OLYMPUS

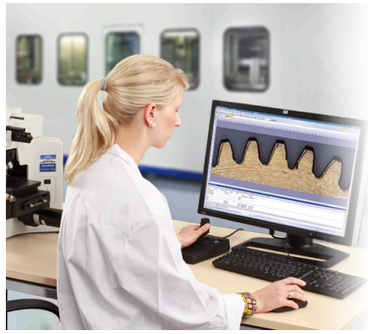
Image Analysis Software

OLYMPUS Stream™

Version 2.5

Tailored Solutions for Manufacturing and Industrial Research

Simplify Your Inspection Workflow



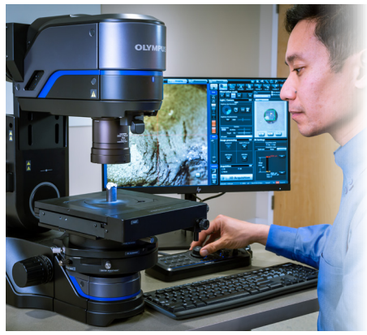


Image Capture > **Measurement** > **Sharing**

Fast, Efficient Inspection Workflows

OLYMPUS Stream™ software offers intelligent step-by-step workflows to acquire sharp, crisp images that are ready for quantitative measurements and professional reporting based on the latest standards. Users of any experience level can conduct complex image analysis tasks, from image acquisition to standard reporting, under any imaging condition.

Designed for flexibility, OLYMPUS Stream software has functions to conduct fast and precise observation sessions on a large variety of samples while maintaining data security and measurement reliability. Optional solutions enable users to adapt OLYMPUS Stream software to their application, including quality analysis, research and development, process development, and quality control.

Intuitive Solutions for Manufacturing Quality Control and Materials Research

Step-By-Step Guidance

An easy-to-use interface guides you through every step of the inspection process from image acquisition, to measurement and analysis, to reporting and archiving. As a result, you can finish even complex tasks more efficiently.

Designed for Olympus Hardware

The software works seamlessly with various Olympus microscopes and digital microscope cameras.

Optimized for the Industrial Lab

With new and updated specific application modules, OLYMPUS Stream™ software provides a unique workflow to produce consistent measurements and results that comply with international standards.

Step-By-Step Guidance

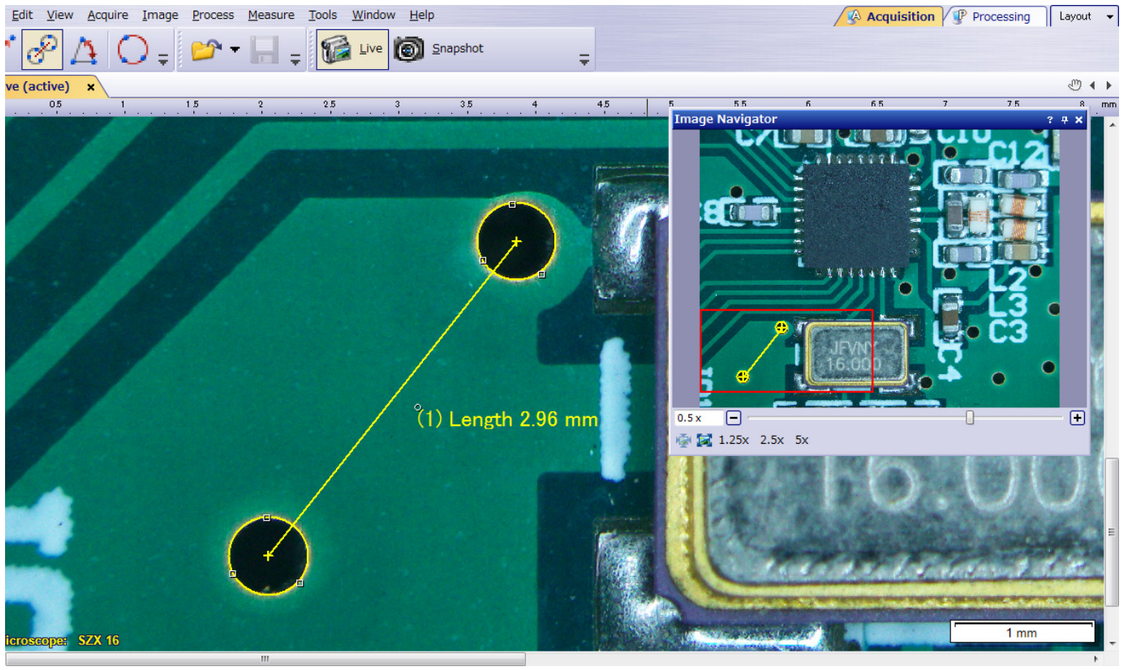
Smart Technologies

OLYMPUS Stream™ software's dynamic user interface reduces desktop clutter by only displaying the tools and functions you want to use. The interface guides you through every step of the process, including image capture, image processing, and report creation. Both simple and complex measurements can be easily conducted using the software's intuitive set of tools.

- I need to know the status of hardware components.
- I have to quickly inspect a live image.
- I need to capture an image with HDR.
- I need to acquire panoramic images.
- I need software that's easy to use.
- I want my entire panoramic image to be in focus.

Simple Layouts

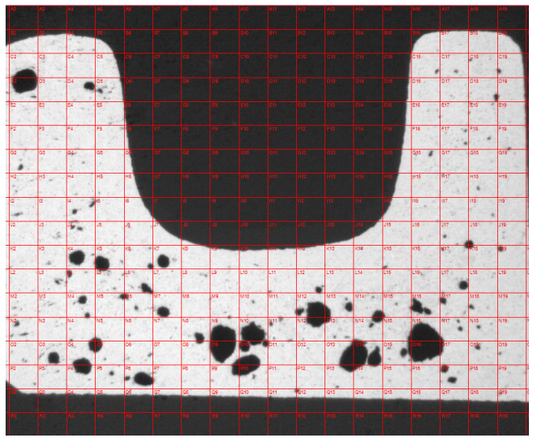
The software's organized layouts contain the minimum necessary functions for performing the required tasks. Simplified layouts help streamline the inspection workflow and efficiently guide users through the inspection process.



Fast measurements on a live image with just a few clicks of your mouse

Tools for Live Images

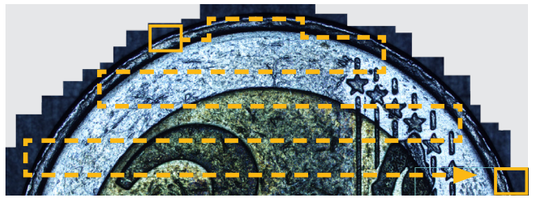
OLYMPUS Stream™ software supports live image functions for instant feedback and response to complex problems. Real-time image processing increases productivity and reduces analysis time. The software enables users to interact with the live image, which is automatically calibrated, and perform quantitative measurements.



