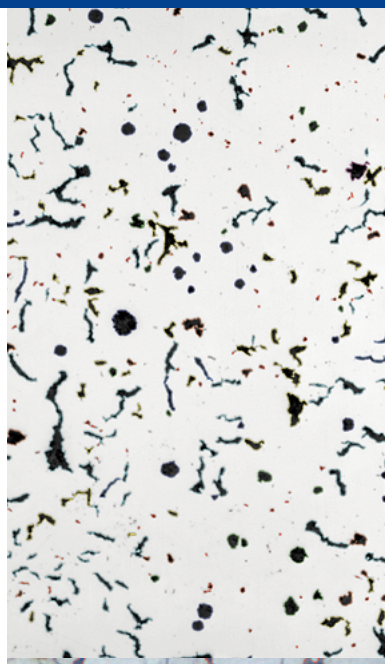
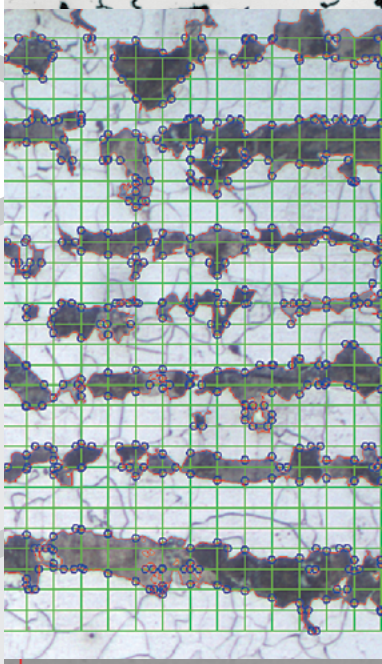
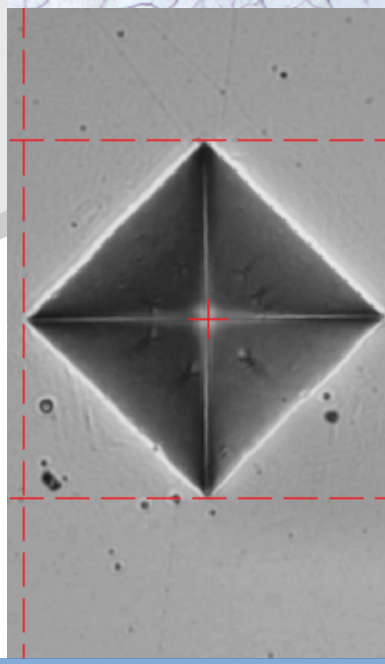
DT-M / DT / DT-L
i-Solution™
iSolution AutoPlus
iSolution Lite

MHT-M / MHT-Premium / MHT AutoPlus







Revised version: April 2025

Easy and Fast Measurement & Analysis Tools

Fast, easy-to-use imaging solutions for metallurgical and materials science applications.

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IMT Quick-Scan™

IMT Motorized Control Stage Applications

IMT **Quick-Scan**™ is an intuitive motorized control stage system that can be applied to a wide range of applications.

IMT Quick-Scan is a trademark of IMT i-Solution Inc.

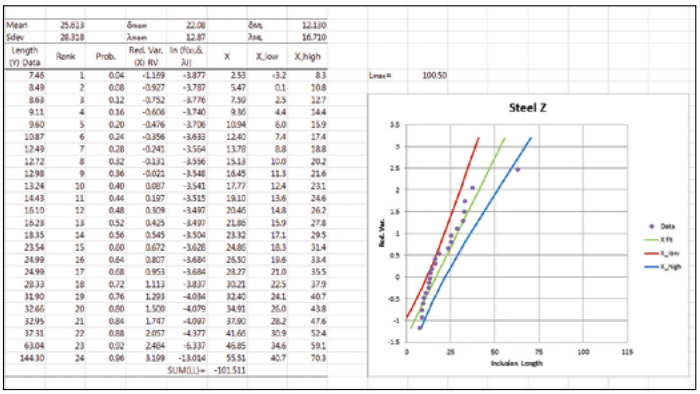
Key Features of IMT **Quick-Scan**™

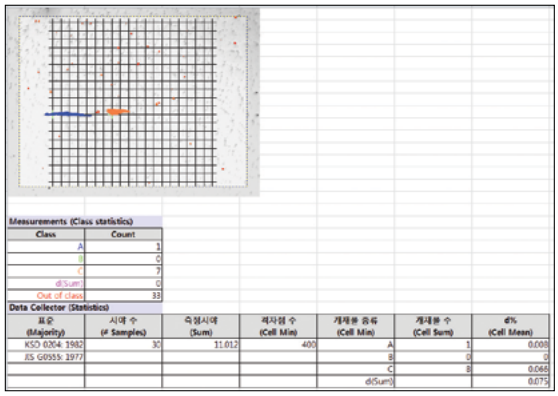
- Very fast scanning: Fast scanning time to capture images.
- Automatic image overlap correction: Live image overlap correction using accumulated data.
- Multiple scanning methods: Circular, rectangular, square, and etc.
- Theta correction for camera and stage misalignment: Images are automatically corrected for camera and/or stage misalignment.
- Automatic shade correction: Shade correction is automatically applied while scanning the specimen.
- Autofocus: Z focus is automatically adjusted while the stage moves in the X and Y directions.
- Stage position memory: The X/Y/Z stage positions are remembered for later recall.
- One-click position recall: With a single mouse click on the mosaic image, the stage moves to the exact position for further observation. It allows the user to switch to a higher magnification objective for more detailed observation and image capture.
- Export to Excel template: Results can be exported to a custom Excel report.

Non-metallic inclusion rating analysis using IMT Quick-Scan™

Extreme value analysis of NMI (ASTM E2283)

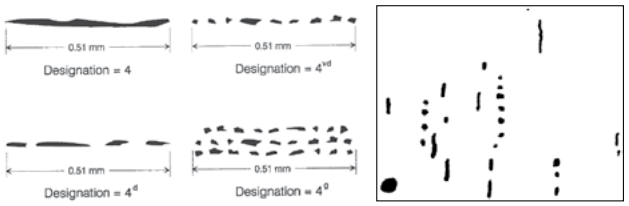
KSD 0204 (1982), JIS G0555 (1977)

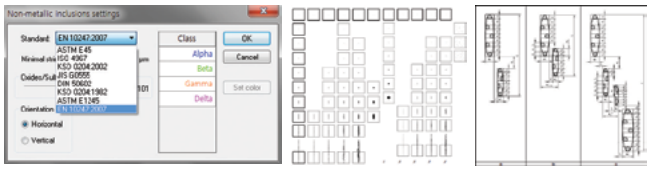




DT-M/ DT software programs are constantly striving to provide the most complete set of tools for metallurgical and materials analysis. This function is intended to determine the inclusion content of steel according to: EN 10247 (2007), ASTM E2283, ASTM E45 (2002), E1122, E1245-03 (2008), DIN 50602 (1985), ISO 4967(1998), KSD 0204 (2002), KSD 0204(1982), JIS G0555 (1977), JISG 0555 (2003).
Two analysis approaches are implemented: stereometry and JK inclusion assessment. The European and British Standard BS EN 10247 (2007) has been added. This is a microscopic examination of the non-metallic inclusions of the steel using standard reference photographs. The basic principle of this European standard allows the determination of non-metallic inclusions using image analysis techniques.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.





