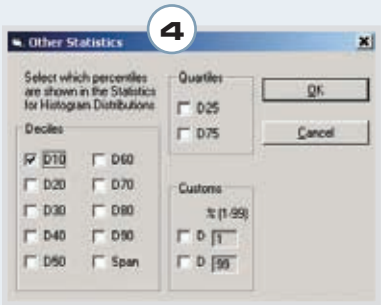
Percentiles Statistics

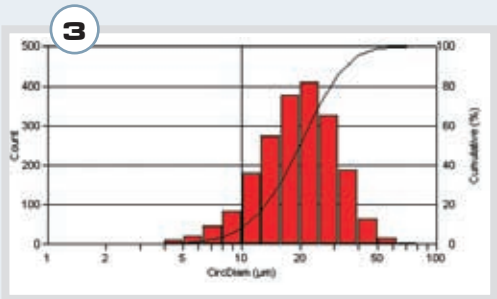
Specifically for particle size, Clemex Vision automatically calculates the percentiles for any size distribution. This is particularly usefull in particle size analysis.

1. Results are saved in .CXR format
2. Results in Linear Scale
3. Results in Logarithmic Scale
4. Other Statistic Menu Window
5. Statistical Results with D10 Percentiles selected









5

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	µm²
Total Area:	4630427.61	µm²
D10:	10.62	µm

Customize reports to meet your unique needs.

step 4

Create Reports

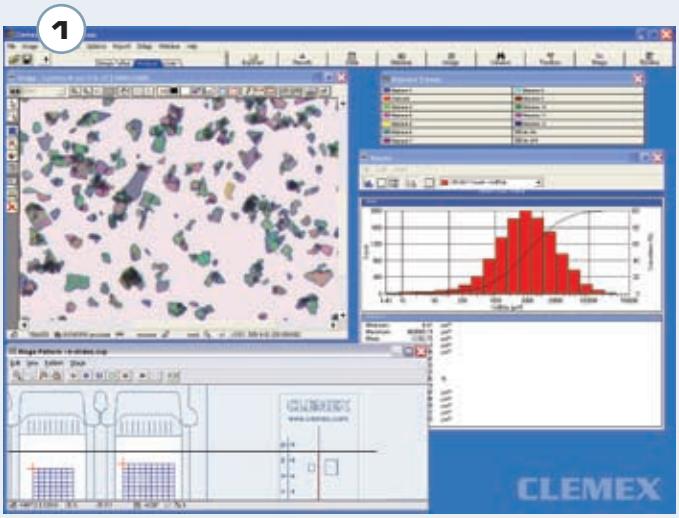
Everyone has special needs that distinguish their business. We know this and we cater to those needs by providing the *Clemex Report Generator*, a quick and easy way to customize reports and create report templates.

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 calculation. Once the templates are defined, reports are generated by inserting a single *Generate Report* instruction into the routine, assuring seamless integration with the run.