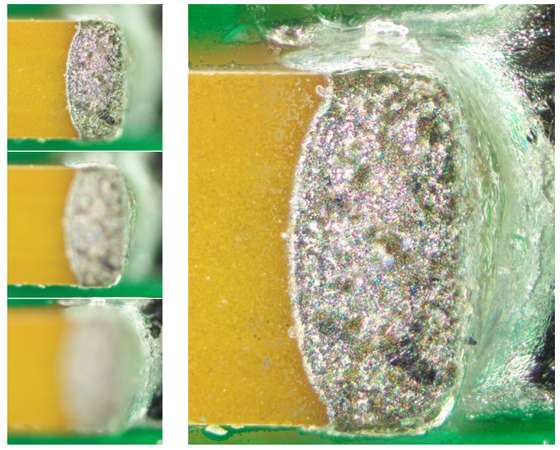
Estimating pore size using live digital reticles (cross section of die casting)

Quick Panoramic Images and Extended Depth of Focus

Quickly create high resolution panoramic images of samples that extend beyond the standard depth of focus. The instant Extended Focus Image (EFI) function uses the fine focus adjustment to combine many images taken at different Z-levels to build a single combined image that is entirely in focus. Instant Multiple Image Alignment (MIA) enables users to create panoramic images simply by moving the XY stage; a motorized stage is no longer necessary.



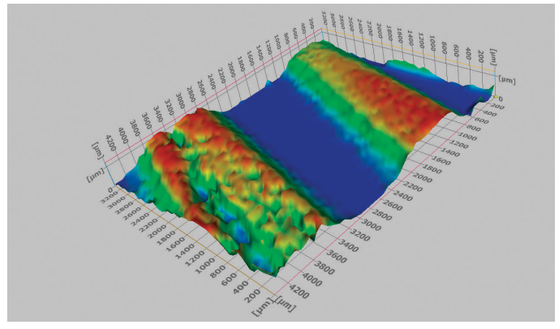
Instant MIA image of a coin



Instant EFI image of a capacitor on a printed circuit board

3D Solution

This solution creates height maps from stacks of images acquired automatically or manually at different Z-positions. The resulting image can be visualized in three dimensions using the surface view. Measurements, such as 3D profiles and height differences between two or several points, can be performed, and the results exported into Microsoft Excel spreadsheets.



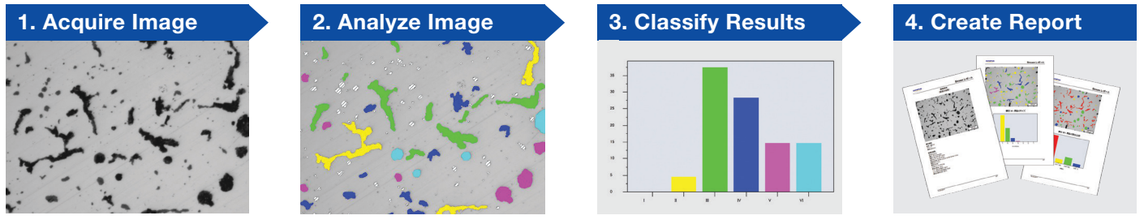
3D profilometry of wear track

Save Time

- I need to know the ideal exposure time.
- I can't remember the order of functions.
- I'd like to take images of large areas repeatedly and efficiently.
- I want to create and edit a report quickly.
- I need to update my report with a new image and measurement.
- I need quantitative information from my sample.

Guided Operation for Dedicated Purpose Analysis

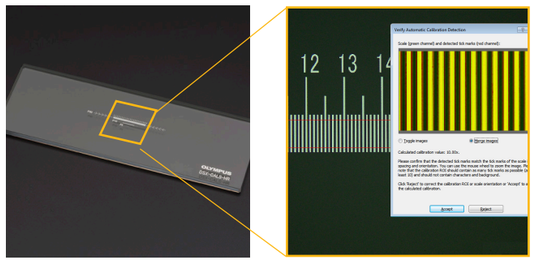
It can be difficult to remember the correct order of functions when performing image analysis. OLYMPUS Stream™ software offers intuitive tools to perform complex image analysis tasks in compliance with most common international standards. This reduces the amount of operator training required to conduct the analysis, leaving more time to complete the task rather than remembering how to do it. When using a motorized stage, the alignment feature speeds up your work on multiple sample locations.



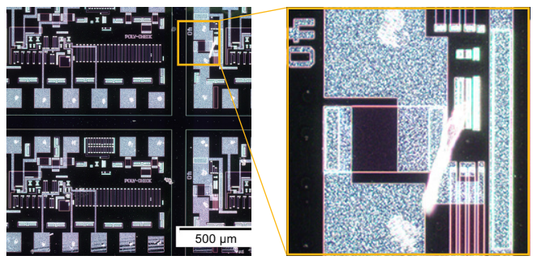
Cast iron analysis

Automated Inspection Tools

The software's automated tools can create a very large set of data in just a few minutes. Automatic magnification calibration using a calibrated grating reticle helps ensure that your images are displayed with the proper scale bar and that your measurements are confirmed. Images of very large areas can be acquired automatically using motorized XYZ stages, enabling the creation of images of large parts with high resolution.



Auto calibration helps eliminate human variability in the calibration process, leading to more reliable measurements



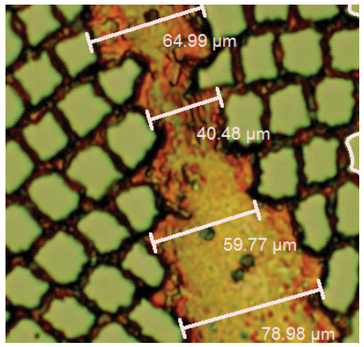
Sharp and high-contrast MIA image of an integrated circuit (IC) pattern (darkfield observation with a 20X objective lens)

Recall Acquisition Setting

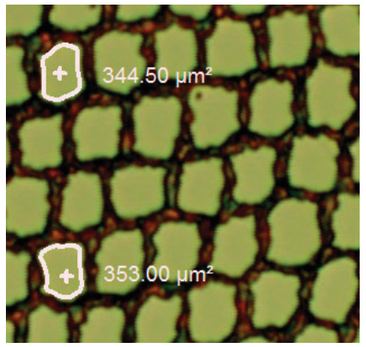
The recall acquisition setting enables users to quickly recall previously used camera settings to capture repeatable images with a consistent look and feel. When using a motorized microscope, this function can automatically recall previous hardware settings. The software also guides the user to manually recall settings when using BX, GX, and MX series microscopes and stereo microscopes.

Quantitative Information That Matters

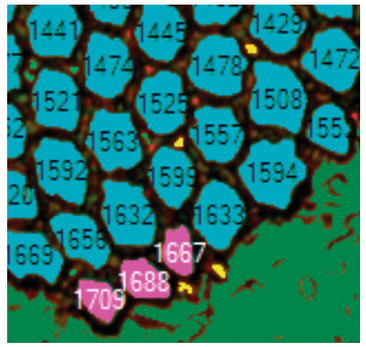
OLYMPUS Stream™ software features a large set of tools that provide quantitative information about your sample. Interactive measurements on live and still images provide basic dimensional information (length, area, and diameter), and the results are directly visible on the image. Advanced interactive measurements include the magic wand and complex polygonal shapes for semiautomatic area measurement, while the Count and Measure solution provides access to more than a hundred single particle parameters for pure quantitative analysis based on the threshold method.