Severity index (Cell Max)	Severity A-Fine (Cell Sum)	Severity A-Thick (Cell Sum)	Severity B-Fine (Cell Sum)	Severity B-Thick (Cell Sum)	Severity C-Fine (Cell Sum)	Severity C-Thick (Cell Sum)	Severity D-Fine (Cell Sum)	Severity D-Thick (Cell Sum)	Severity DS (Cell Sum)	Cleanness (Cell Mean)
0.50	4	5	0	0	0	2	18	14	10	94
1.00	0	0	0	0	0	1	1	8	1	39
1.50	0	0	0	0	0	0	0	0	3	21
2.00	0	0	0	0	0	1	0	0	2	53
2.50	0	0	0	0	0	0	0	0	1	35
3.00	0	0	0	0	0	0	0	0	0	0
Cleanness	7	8	0	0	0	24	35	53	113	242

Standard (Majority)	Feild area (Sum)	Type of inclusion (Cell Min)	Rating 1 (Cell Sum)	Rating 2 (Cell Sum)	Rating 3 (Cell Sum)	Rating 4 (Cell Sum)	Rating 5 (Cell Sum)	Rating 6 (Cell Sum)	Rating 7 (Cell Sum)	Rating 8 (Cell Sum)	Sulfide (Total index K)	Oxide (Total index K)	Overall (Total index K)
DIN 50602	23600327.35	SS	0	0	0	0	0	0	0	0	0.00	1267.28	1267.28
		OA	21	8	10	3	0	1	0	0			
		OS	2	1	0	0	0	0	0	0			
		OG	34	13	2	0	0	0	0	0			

Standard (Majority)	Severity Index (Cell Max)	Severity A-Thin (Cell Sum)	Severity A-Thick (Cell Sum)	Severity B-Thin (Cell Sum)	Severity B-Thick (Cell Sum)	Severity C-Thin (Cell Sum)	Severity C-Thick (Cell Sum)	Severity D-Thin (Cell Sum)	Severity D-Thick (Cell Sum)
ASTM E45/E1122 _2013	0.5	0	1	0	0	0	0	15	206
	1	0	0	0	0	0	0	102	45
	1.5	0	0	0	0	0	0	128	2
	2	0	0	0	0	0	0	21	0
	2.5	0	0	0	0	0	0	7	0
	3	0	0	0	0	0	0	3	0

Data Collector (Statistics)

Standard (Majority)	Worst Severity A-Thin (Max)	Worst Severity A-Thick (Max)	Worst Severity B-Thin (Max)	Worst Severity B-Thick (Max)	Worst Severity C-Thin (Max)
ASTM E45/E1122 _2013	0	0.5	0	0	0

Worst Severity C-Thick (Max)	Worst Severity D-Thin (Max)	Worst Severity D-Thick (Max)	Max Area (Max)	Max Length (Max)
0	3	1.5	428.02	99.662

Total area of polished section= 229.292 mm2

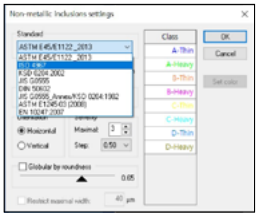
Specimen N	Area of polished section evaluate	Type of inclusion as in diagram	Number of inclusion s classified by rating number: Factor fg 0.05	0.1	0.2	0.5	1	2	5	10	20	Multiplication and first subtotal: Sulfides	Oxides
1	57.323	SS	2	0	3	3	0	0	0	0	0	0.1	
		OA	0	0	3	3	0	0	0	0	0		0
		OS	0	0	3	3	0	0	0	0	0		0
		OG	6	5	3	3	1	1	0	0	0		6.8
		SS	22	0	3	3	0	0	0	0	0	1.1	
2	57.323	OA	0	0	3	3	0	0	0	0	0		0
		OS	0	0	3	3	0	0	0	0	0		0
		OG	5	3	4	3	1	0	1	0	0		7.3
		SS	0	0	3	3	0	0	0	0	0	0	
3	57.323	OA	1	3	3	1	0	0	0	0	0		0.8
		OS	0	0	1	3	0	0	0	0	0		0.4
		OG	8	4	2	3	0	2	0	0	0		6.2
		SS	0	0	3	3	0	0	0	0	0	0	
4	57.323	OA	0	0	3	3	0	0	0	0	0		0
		OS	0	0	3	3	0	0	0	0	0		0
		OG	6	7	5	3	1	2	0	0	0		7
		SS										0	
5		OA											0
		OS											0
		OG											0
		SS										0	

Workflow for easy and fast analysis

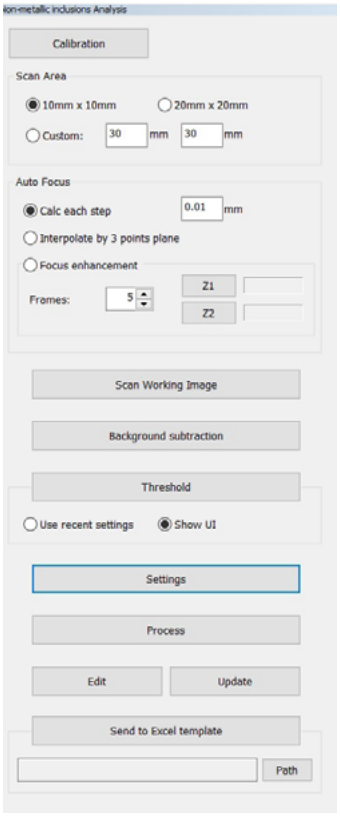
- The workflow menu allows even beginners to use it quickly and easily.

  Follow the workflow and you'll automatically get results and reports with just one click of the mouse.

1. Calibration: Select lens magnification
2. Scan Area: Select the desired scan area.
3. Auto Focus: The focus at the Z position is automatically adjusted while the stage moves in the X and Y directions.
4. Scan Working Image: Start scanning.
5. Background subtraction: Automatically corrects the difference in background brightness of each image.
6. Threshold: Distinguish NMI objects from background
7. Settings: Choose from a variety of standards.