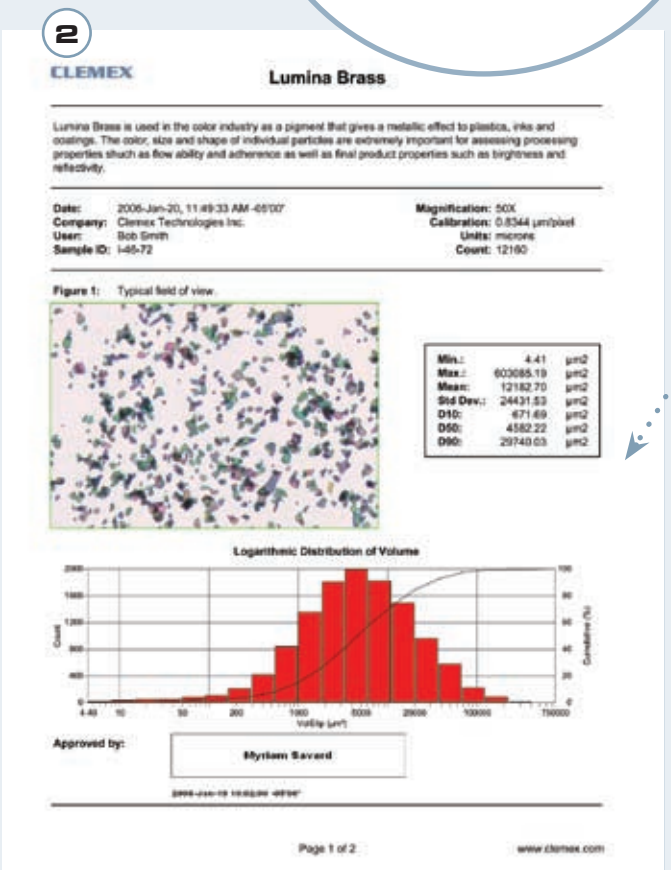
3

Min.:	4.41	µm2
Max.:	603085.19	µm2
Mean:	12182.70	µm2
Std Dev.:	24431.53	µm2
D10:	671.69	µm2
D50:	4582.22	µm2
D90:	29740.03	µm2

1



2



1. Results as they appear on the screen
2. Final custom report in PDF format
3. D10, D50 and D90 results

Clemex Vision Options

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 identification of samples on the slides allows the Data Browser to link directly to specific particles.

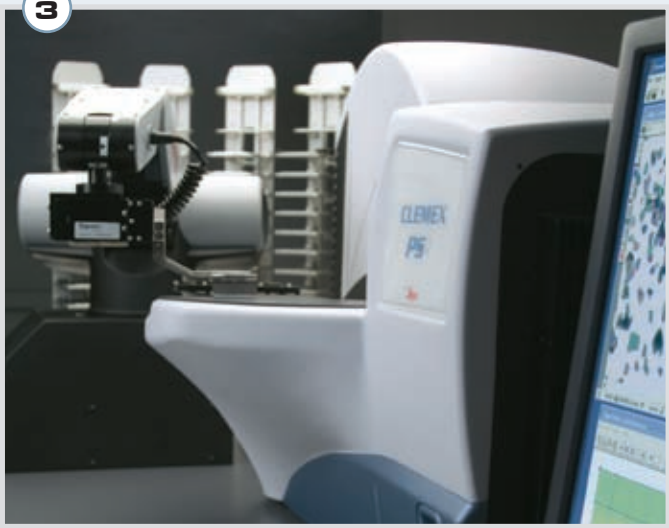
"The Clemex Maestroscope allows us to process many samples quickly and efficiently. Its nice to know that our analysis can be performed without supervision and we can return knowing our results are accurate"

Geert Rombaut, INVE

1

2

3

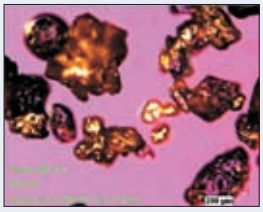


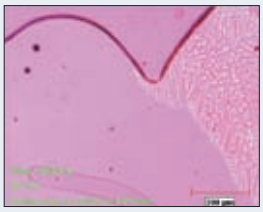
4

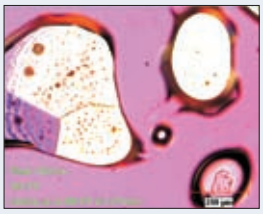
1. Robot selects sample holder from hotel (glass slides or microplates)
2. Bar codes are scanned for sample identification
3. Robot positions sample holder in stage plate
4. Robot places the samples in analysis position

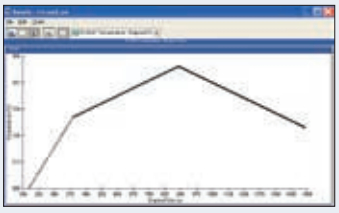
Hot or Cool Stages

Within Clemex Vision, 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.