Basic measurement (superconductor)



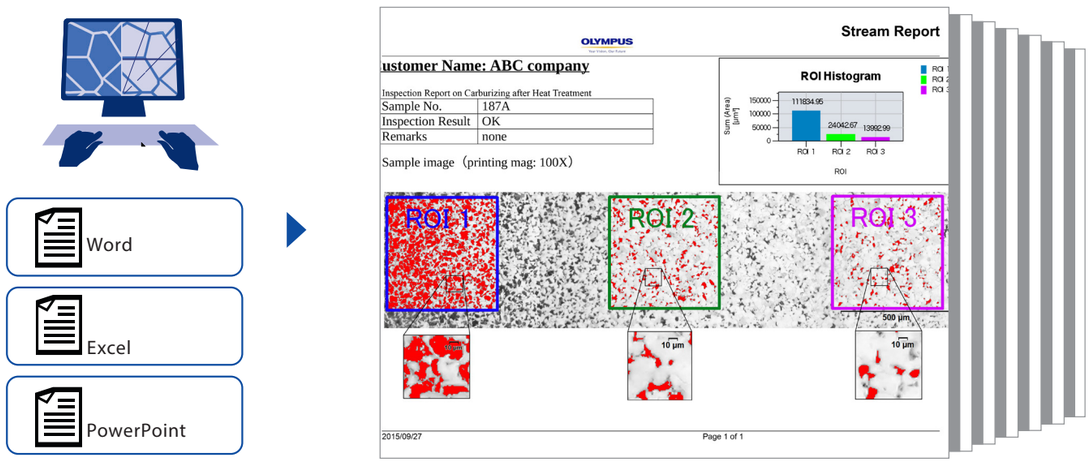
Magic wand (superconductor)



Object detection (superconductor)

Efficient Report Creation

Creating a report often takes longer than capturing the image and taking the measurements. OLYMPUS Stream software provides intuitive report creation to repeatedly produce smart and sophisticated reports based on predefined and customized templates. Editing is simple, and reports can be exported to Microsoft Word, Excel, or PowerPoint. In addition, the software's reporting tool enables digital zooming and magnification on acquired images. Report files are a reasonable size for easier data exchange by email.



Professional report that summarizes particle count data, including image details using digital zooming

Designed for Olympus Hardware

Real Integration Adapted to Your Daily Needs

Developed for Olympus microscopes, OLYMPUS Stream™ software is a powerful and user-friendly measurement tool. There is no need to manually record the optical parameters of Olympus UIS2 objectives when using it with a conventional microscope. Magnification calibration is also not required when importing images from our DSX and LEXT™ microscopes. The software is available from entry-level to advanced packages.

Configurable

Control Olympus Microscopes

- Upright, inverted, and stereo frames
- Nosepieces and illuminators, both motorized and coded
- Assign functions to the handset

Reliable Data

Automatic Recognition

- Microscope unit names
- Observation conditions
- Correct magnification

High Image Quality

Olympus Cameras

- Well-balanced color tuning
- Image processing, including HDR
- Online shading correction

Seamless Sharing

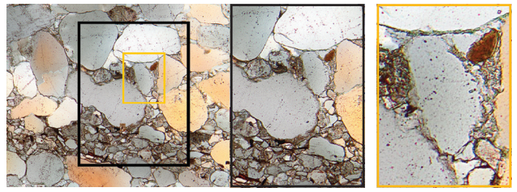
Seamless Data Import for Post-Processing

- DSX digital microscopes
- LEXT laser microscopes
- Other lab-based imaging systems

Olympus Digital Cameras

Resolution and Color Fidelity

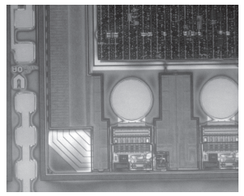
True-to-life samples are important for reproducible and high-quality measurements. Excellent spatial resolution combined with a high pixel count exploit the full optical resolution of the objectives and enable small structures and details within the samples to be imaged, even with low magnification objectives. High-resolution images enable users to make observations exclusively on screen without using the eyepieces.



The low-noise, high-resolution images of a 9-megapixel sensor enable the user to zoom deep into the sample, revealing its structures (sandstone)

Reveal More with Infrared (IR)

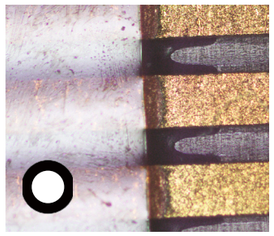
IR imaging mode is a fundamental tool for quality control and in R&D laboratories. IR mode enables nondestructive inspection through silicon layers of packaged products during the back end stage of fabrication.



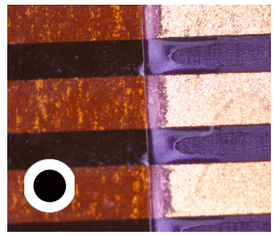
IR image of the backside from a silicon wafer, taken with the XM10-IR monochrome camera

Dedicated Observation Methods

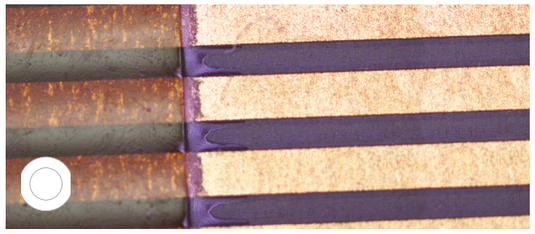
OLYMPUS Stream™ software supports various illumination methods, including MIX observation. This illumination technique combines directional darkfield, which uses a circular LED to illuminate one or more quadrants at a given time, and brightfield, fluorescence, or polarization, enabling users to highlight defects and differentiate raised surfaces from depressions that are normally difficult to see with conventional microscopes. MIX observation helps reduce a sample's halation and is useful for visualizing a sample's surface texture.



Brightfield



Darkfield



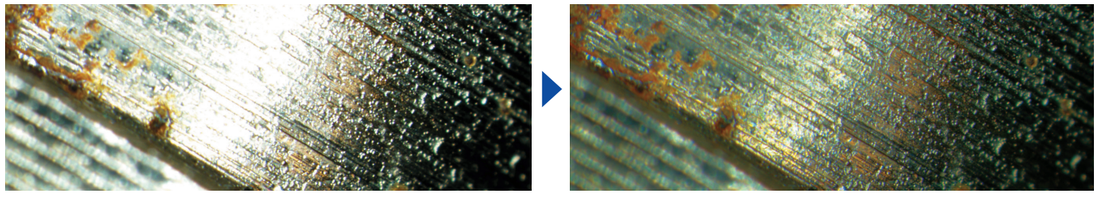
MIX: Brightfield + Darkfield

Conventional: brightfield shines the light straight down on the sample while traditional darkfield highlights scratches and imperfections on a flat surface by illuminating the sample from the side of the objective

Advanced: MIX is a combination of brightfield and directional darkfield from a ring of LEDs; the LEDs can be adjusted to select which direction to illuminate from

Enhanced Contrast

High dynamic range (HDR) imaging improves image contrast in difficult conditions (very bright areas together with very dark areas in the same image). All cameras supported by OLYMPUS Stream software can be used in this mode, and dedicated cameras have an available live mode.



Clearly exposed for both dark and bright parts using HDR (sample: fuel injector bulb)

Optimized for the Industrial Lab

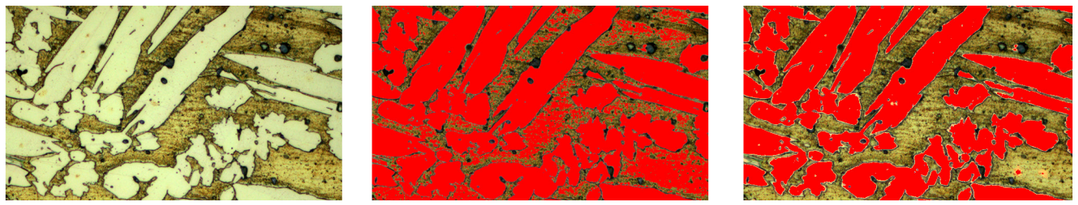
Solving Your Inspection Challenges

Industrial labs often have demanding conditions and require repeatable and reproducible results as part of their standard operating procedures. OLYMPUS Stream™ software facilitates inspection, measurement, and analysis with a simple and reliable workflow. The software offers a variety of tools for various materials science analyses, so you can be confident in your results.