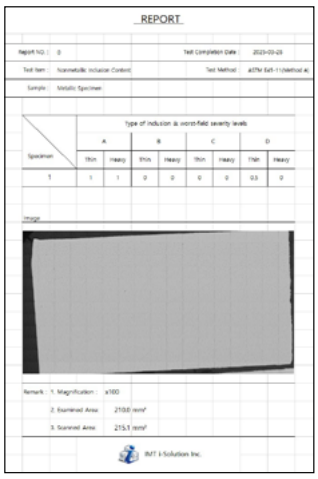


8. Process and Edit
9. Send to Excel template: NMI analysis results are sent to an Excel report.

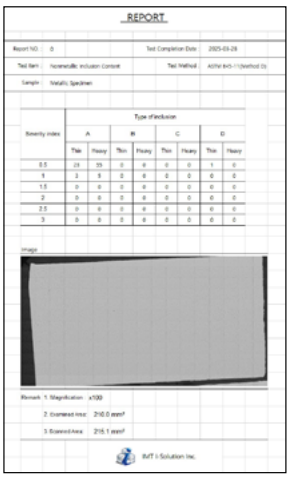


Workflow

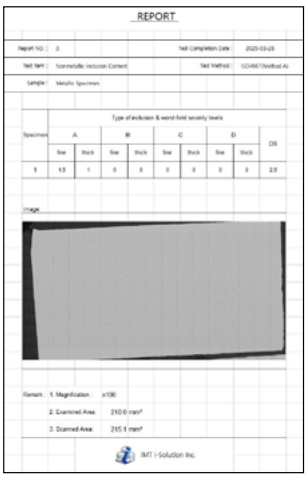
Excel reports : ASTM_E45 method A/ ASTM_E45 method D/ ISO_4967 method A/ ISO_4967 method B/ DIN_50602 method K



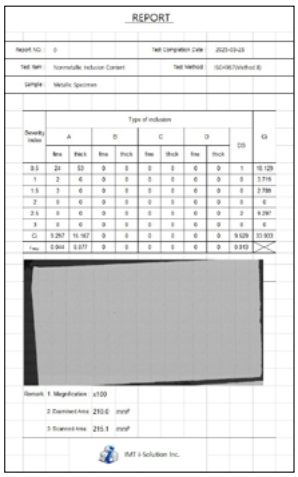
ASTM_E45 method A



ASTM_E45 method D



ISO_4967 method A

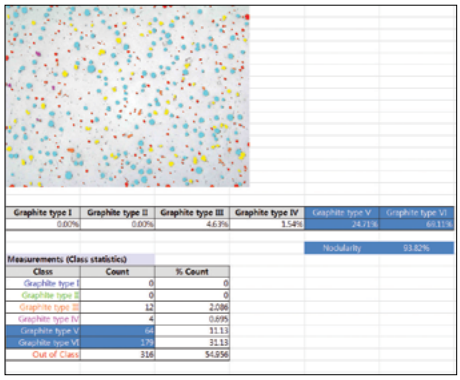


ISO_4967 method B

DIN_50602 method K

Microstructure of cast iron (using image analysis software)

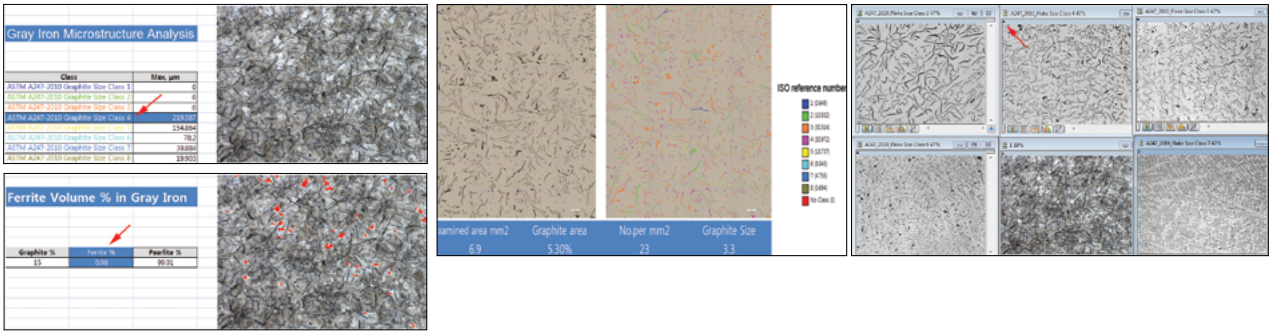
- Nodularity analysis according to the standard for the microstructure of cast iron. Nodularity is calculated according to the type of graphite.



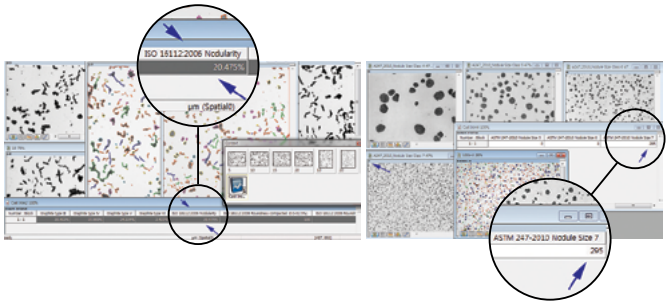
- DT-L / DT / DTM provide the shape, size, graphite type, nodularity and distribution of graphite inclusions in cast irons according to international standards such as ASTM E2567-16a, ASTM A247_2010, ASTM A247-67(1998), ISO/TR 945-2: 2011, JIS G5502(2001), KSD 4302(2002). ASTM E2567-16a describes procedures using image analysis software for graphite classification.

  Cast iron analysis considers one or multiple image frames to obtain more accurate statistical results. Results are accumulated in a special data collector document. An Excel file can be created to report the results. The percentage is calculated and weighted based on the circularity coefficient and graphite shape. Reference images provided in the chart navigator (see below) include nodule size classes, flake sizes, classes, graphite forms, and distribution examples.

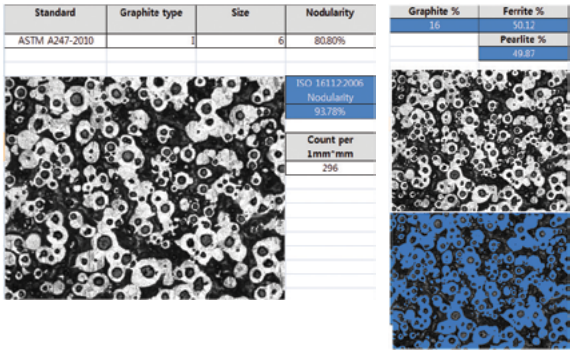
- Gray Iron Microstructure Analysis

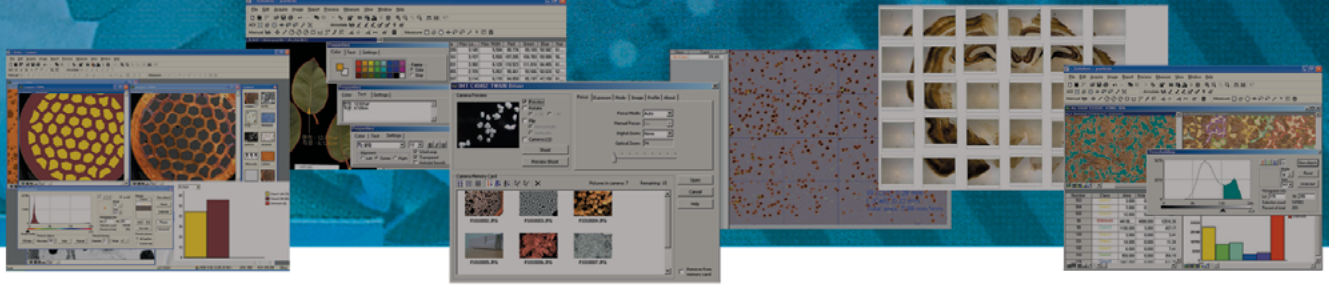


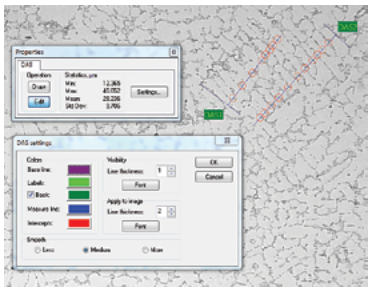
- CGI (Compacted Graphite Iron) Microstructure Analysis