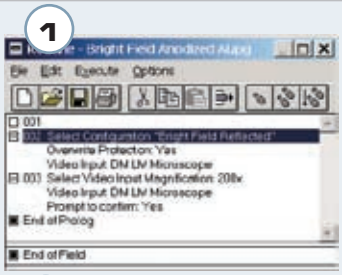
Control of Microscope Parameters Settings

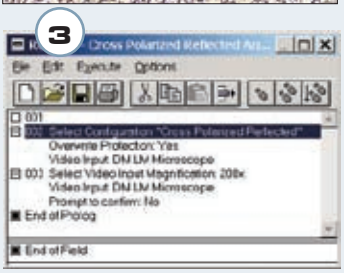
This new set of functions allows the user to control the configuration parameters by software. Camera and Light Intensity settings can be modified within a routine as well as microscope parameters such as objective lens change for a motorized nosepiece.

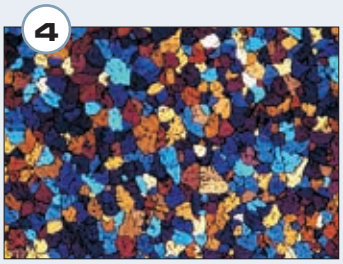
Camera and Microscope Configuration Instruction

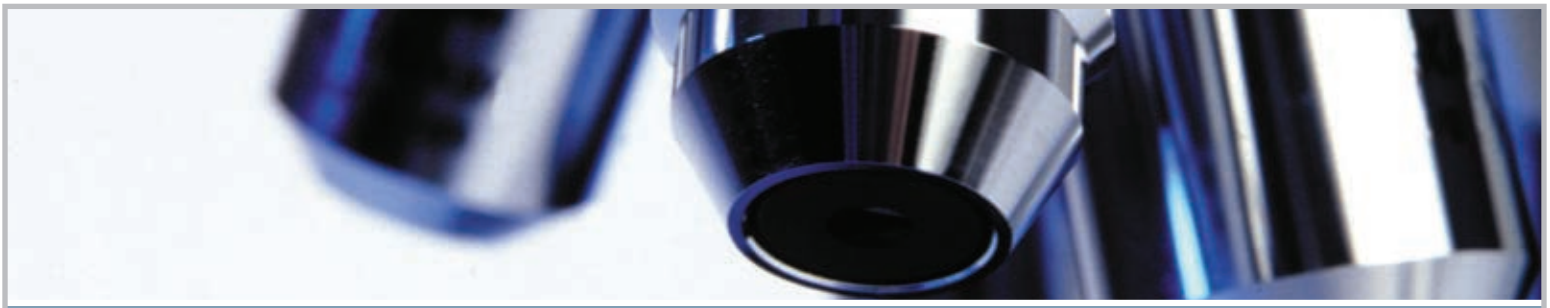
By inserting a Select Configuration instruction into the prolog of a routine, the user tells the system to load a specific set of camera and microscope settings to match the corresponding image analysis application. This is particularly useful when performing analyses requiring special illumination techniques, 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.

1. Routine Window showing the Select Configuration instruction for Bright Field and the Select Magnification Instruction
2. Live image of Aluminium Grains as seen in the Image Viewer with Bright Field Illumination and 200X
3. Routine Window showing the Select Configuration instruction for Cross Polarization.
4. Automatic Camera adjustments based on Configuration Instruction in Step 3.









CLEMEX
A Commitment to **Excellence in Imaging**

Choosing an imaging system can be a time consuming and often difficult process. Here are some key benefits you can count on when making Clemex your preferred system provider:

	Highly Qualified Team works closely with users for customized approach.
Reputation:	As a result of the company's highly focused efforts in building the best digital imaging systems, Clemex acquired a leadership position as provider of innovative solutions in image analysis.
Experience:	Management along with a highly specialized staff have decades of combined experience in the digital imaging industry.
Ease-of-use:	The intuitive nature of our systems allows users to get up and running surprisingly quickly.
Support:	Our dedicated staff of engineers and technicians are ready to provide you with fast, reliable assistance.
Commitment:	With the majority of employees retaining shares in the company, Clemex is highly committed to its continued development. Our track record of sustainable growth demonstrates that Clemex is a stable company, ready to serve your needs for years to come.
Leadership:	Since the company's inception, Clemex has succeeded in maintaining a competitive lead based on its superior technology. To remain the leader, Clemex continues to reinvest large portions of its revenues in R&D each year.

CLEMEX

www.clemex.com

Printed in Canada

03/07