TruAI™ Deep-Learning Technology

Image segmentation using conventional threshold methods that depend on brightness or color can miss critical information or targets in samples. The OLYMPUS Stream TruAI solution offers a more accurate segmentation approach using deep-learning technology for a highly reproducible and robust analysis. With the intuitive user interface, operators can efficiently label images and easily train robust models with excellent generalization properties. A pre-trained network can be applied to future analyses for a similar application. In the materials science field, TruAI technology is a useful tool for metallic analysis, semiconductor quality control, and mineralogy.

Data obtained: Accurate and automated image segmentation

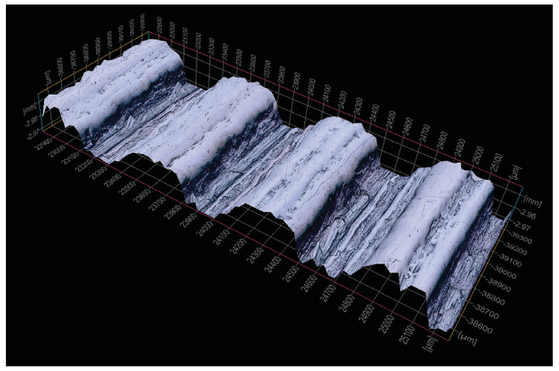


Multiphase analysis of composite materials is a typical industrial image analysis application using deep-learning technology. After image deep-learning segmentation with OLYMPUS Stream 2.5, different phases can be distinguished and detected accurately. Combined with OLYMPUS Stream Count & Measure solution, users can easily extract repetitive and quantitative results out of the samples. left: Original image of a etched copper. middle: image segmentation using conventional thresholding methods. right: deep-learning image segmentation

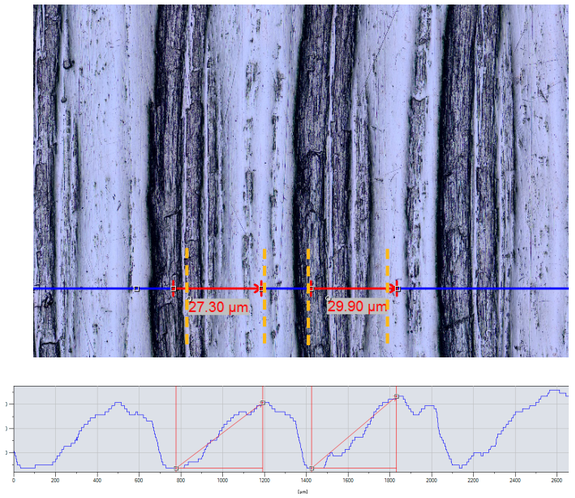
Three-Dimensional Measurement and Line Profiles

New materials, new techniques, and the drive toward nanotechnology demand higher standards of measurement and quality control. Without the appropriate tools for 3D imaging, it is impossible to quantitatively analyze images from a sample. The OLYMPUS Stream 3D solution provides coded and motorized Z-control and instant EFI with height mapping capabilities to measure a three-dimensional sample.

Data obtained: 3D surface view, 3D measurement, 3D profile measurement



3D surface view (roughness test sample)

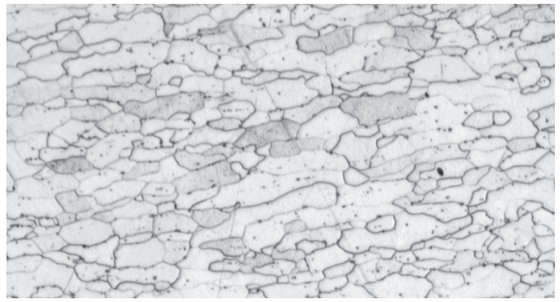


Single view and 3D profile measurement

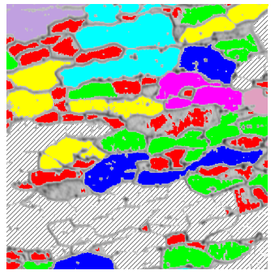
Count and Measure Solution

Detecting objects and measuring size distribution are among the most important applications in digital imaging. The OLYMPUS Stream™ Count and Measure solution uses advanced threshold methods to reliably separate objects, such as particles and scratches, from the background. More than 50 different object measurement and classification parameters are available, including shape, size, position, and pixel properties. Two classification parameters can be selected simultaneously. OLYMPUS Stream software with the Count and Measure solution can also be used to support the DSX1000 digital microscope for particle analysis common to metallography evaluation and similar applications.

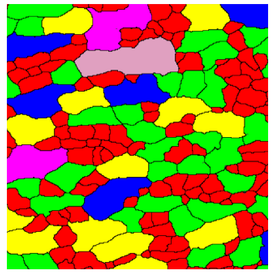
Data obtained: number of detected particles, individual measurement results, and class histograms



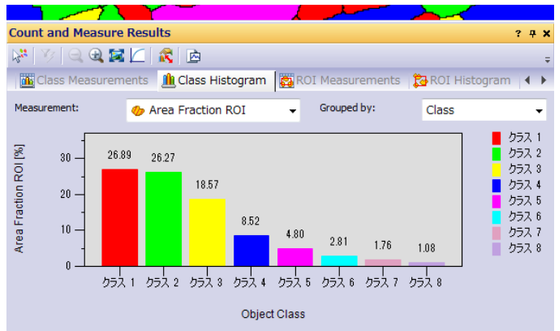
Etched steel microstructure (original image)



Grain boundary detection with conventional software



Grain boundary detection using the powerful Separate Objects filter



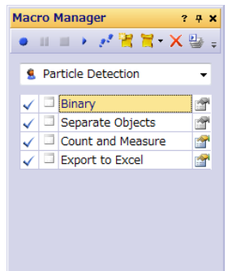
Recommended Functions

Efficient Analysis

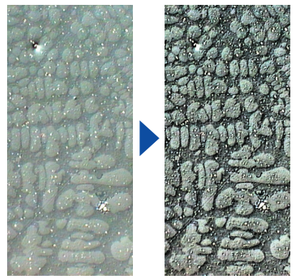
Users can preset complex imaging and measurement tasks with the Macro Manager. The set of tasks can then be performed with a single click. This capability helps ensure consistent output when different operators are using the Count and Measure solution.

Powerful Image Filters

OLYMPUS Stream software has a variety of useful filters for edge detection, smoothing, and other purposes. For example, the Separate Objects filter, DCE (Differential Contrast Enhancement) filter, and Grayscale filter help make threshold settings and particle detection easier.

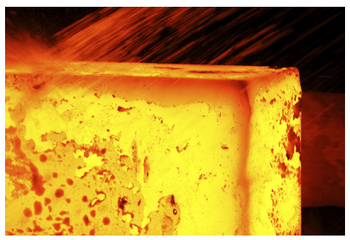


Example of Macro Manager setup for Count and Measure



Enhanced contrast using the DCE filter (Dendrite in an aluminum casting)

Optimized for Industrial Laboratory Work



Solutions for Metallography

Traditionally, metallography is the study of metal and alloy microstructures using optical, digital, and laser scanning microscopes. By analyzing a material's microstructure using this OLYMPUS Stream™ software solution, its performance and reliability can be better understood. Today, metallography is used in materials development, incoming inspection, production and manufacturing control, and failure analysis.