- Ductile Iron Microstructure Analysis



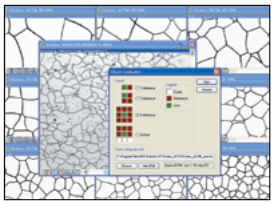


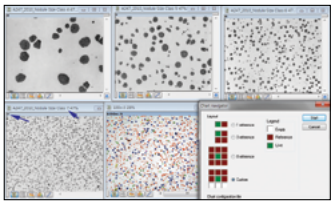


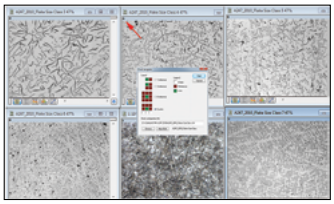
DAS (Dendrite Arm Spacing), ARP1947-2007/08

- This procedure is to determine the acceptability of the dendrite arm spacing (DAS) of D357-T6 aluminum alloy castings having a specified tensile strength. Dendritic arm spacing (DAS) is the spacing between the secondary arms of a dendritic structure. A straight line is drawn perpendicular to the growth direction of the secondary arms according to the ARP1947-2007/8 standard. Each space is then automatically measured. Mean, minimum, maximum and standard deviation measurements are automatically generated.

Chart Navigator



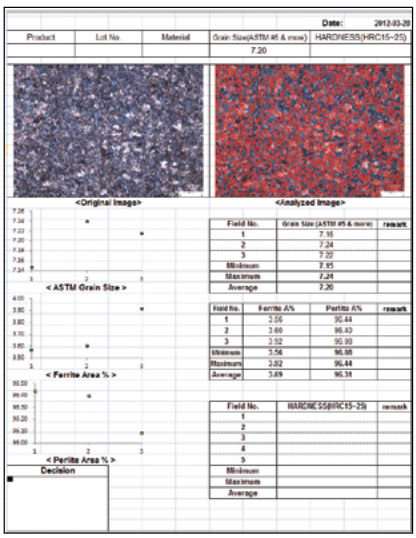




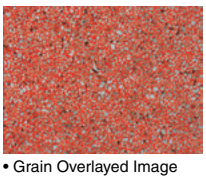
- The Chart Navigator allows you to directly compare a live or captured image with a series of reference images. Quickly select the best-fit reference image through a user-friendly interface, either live or captured. Both live and reference images can be exported to MS Excel with a simple mouse click.
The synchronized zoom feature maintains the zoom relationship between the reference image and the live or captured image even if you zoom in or out of the image arbitrarily.
The reference images included are:
Grain size ASTM, Grain size ASTM_precise, Twin Grains ASTM, ASTM A247_2010 Distribution, ASTM A247_2010 Flake Size Grade, ASTM A247_2010 Graphite Form, ASTM A247_2010 Nodule Size Grade, ISO TR 945-2_2011 Graphite Form, Sintered Cast CGI (Compact Graphite Iron).

Grain Size Measurement
ASTM E112-24/13/12 (2024/ 2013/ 2012), ASTM E1382-97 (2023), ISO 643: 2024/ 2019/ 2012, KSD 0205. JIS G0551

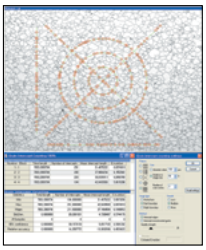
- DT-L/ DT/ DTM provide a standard measurement environment for the structural analysis of metals and materials. ASTM E112-24/ 13/ 12 (2024/ 2013/ 2012), ASTM E1382-97 (2023) describe the “Grain size measurement” methods using both “Line intercept” and “Planimetric counting”. The ASTM E1382-97 (2023) standard defines how to determine grain size when using image analysis software. DT-L/ DT/ DTM provide accurate measurement results due to the use of precise “Edge detection” algorithm. They provide both automatic and manual measurement environments. After measurement, grain number, grain size data and statistics, and overlay images are generated. Grains that touch the image borders are automatically ignored according to the standards.

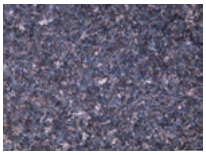


• Carbon Steel

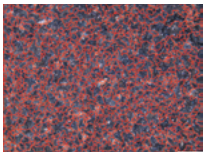


• Grain Overlayed Image





• Low-Carbon Steel

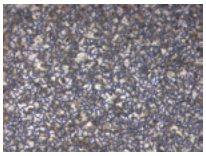


• Grain Overlayed Image

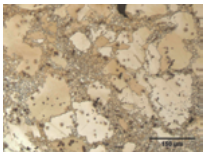
• Alloy

• Grain Overlayed Image

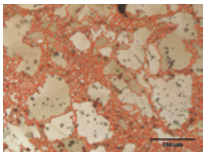
• High-Carbon Steel



• Grain Overlayed Image

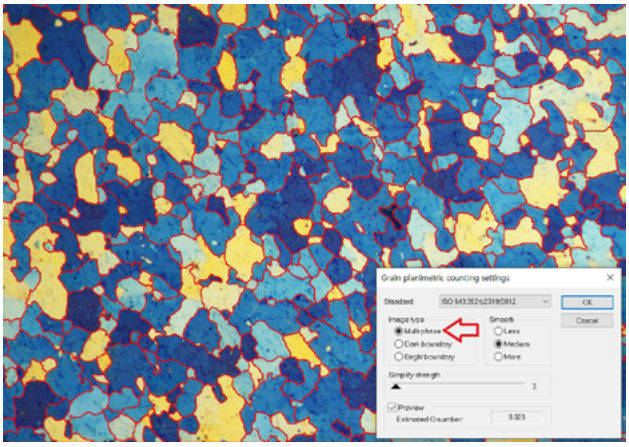


• Alloy

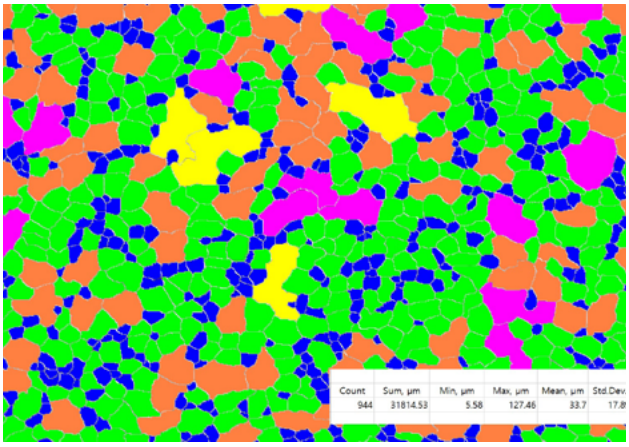


• Grain Overlayed Image

- DT and DTM provide better “Grain size measurement” environment than DT-L.
  Grains with multiple phases, such as aluminum alloys, are also automatically detected and measured.