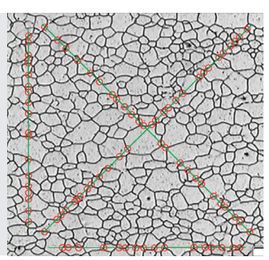
Grain Sizing in Microstructures Using the Intercept Counting Method

This solution is for manual ferritic or austenitic grain size measurement of steel. It gives a single averaged value using the different available standards (ASTM E112-13, ISO 643:2012, JIS G 0551:2013, JIS G 0552:1998, GOST 5639-82, GB/T 6394-2002, DIN 50601:1985, ASTM E1382-97(2015)).

Key Features
- Count the number of grain intercepts with patterns
- Direct visualization of the pattern and grain boundaries
- Select from multiple standards

Typical Applications
- Metallic materials and other types of materials with a geometric structure
- Non-twinned materials (ferrite, aluminum, BCC metals)

Associated Functions
- Various image filters
- HDR



Grain sizing intercept solution
(Microstructure with ferritic grains)

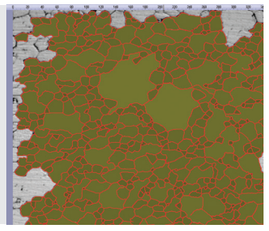
Grain Sizing in Microstructures Using the Planimetric Method

This solution is for automatic grain size distribution measurement on etched microstructures (it also works on aluminum microstructures) using the different available standards (ASTM E112-13, ISO 643:2012, JIS G 0551:2013, JIS G 0552:1998, GOST 5639-82, GB/T 6394-2002, DIN 50601:1985, ASTM E1382-97(2015)).

Key Features
- Count the number of grains included in the image
- Powerful grain boundary reconstruction by the separator filter
- Area percentage of secondary phase

Typical Applications
- Metallic materials and other types of materials with a geometric microstructure
- Thermally processed metals

Associated Functions
- Various image filters
- HDR



Grain sizing planimetric solution
(Microstructure with ferritic grains)

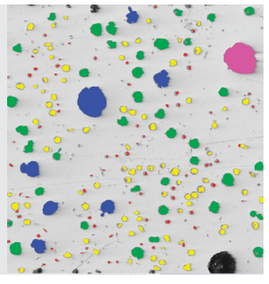
Graphite Nodularity Evaluation

This solution automatically evaluates graphite nodularity and content in cast iron samples (nodular and vermicular types). The form, distribution, and size of graphite nodes are classified according to EN ISO 945-1:2018, ASTM A247-17, JIS G 5502:2001, KS D 4302:2006, GB/T 9441-2009, ISO 16112:2017, JIS G 5505:2013, NF A04-197:2017, ASTM E2567-16a (for nodularity only) standards. This solution also assists with determining the ferrite-pearlite ratio in cast iron cross sections.

Key Features
- Measure both the ferrite-pearlite ratio (on etched samples) and graphite distribution (on non-etched samples)
- Measure the distribution of vermicular graphite using standard charts
- Select from multiple standards

Typical Applications
- All cast iron samples (metallic parts requiring high strength, castability, etc.)

Associated Functions
- Grayscale mode



Cast iron solution
(Ductile cast iron showing nodular graphite)

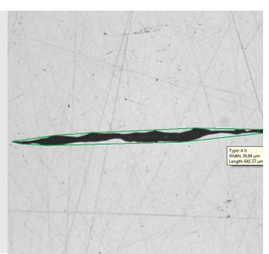
Rating Non-Metallic Inclusion Content in Certain Steels and Alloys

OLYMPUS Stream™ software offers two methods to detect and classify non-metallic inclusions in certain steels and alloys. One is to detect the largest/worst inclusion, and the other is to run statistical evaluations of all inclusions in the scanned area. The inclusion worst field results are in accordance with ASTM E45-18 (method A), SEP 1571:2017 (method M), DIN 50602:1985 (method M), ISO 4967:2013 (method A), GB/T 10561-2005 (method A, equivalent to ISO 4967), JIS G 0555:2003 (method A, equivalent to ISO 4967), UNI 3244:1980 (method M), EN 10247:2017 (methods P and M), and EN 10247:2017 (methods P and M). Individual inclusions are displayed and can be edited by the user. The statistical evaluation of inclusion content on the entire scan are examined according to ASTM E45-18 (method D), ISO 4967:2013 (method B), SEP 1571-2017 (method K), and EN 10247:2017 (method K).

Key Features
- Requires minimal training
- Select from multiple standards

Typical Applications
- All high-purity steels
- Roll bearing, special steels, controlled dilatation steel, etc.

Associated Functions
- Various image filters
- HDR



Non-metallic inclusion content solution
(Steel with non-metallic inclusions)

Comparing Sample Images with Reference Images

Easily compare live or captured images with autoscaled reference images. This solution includes reference images in each available chargeable set (ASTM E112:2010, ISO 643:1983, ISO 643:2012, DIN 50602:1985, ISO 945-1:2008, SEP 1520:1998, SEP 1572:1971, EN 10247:2007, and ISO 4505:1978). The solution also supports multiple modes, including live overlay display and side-by-side comparison. Additional reference images can be purchased separately.

Key Features
- Not dependent on microscope magnification
- Intuitive comparison with known standards
- Works with live and captured images
- Select from multiple standards

Typical Applications
- Metallic and other materials
- Thermally processed metals

Associated Functions
- Easy focusing and capturing tools

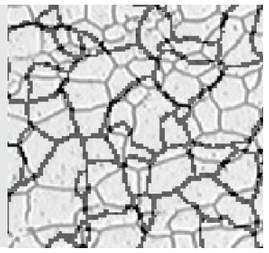


Chart comparison solution
(Microstructure with ferritic grains)

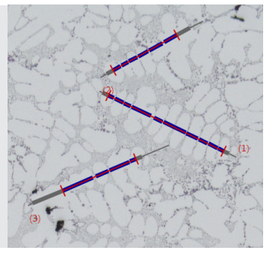
Dendrite Arm Spacing

This solution automatically measures the mean secondary dendrite arm spacing in solidified aluminum alloys. Secondary dendrite arm spacing is directly connected to the alloy's solidification time, which is automatically calculated when the material-specific constant is used. The measured parameters are the total length, the number of dendrite arms, and the average and median DAS values.

Key Features
- Manually or automatically measures the dendrite arm spacing using thresholds
- Works with live and still images
- Displays the DAS result on the image with editable points

Typical Applications
- Aluminum (die castings and gravity castings)
- Lightweight alloys

Associated Functions
- Easy focusing and capturing tools



Interactive determination of the mean dendrite arm spacing

Other recommended solutions: Count and Measure, Particle Distribution, Porosity, Extended Phase Analysis, Weld Measurement, 3D

Solutions for Machinery Processing (Automotive/Machined Parts Industries)

When cutting, drilling, polishing, and milling metal parts, many types of small defects may occur. To ensure the high quality of these parts, they must be strictly scrutinized during the production process to identify any scratches, cracks, pore size, or contamination.

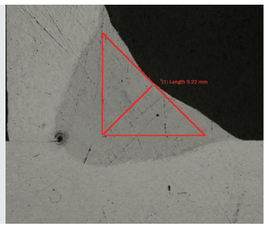
Welding Distortion

OLYMPUS Stream™ software offers an optional solution for measuring the geometric distortion induced by heat during welding. With this solution, it is easy to perform asymmetry, multiple perpendicular lines, and A-throat measurements, enabling detailed and quantifiable measurements of the welding distortion. These measurements are important for assessing the quality of the weld.