• Multi-phases grain size measurement



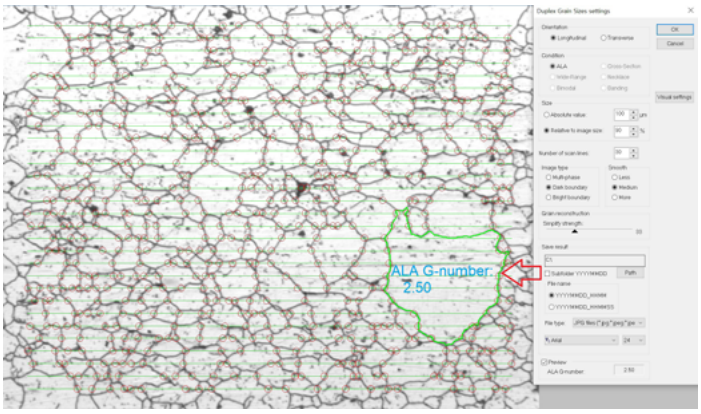
• Grain classification and size measurement

ASTM E1181-02: 2023

Standard Test Methods for Characterizing Duplex Grain Sizes

Assigning an average grain size value to a duplex grain size specimen does not adequately characterize the appearance of that specimen, and may even misrepresent its appearance. For example, averaging two distinctly different grain sizes may result in reporting a size that does not actually exist anywhere in the specimen.

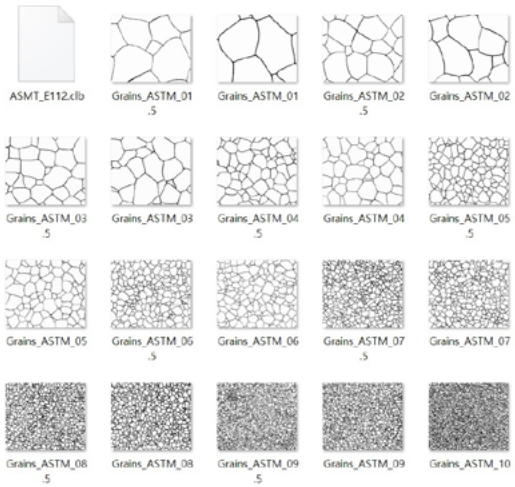
The ALA (as large as) grain size number is a measure of the largest grain in a random distribution of coarse grains in a metallographic section. It is used to evaluate the mechanical behavior of a material, such as crack initiation and fatigue.



• ALA (as large as) G-number: 2.5

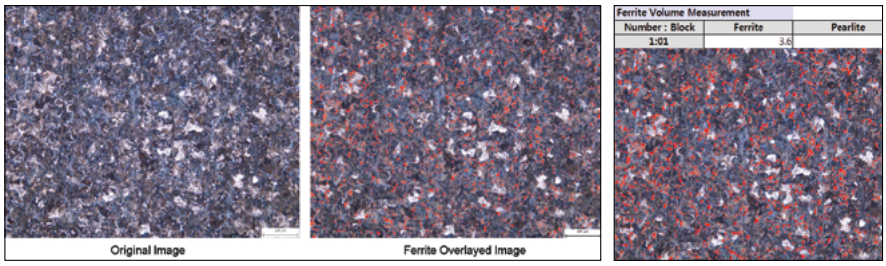
Verification of Software Accuracy

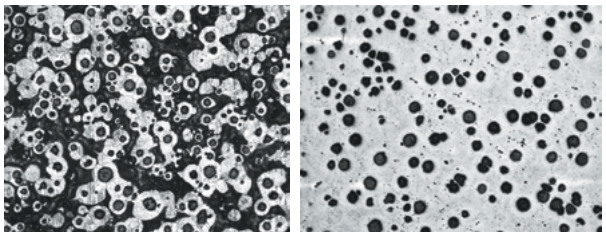
- IMT software has a software accuracy verification for grain size measurement. The software accuracy has been verified using grain size standard photos provided by ASTM



Ferrite Volume Measurement

- The percentage of ferrite area excluding graphite area is automatically calculated. So you can get the percentage of ferrite, pearlite and graphite area very easily. Just click the mouse in the ferrite volume measurement and the result will be generated (below).

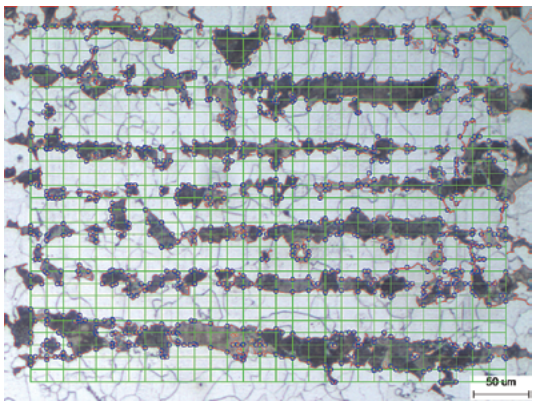


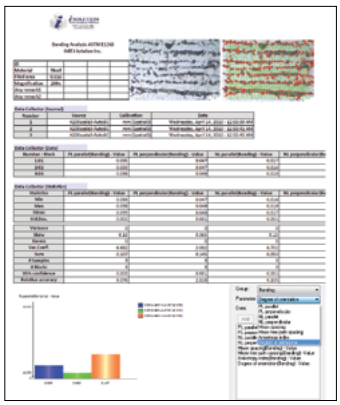


ASTM1268-19 Banding Analysis
Evaluation of Banding or Directionality of Microstructure according to ASTM E 1268-19

- Segregation occurs during the dendritic solidification of metals and alloys and is aligned by subsequent deformation. Solid-state deformation can develop a lamellar or banded microstructure, influenced by the resulting microsegregation pattern. The parameters below are used in ASTM1268-19 banding analysis.

- Anisotropy index (Banding) value
- NL parallel (Banding) value
- NL perpendicular (Banding) value
- PL parallel (Banding) value
- PL perpendicular (Banding) value
- Degree of Orientation (Banding) value
- Mean spacing (Banding) value
- Mean free path spacing (Banding) value



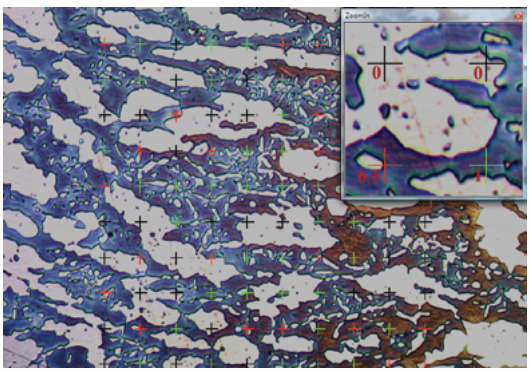


Volume Fraction by Systematic Manual Point Counting (ASTM E 562-05)

- This test method describes a systematic manual point counting procedure for statistically calculating the volume fractions of identifiable components or phases in cross-sections of microstructures using a point grid. The volume fraction of “Retained Austenite (RA)” and “Ferrite” is commonly measured.

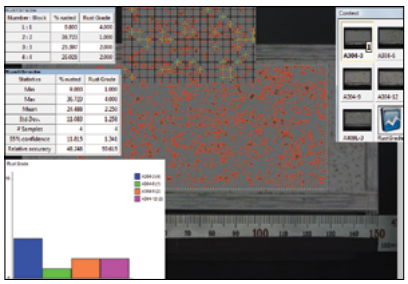
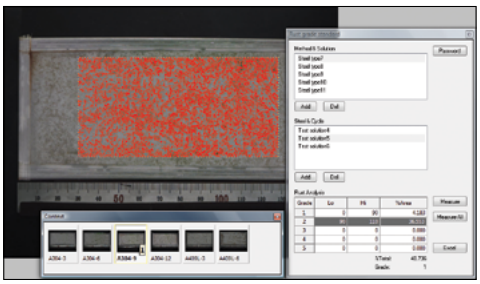
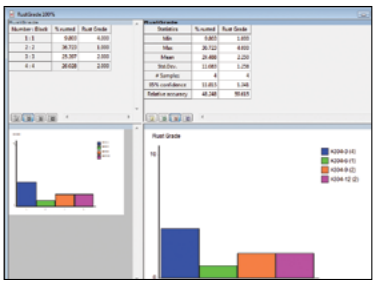
Testing Specification:- ASTM E562 - 05e1

	A	B	C	D	E	F
1						
2		FERRITE DETERMINTAION ON STAINLESS STEEL SECTION				
3		Testing Specification:- ASTM E562 - 05^{e1}				
4						
5	Number	Source	Calibration	Date		
6	1	NO Grid(1) (2)	pixel (Default)	Saturday, December 12, 2008		
7	2	NO Grid(2) (2)	pixel (Default)	Saturday, December 12, 2008		
8						
9						
10	Number : Block	Volume Ferrite %				
11	1:01	53				
12	2:02	42.5				
13						
14						
15	Statistics	Volume Ferrite %	Volume Austenite	52.25%		
16	Min	42.5				
17	Max	53	Volume Ferrite	47.75%		
18	Mean	47.75				
19	Std Dev.	7.424				
20	# Samples	2				
21	95% confidence	15.33				
22	Relative accuracy	32.104				
23						
24						



Rust Incidence Analysis (ASTM D 610-2008 and JIS H 8681-2:1999)

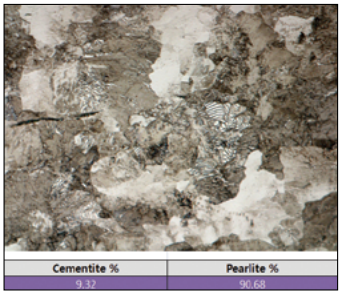
- This feature covers the evaluation of rust incidence on painted steel surfaces according to ASTM D610-2008. It provides a standardized means to quantify the amount and distribution of visible surface rust. JIS H 8681-2:1999 is for evaluating the corrosion resistance of anodic oxide coatings on aluminum and aluminum alloys according to JIS H 8681-2:1999. The software also provides custom methods and tables for users to create their own criteria. A password option is available to protect all criteria created from unintended changes.

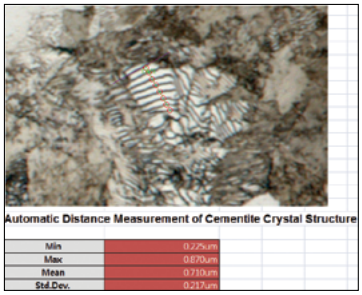




Cementite Crystal Structure Analysis

- Cementite Volume Measurement:
  The cementite and pearlite volumes are measured to define the hardness and brittleness of the material.

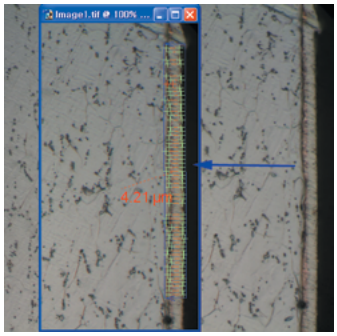
  Automatic Distance Measurement of Cementite Crystal Structure: Each distance in the cementite crystal structure is measured automatically.





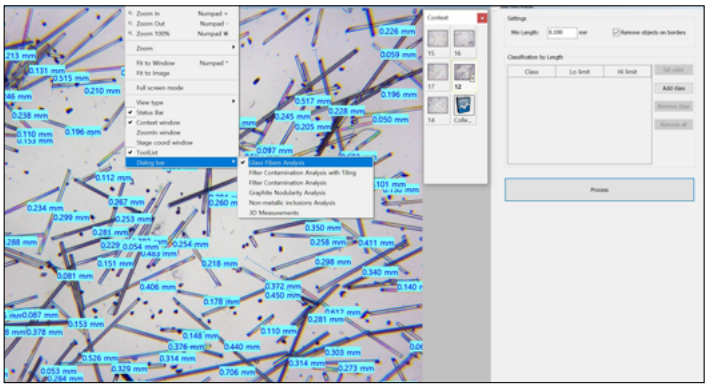
Layer Depth Measurement

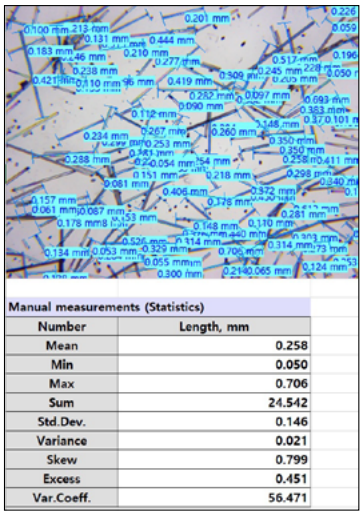
- Average, Min, Max, Standard Deviation, Width Thickness are automatically measured by simply defining the box shape of the region of interest (ROI). The number of scan lines is up to 999.