Key Features
- Measures throat thickness, asymmetry, and the thickness of welds
- Geometry is shown on the live image

Typical Applications
- Fillet-welded joints (tee, lap, and corner joints)
- Arc-welded joints

Associated Functions
- MIA and EFI



Weld measurement solution
(A-throat measurement in a weld seam)

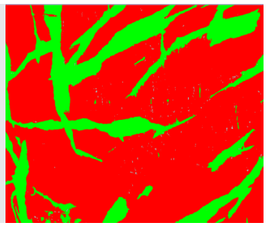
Phase and ROIs Measurement

The software is used to measure multiple phases in a microstructure by selecting color or gray level intensity (threshold). Sixteen different phases can be defined as well as multiple regions of interest (ROIs) (including the magic wand). Several color spaces can be used (RGB or HSV), and minimal size criteria can also be defined. The results are then expressed as phase fraction area calculations. To create reproducible results, the ROIs can be defined using discrete sizes for comparative measurements.

Key Features
- Selecting different phases using multiple thresholding techniques
- Multiple ROIs (including magic wand) can be selected
- Results are calculated per ROI and per phase

Typical Applications
- Welding quality check
- Die casting
- Steel microstructure
- Composite materials

Associated Functions
- MIA and EFI



Advanced phase analysis solution
(Phase analysis in dual phase polymer)

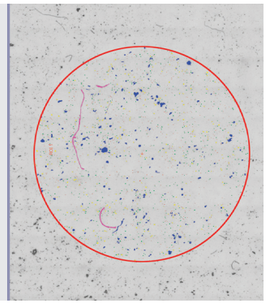
Particle Distribution

Measuring the physical characteristics of particles is a common task in a wide range of industries and is often a critical parameter in the manufacture of many products. The Materials Solution Particle Distribution classifies particle parameters based on their morphology, including characteristics such as size, diameter, area, color, and elongation, and build a graphical representation of the distribution. Class bins can be defined with color codes to give a better understanding of the results.

Key Features
- Counts the number of particles in one or multiple images (motorized solution)
- Classifies according to a selected dimension among a large number of choices
- Codes and validates results according to a user's standards

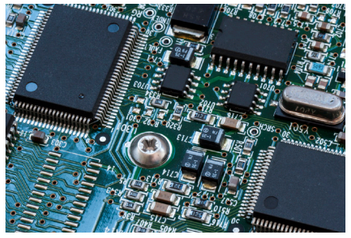
Typical Applications
- Reactivity of dissolution rate (ex. catalyst, tablets)
- Stability in suspension (ex. sediments, paints)
- Efficacy of delivery (ex. asthma inhalers)
- Texture and feel (ex. food ingredients)
- Appearance (ex. powder coatings and inks)

Associated Functions
- MIA and EFI



Particle distribution
(Particles extracted on membrane filter)

Other recommended solutions: Count and Measure, Cast Iron, Non-Metallic Inclusions, Grains Intercept, Grains Planimetric



Solutions for Electronics (Electronic Device/Semiconductor Industries)

As electronic devices such as computers, cameras, and smartphones continue to shrink, components like lead frames and connectors are also getting smaller. For example, the average distance between electrical connector pins is now only 0.2 mm. In printed circuit boards, very thin plates are coated, and verifying the homogeneity of this coating is a key element of product quality.

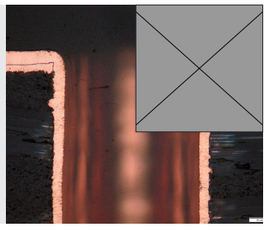
Throwing Power Measurement

Use this solution to measure the distribution of copper plating thickness in through-holes or micro-vias and to perform all the steps necessary to make critical measurements of printed circuit boards (PCBs). This includes dimple depth or the difference in height between the copper plating within a via and around its perimeter.

Key Features
- Manually measure selected points on a live image in a cross-sectioned sample
- Extensive user guidance through all points, according to the sample geometry
- Automatic result correction for samples not fully cut through the center of the hole

Typical Applications
- HDI printed circuit boards

Associated Functions
- Easy focusing and capturing tools



Throwing power solution
(Cross section of a through-hole of a PCB)

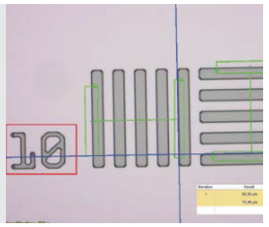
Automatic Critical Dimension Measurement

Use this solution to create edge-detection-based measurements in a live image with pattern recognition. Use the software to create scanners to measure distances (point-to-line, circle-to-circle), circle diameter, circle roundness, and bounding boxes (width, length, and area). The integrated validation tool provides a pass/fail flag for every measurement.

Key Feature
- Expert users can define a measurement routine
- Execute the measurement recipe using a controller without changing the measurement parameters or the tolerance
- Immediate "Fail" or "Passed" flag

Typical Applications
- Semiconductor products

Associated Functions
- Easy focusing tools



Automatic measurement solution
(Wafer structure)

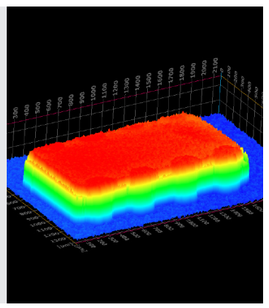
Three-Dimensional Measurement and Line Profiles

This solution creates height maps from stacks of images acquired automatically or manually at different Z positions. The resulting image can be visualized in three dimensions using the surface view. Measurements, such as 3D profiles and height differences between two or several points, can be easily performed. The results can then be exported into workbooks and Microsoft Excel spreadsheets.

Key features
- 3D image obtained with the focus-variation method without any size limit
- Extract a 3D profile by selecting a line and measure the orthogonal distances on the profile with feedback on the image
- Export 3D profiles for compatibility with roughness calculation by using third party software

Typical applications
- 3D profile for evaluation of surface flatness
- Failure analysis

Associated functions
- Easy focusing tools



3D solution
(IC chip on a PCB)

Other recommended solutions: Count and Measure, Particle Distribution, Porosity, Extended Phase Analysis

Solutions for Surface Coatings and Thin-Film Deposits (Coating Industries)

Surface coatings are any mixture of film-forming materials that contain pigments, solvents, and other additives, which, when applied to a surface and cured or dried, yield a thin film that is functional and often decorative. Surface coatings include paints, drying oils and varnishes, clear synthetic coatings, and other products that protect the surface of an object from the environment. These products can also enhance the aesthetic appeal of an object by accentuating its surface features or concealing blemishes.

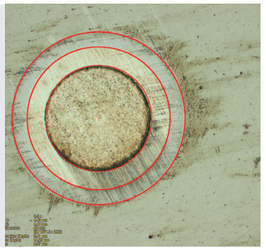
Thin Coating Thickness Evaluation (Calotest Method)

This solution enables coating thickness from top-view images using the Calotest method. Results can classified according to ISO 26423:2016. With the Calotest method, a grinding sphere wears a tiny crater through the coating. The software uses the sphere and sample geometry to calculate the coating's thickness.