Glass Fiber Measurement

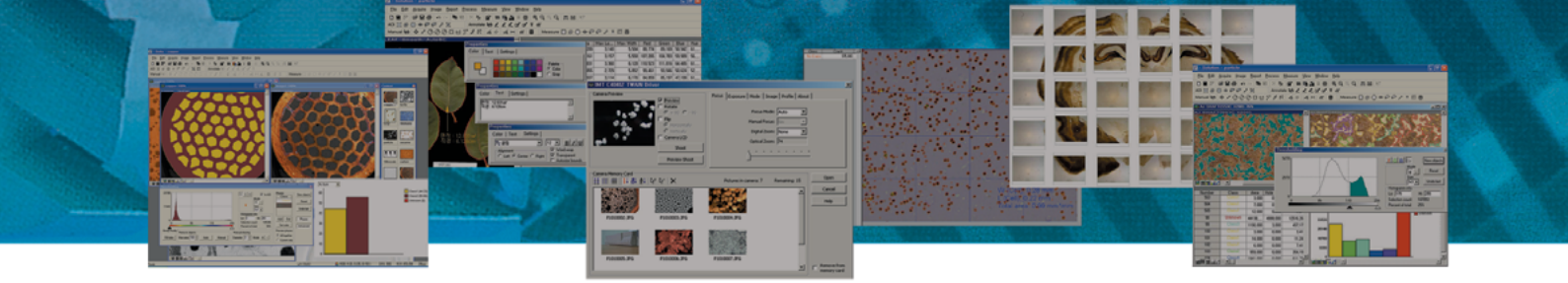
- The specimens for the glass fiber measurement are often very overlapping. IMT software allows automatic measurement of even these overlapping specimens. You can set the minimum size you want to exclude and the minimum and maximum units you want to sort. All measurements are done automatically with one mouse click.





Manual measurements (Statistics)

Number	Length, mm
Mean	0.258
Min	0.050
Max	0.706
Sum	24.542
Std.Dev.	0.146
Variance	0.021
Skew	0.799
Excess	0.451
Var.Coeff.	56.471



The i-Solution software suite helps you keep pace with today's rapidly changing digital technologies. This advanced software technology and leading image analysis tools simplify image capture, measurement and enhancement while improving the accuracy of your results.
All versions combine innovative measurement and analysis technology with an outstanding, user-friendly interface.
Become an expert in image analysis and optimize your work environment with this image software suite.

DT-M is a full-featured motorized control stage application version. User-requested features can also be added.

DT is IMT's premium software program that includes all the features for a wide range of scientific and inspection applications.

DT-L is a program focused on core materials science applications.

i-Solution is an advanced image analysis application that can be easily integrated into any workspace, offering an intuitive interface and groundbreaking image analysis technology.

iSolution Auto plus includes all the features of iSolution Lite plus advanced fluorescence image merging capabilities. It is the perfect solution for fluorescence microscopy applications.

iSolution Lite A streamlined image measurement application that provides image interpretation, measurement, and enhancement tools.

Significantly improved the speed of image and data processing.

- The new versions of the IMT programs have significantly improved the speed of image and data processing. They have optimized the use of Computer RAM, allowing more tasks to be performed simultaneously using less RAM.

Image Acquisition

- The i-Solution software suite is designed to capture images directly from a variety of hardware sources. It allows direct control of digital cameras. IMT software also supports WDM, TWAIN drivers, and Plug and Play. The "Time Lapse Capture" tool provides accurate time interval analysis for video production from both analog and digital cameras. Video recordings can be saved in AVI, MPG, MPEG and MOV file formats. Time is also displayed during recording.

Live Measurement and Overlay

- Measuring and analyzing large numbers of images can be time-consuming. With the "Live Measurement" feature, there is no need to capture images to perform measurements. You can measure, analyze, sort and manage them in the "Live Measurement" window. You can also export measured data, images, statistics and diagrams to MS Excel in real time. These high-speed live measurements can be performed using both CCD and high-resolution digital cameras. Crosshair generation and grid masks are also available in the "Live Measurement" window based on the calibrated scale.

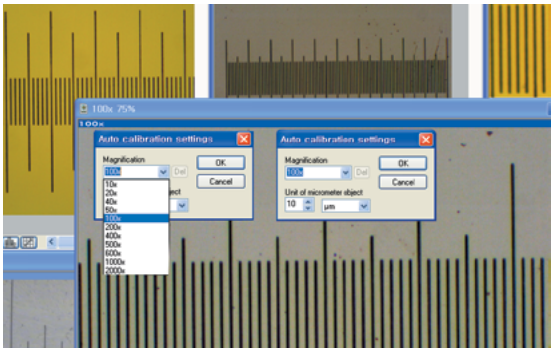
Calibration (automatic and manual methods)

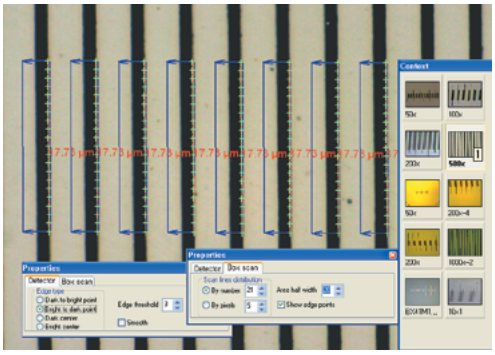
- All measurements start with accurate calibration. Automatic and semi-automatic calibration allows the software to automatically calculate the unit value per pixel. All you have to do is set the unit of the calibration scale and the minimum distance between the scale marks. This feature greatly improves the accuracy and repeatability of your measurements.

  Manual calibrations can be easily added and loaded from the drop-down menu. All calibrations can be saved as a file. When you open this saved file later, the existing calibration values will appear.

  Calibration can be protected with a password option. Two password options, one in the calibration menu itself and one in the camera resolution options, protect the calibration from unexpected changes.

  You can add a scale bar to each image. The scale bar properties for color, size, and text can be easily optimized to suit different image background conditions.



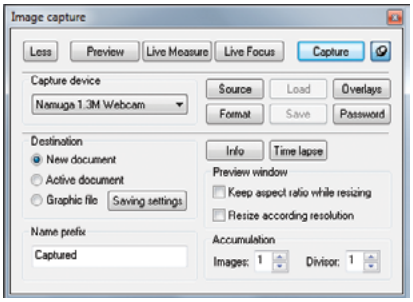


Auto-calibration adjustment

- The “Adjust Resolution” option in the Calibration menu allows you to use any camera capture resolution, regardless of the image resolution used for calibration.

Easy to handle from the same menu window

- “Image Capture”, “Live Measurement”, “Live Focus” and “Overlay Settings” are all in the same menu window. Users can easily handle all functions from the same menu window.

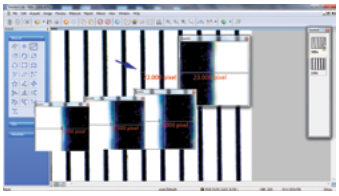


Shading Correction

- The edges of images taken at low magnification often have background shading. The shading correction function can solve this problem.
  The colors of the original image remain the same. A reference image is obtained from a blank space on a slide glass or an out-of-focus image of a metallurgical specimen. This reference image is used to correct the background shading of other captured images.