Key Features
- Guides the user through a selection of shapes and print morphologies
- Measurements are easy to perform
- Complies with international standards

Typical Applications
- CVD, PVD, plasma spray coatings
- Anodic oxidation layers
- Surfaces treated by ion sputtering or ion plating
- Chemical and galvanic deposits
- Polymers, paints, and lacquers

Associated Functions
- Various image filters



Coating thickness solution
(A printed thin coating on a metal substrate obtained with the Calotest method)

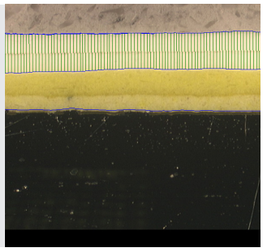
Layer Thickness Measurement

Measures layer thicknesses either perpendicular to neutral fibers, via the shortest distance, or with a parallel method. Users can now measure layers with even or uneven boundaries. Layer thickness measurement software calculates mean, maximum, and minimum values as well as statistical data for each layer. Layer boundaries can be specified using automatic detection, magic wand, or manual mode. Individual measurements can be added or deleted later.

Key Features
- Select different phases using automatic, magic wand, and manual measurement modes
- Automatic layer measurement is performed using the neutral fiber as reference layer
- Flexible selection of multiple points or inter-distance

Typical Applications
- CVD, PVD, plasma spray coatings
- Anodic oxidation layers
- Chemical and galvanic deposits
- Polymers, paints, and lacquers

Associated Functions
- EFI and MIA



Layer thickness solution
(Cross section of paint and primer lacquer on steel)

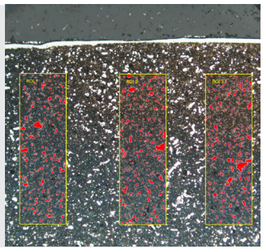
Pore Fraction and Density Measurement

The Porosity solution in OLYMPUS Stream™ software measures the area fraction and number of pores on cross-sectional surfaces and coatings. The software uses the threshold method to differentiate between the pores and the substrate on color or gray level images. It is possible to calculate the following parameters: porosity, pore size, number of pores, distance between adjacent pores, and the pore density for every selected region of interest as well as the whole image.

Key Features
- Several thresholding techniques are available
- A size limit per pore can be fixed
- Measurement per ROI is available
- Largest pore is highlighted

Typical Applications
- Voids in chemical materials
- Level of porosity in foam
- Control of air voids in weldments
- Additive manufacturing

Associated Functions
- MIA and EFI



Porosity solution
(Cross section of carbide coating in thermal deposition processing)

Other recommended solutions: Count and Measure, Particle Distribution, Extended Phase Analysis

Materials Solutions for Every Purpose

	Solutions	Descriptions	Application example	Recommended Industry: Metal/Casting	Automotive	Glass/Ceramic	Coating	Consumer Goods	Electronic Devices	Semiconductors	Fluids & Oils	Machined Parts	Carbon/Composites	Chemical/Plastic/Rubber	Industrial Scientific Research
	Grain Intercept	Steel manufacturers use this solution for measuring and controlling grain size after cross-sectioning, polishing, or etching steel samples. This function is based on overlaying "test lines" and counting the number of intercepts with grain boundaries	Page 12	■	■			■				■			■
	Grain Planimetric	Steel manufacturers use this solution for measuring and controlling grain size after cross-sectioning, polishing, or etching steel samples. This function reconstructs boundaries for each grain and conducts grain sizing with the area percentage of the second phase.	Page 12	■	■			■				■			■
	Non-Metallic Inclusions	Steel manufacturers use this solution for measuring and classifying the shape and size of non-metallic inclusions (oxide, alumina, sulfide, or silicate) in steel.	Page 13	■	■			■				■			■
	Cast Iron	Casting manufacturers who need to measure and control the graphite nodularity and check the mechanical characteristics of their cast products use this solution.	Page 12	■	■			■				■			■
	Chart Comparison	A live or still image can be overlaid onto standard charts for comparison; function preview is available	Page 13	■	■			■				■			■
	Dendrite Arm Spacing	This solution is used to manually or automatically determine the mean dendrite arm spacing in cast aluminum	Page 13	■	■			■							■
	Layer Thickness	One or multiple layers of a cross-sectioned sample can be measured using the Layer Thickness solution. The shapes are defined, and the layers are automatically measured.	Page 16		■		■								■
	Coating Thickness	This solution enables the measurement of coating thickness from top-view images using the Calotest method.	Page 16		■		■								■
	Automatic Measurements	This solution is used for creating measurements based on edge-detection on a live image with pattern recognition.	Page 15						■	■					
	Throwing Power	This solution measures the distribution of copper plating thickness in through-holes or micro-vias.	Page 15						■	■					
	Porosity	This solution enables pores to be measured either for area fraction or the number of surface pores using ROIs (circular, triangular, rectangular, and polygonal) and thresholds.	Page 16	■	■		■	■		■		■	■	■	■
	Particle Distribution	This solution is used to create particle size distribution histograms and tables from multiple images or image series.	Page 14	■	■	■	■	■	■	■	■	■	■	■	■
	Advanced Phase Analysis	This feature offers a new integrated solution to perform phase analysis on a selection of various regions of interest (ROIs) including triangles, circles, rectangles, and polygons.	Page 14												

More information is available on the application solution pages of the Olympus website (www.olympus-ims.com/application-solutions).

OLYMPUS Stream™ Software Version 2.5 Specifications

Main License Specifications

■ : Standard
■ : Optional

	Start	Basic	Essentials	Motion	Desktop
Image Acquisition					
Basic image acquisition including HDR and auto-calibration of magnification and Live HDR*1, and position navigation*1	■	■	■	■	
Software autofocus*2 and movie acquisition (Avi format)		■	■	■	
Time lapse, instant EFI, and instant/manual MIA*3		■	■	■	
Motorized EFI/MIA and Z-stack acquisition		■	■	■	
Image and Customization Tools					
Basic tool windows (image history, properties, navigator, and gallery view tool window)*4	■	■	■	■	■
Annotations, layer management, scale bar, cross hair, info stamp display, and image filters	■	■	■	■	■
Digital reticle/grid, line profile display, My Function, layout management, and Macro Manager		■	■	■	■
Measurements / Image Analysis					
Basic interactive measurement (distance, angles, rectangles, circles, ellipses, polygons, circle-to-circle distance, angle ruler, and line ruler) and data export to MS Excel	■	■	■	■	■
Phase analysis, magic wand, freehand polyline, interpolated polygon, morphology filter, and image arithmetics		■	■	■	■
3D measurements, 3D profile measurements, and 3D surface view		■	■	■	■
Reporting*5					
Report creation (MS Word, and MS Excel formats)		■	■	■	■
Presentation creation		■	■	■	■
Data Management					
Stream document storage*6		■	■	■	■
Workgroup database with structured data format		■	■	■	■
Device Support					
Olympus microscopes*7 and Olympus cameras*8	■	■	■	■	
Non-Olympus cameras and image source converters*9		■	■	■	
Non-Olympus stage controllers*9		■	■	■	

PC Requirements	
CPU	Intel® Core i5, Intel® core i7, Intel® Xeon
RAM / Hard disk / DVD drive	4 GB or more (8 GB recommended)/2.4 GB or more free space/DVD+R DL compatible
OS*10	Windows 10 Pro (64-bit) , Windows 8.1 (64-bit) Pro
.NET Framework	Version 4.6.2 or higher
Graphic card*11	1280 × 1024 monitor resolution with 32-bit video card
Web browser	Windows Internet Explorer 8, 9, 10, or 11

*1 Requires the DP74 camera, and the Live HDR function requires a 64-bit OS.
*2 Requires an Olympus microscope with motorized Z-axis or external motorized Z-axis with OLYMPUS Stream Motion or Automation Solution.
*3 Instant MIA may not work properly with some cameras.
*4 Write and read all major file formats and open Olympus proprietary formats (DSX, LEXT and POIR file formats).
*5 Requires Microsoft Word 2010, 2013, 2016, 2019, or Office 365 to be installed beforehand (not provided).
*6 Using Microsoft SQL Server Express.
*7 Supports MX61A, MX61, MX61L, MX61A, MX63L, MX63, GX53, BX3M-CB, BX3M-CBFM, BX-UCB, BX-REMCB, IX-UCB, SZX-MDCU, SZX2-MDCU, U-CBS, STM7.
*8 Supports DP21, DP22, DP23, DP26, DP27, DP28, DP73, DP74, LC30, SC30, SC50, SC100, SC180, UC30, UC50, UC90, XC10, XC30, XC50, XM10.
*9 Please contact Olympus for supported device information.
*10 Starting with Stream 2.5, Olympus cameras DP74, DP73 and SC180/UC90 are compatible with Windows 10/8.1 only. Windows 7 is no longer supported.
*11 Required configurations for Live HDR in DP74. Graphic board applicable to CUDA made by NVIDIA (compute capability 2.1 or higher). Graphic board driver applicable to CUDA 9.1 or higher.

Special Solution Specifications

	Compatiblity				Functions
Solutions	Basic	Essentials	Motion	Desktop	Measurement Type
3D	■	■	Included	Partially included*	3D Surface View, 3D Measurement, 3D Profile Measurement, Motorized Z-stack/EFI, Instant EFI with height map (requires coded or motorized Z-axis).
Automation	■	■	Included		Automation Solution (Motorized/Manual/Instant MIA, Motorized/Instant EFI without height map (requires coded or motorized XYZ-axis) and with time lapse.
Weld Measurement	■	■	■	■	Weld Measurement solution (measurements for geometric distortion introduced by the heating during welding).
Count & Measure	■	■	■	■	Multiple threshold methods are available (automatic, manual HSV, manual and adaptive) The system can automatically measure multiple parameters on all segmented objects (Area, Aspect Ratio, Bisector, Bounding Box, Gravity Center, ID, Mass Center, Intensity Values, Convexity, Diameters, Elongation, Feret, Extent, Next Neighbor Distance, Orientation, Perimeter, Radius, Shape, Sphericity, etc.) Spreadsheet and charts with individual and distribution measurements.
TruAI™ Deep-Learning Technology		■			Accurate and automated image segmentation

*Not possible to use the functions relating to image acquisition.

Materials Solutions Specifications

	Compatiblity			Output			Functions		
Solutions	Basic	Essentials/Motion	Desktop	Automatic Report Creation	Workbook with Individual Measurement	Store All Results in the Image Properties	Measurement Type	Supported Standards	Multiple Stage Location*1 Sample Alignment*1
Grain Intercept	■	■	■	■	■	■	Selection of pattern (circles, cross, cross & circles, vertical lines, horizontal lines, horizontal & vertical lines) Definition of the number of test lines for determination of grain elongation Displays the G-value in the Material Solution tool window	ASTM E112-13, ISO 643:2012, JIS G 0551:2013, JIS G 0552:1998, GOST 5639-82, GB/T 6394-2002, DIN 50601:1985, ASTM E1382-97(2015)	■
Grain Planimetric	■	■	■	■	■*2	■	Automatic extraction of grain boundaries User interaction using Stream sliders for improved usability Displays the G-value histogram in the Material Solution tool window for direct interaction	ASTM E112-13, ISO 643:2012, JIS G 0551:2013, JIS G 0552:1998, GOST 5639-82, GB/T 6394-2002, DIN 50601:1985, ASTM E1382-97(2015)	■
Non-Metallic Inclusions	■	■	■	■	■	■	Automatic detection of non-metallic inclusion using colors, shape, and size Automatic classification of oxides, sulfides, silicates, and aluminates Live display of the detected inclusion with its rating Statistical overview of inclusions on the entire scanned area	ASTM E45-18 (method A), DIN 50602:1985 (method M), ISO 4967:2013 (method A), GB/T 10561-2005 (method A, equivalent to ISO 4967), JIS G 0555:2003 (method A, equivalent to ISO 4967), UNI 3244:1980 (method M), EN 10247:2017 (methods P and M), EN 10247:2007 (methods P and M), ASTM E45-18 (method D), ISO 4967:2013 (method B), SEP 1571-2017 (methods M and K), EN10247:2017 (method K).	■
Cast Iron	■	■	■	■	■	■	On polished samples: automatically measures the characteristics of the graphite content (size, shape, and distribution) On etched samples: measures the ferrite to pearlite ratio Integrated workflow that takes into account the sample status (etched or polished)	EN ISO 945-1:2018, ASTM A247-17, JIS G 5502:2001, KS D 4302:2006, GB/T 9441-2009, ISO 16112:2017, JIS G 5505:2013, NF A04-197:2017, ASTM E2567-16a (for nodularity only)	
Chart Comparison	■	■	■		■	■	Multiple displays available, including live overlay User interaction using Stream sliders for improved usability Calculates statistics on the selected values	DIN 50602:1985, ISO 945-1:2008, ISO 643:1983, ISO 643:2012, EN 10247:2007, SEP 1520:1998, SEP 1572:1971, ASTM E112:2010, ISO 4505:1978	
Layer Thickness	■	■	■	■	■		Layer boundaries can be specified using automatic detection, magic wand, or manual mode (using 2 or 3 points) Individual measurements can be added or deleted later on Measurement of any type of layers (with even or uneven boundaries) is supported Layer thickness measurement calculates mean, maximum, and minimum values as well as statistical data for each individual layer		
Coating Thickness	■	■	■	■	■	■	Prints are measured from top view Calculation of the coating thickness according to the sample geometry	EN 1071-2:2002, VDI 3824: 2001, ISO 26423:2016	
Dendrite Arm Spacing	■	■	■	■	■	■	Determines the mean dendrite arm spacing in cast aluminum alloys		
Automatic Measurements	■	■			■		Automatically measures distances (point-to-point, point-to-line, circle-to-circle, point-to-circle, line-to-circle) Automatically measures circle diameter (roundness, bounding box) Automatically measures angles between two lines Definition of tolerances values for measurement and visual validation Expert and user mode for measurement repeatability		■
Throwing Power	■	■		■	■	■	Manual measurements of selected point of interest on the sample Predefined points that will be triggered by the operator Selection of the vias type and documentation of the analysis Report and automatic calculation according to the manual measurements		
Porosity	■	■	■	■	■	■	Pore detection per ROIs (triangle, circle, rectangle, polygon, or magic wand) with overlapping capability Measurement of the pore density, count, and specific area Measurement of the biggest pore Measurement of a specified size range	VW 50093/ P6093:2012, VDG P201-2002, VDG P202-2010, VDG P211-2010	■
Particle Distribution	■	■	■	■	■	■	Particles are defined using simplified threshold settings Automatic classification according to a selected parameter (size, color, or shape) Measurement of ROIs and multiple thresholds Definition of validation and coding according to user-defined standards		■
Advanced Phase Analysis	■	Included	Included	■	■		Phase fraction per ROIs (triangle, circle, rectangle, or polygon) Magic wand, freehand polyline, interpolated polygon, morphology filter, and image arithmetics also usable Measurement of the total phase percentage per phase and per ROI Selectable minimum area detection		■

*1 Possible with OLYMPUS Stream Motion and other Stream packages with the Automation solution
*2 Stream chart with the distribution can be output.

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OLYMPUS

EVIDENT CORPORATION
Shinjuku Monolith, 2-3-1 Nishi-Shinjuku, Shinjuku-ku, Tokyo 163-0914, Japan

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