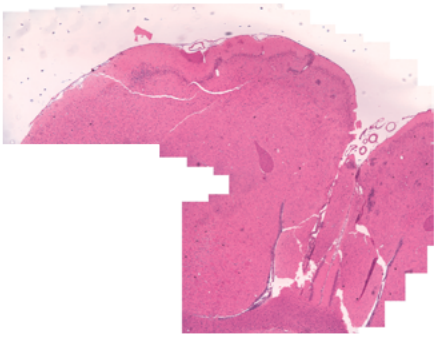
One pixel control measurement for ultimate accuracy.

- Measurement accuracy has been significantly improved. 1-pixel accuracy is guaranteed. It is not easy to point to the exact location with a mouse click. It is practically impossible to control 1-pixel accuracy with a mouse drag. Using the keyboard arrow keys, the user can move the mouse point 1 pixel at a time. You can use the zoom window function in the “View” menu to see the 1-pixel movement. The “Enter key” is also used to start and end line measurements.



Live Image Stitching

- You can achieve similar results without a motorized control stage. Just move the X/Y manual stage by hand and you will get the same performance results.
  No need to capture an image. It's all done live.
- Live Focus Enhancement
  Just click the “Live Focus” menu and move the Z axis of the microscope by hand.
  The entire process takes place live.



Measurement

- IMT software provides a variety of measurement tools for measuring length, area, angle, etc. The software can automatically detect the outline of an object and then perform the specified measurements. The software is equipped with many essential measurement functions, including 3-point circle diameter measurement, N-point circle measurement, parallel line distance measurement, vertical distance measurement, distance between objects, automatic object contour tracking, and etc. You can also use the “Zoom Window” to check the exact measurement point on the object. After measuring the specimen, you can export the image, measurement data, statistics, and classification graphs to an Excel file, either all or selectively.

Microscope Focus Enhancement

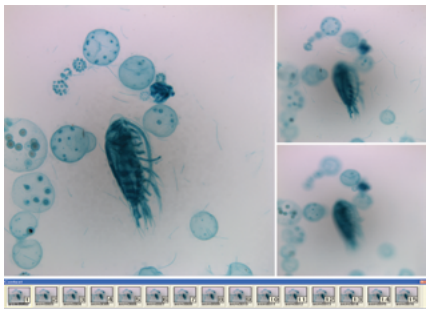
- Specimens with curves or differences in height may have difficulty obtaining an image with all areas in focus when observed at high magnification. IMT software combines multiple images with different focus positions to provide a single, sharp image that is in focus everywhere. This feature leaves no trace made by overlapping multiple images. Even when using a stereoscopic microscope where the position of the image moves continuously in a certain direction when moving along the Z axis to obtain an accurate focus, a perfectly focused image can be obtained. The software automatically readjusts the position of each moved image. Stereo microscopes use two lenses positioned at different angles to observe. To obtain a focused image, the stereo microscope moves up and down the Z-axis and takes a series of partially focused images. As a result, we get images that keep moving in a certain direction. The IMT software automatically compensates for these shifted positions to produce a single image that is perfectly focused. IMT software has four different focus enhancement (extended depth of focus) methods, as shown below. You can choose the one that best suits your application and specimen.

- Live Focus
  There is no need to capture an image for focus enhancement. Simply click the “Live Focus” button and then move the focus knob on the microscope. Everything happens live.

- Perfect Focus
  It can be used for best results. Even the finest details of the specimen are reproduced. It takes slightly longer than the “Fast Focus” function. The algorithm used for “Perfect Focus” is different from the “Fast Focus” function.

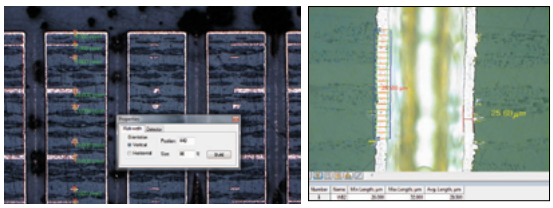
- Fast Focus
  The processing time is very fast.
  This feature is used when both processing time and best results are considered simultaneously.

- Stereo Microscope Focus
  It automatically aligns the position shift that occurs when moving the stereo microscope's Z axis.



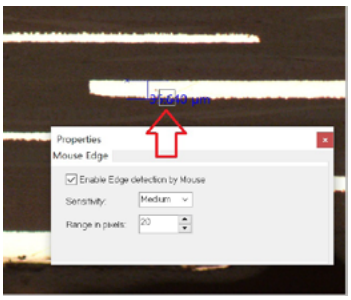
Automatic Edge Detection and Multi-Width Measurement

- The software automatically detects the edges of the object being measured. The automatic detection feature simplifies the process of determining the beginning and end of the object being measured, making image measurement and analysis tasks faster and more accurate. Each width in the vertical or horizontal direction is automatically measured.



Automatic Edge Detection by Mouse

- It is very difficult to click exactly where you want to measure using a mouse. There will always be mouse click errors. In such cases, please use the auto-detection function for mouse clicks. When you bring the mouse close to the location you want to measure, it will automatically specify the exact location.



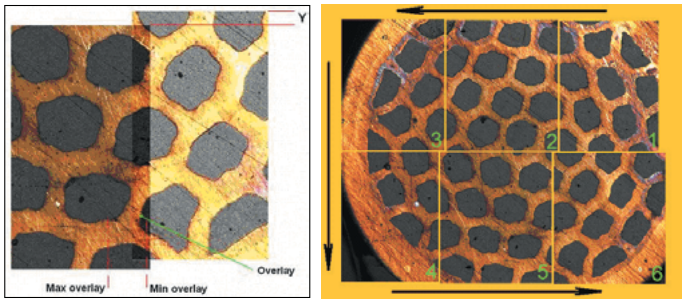
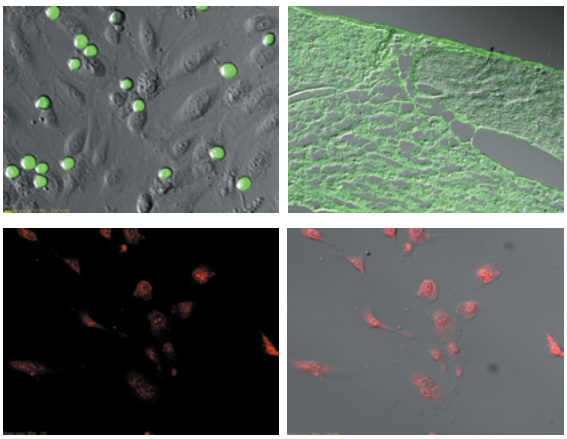


Image Stitching

- This feature allows you to combine images taken in succession to create one large mosaic image. The combined image will not show any traces of the previous edges. The brightness differences in each image are also automatically corrected.

Fluorescence Image Composition

- This feature allows you to create a composite image using fluorescence images captured through mono and color channel filters. It provides a variety of methods including addition, masking, and averaging.



Advanced Fluorescence Image Composition

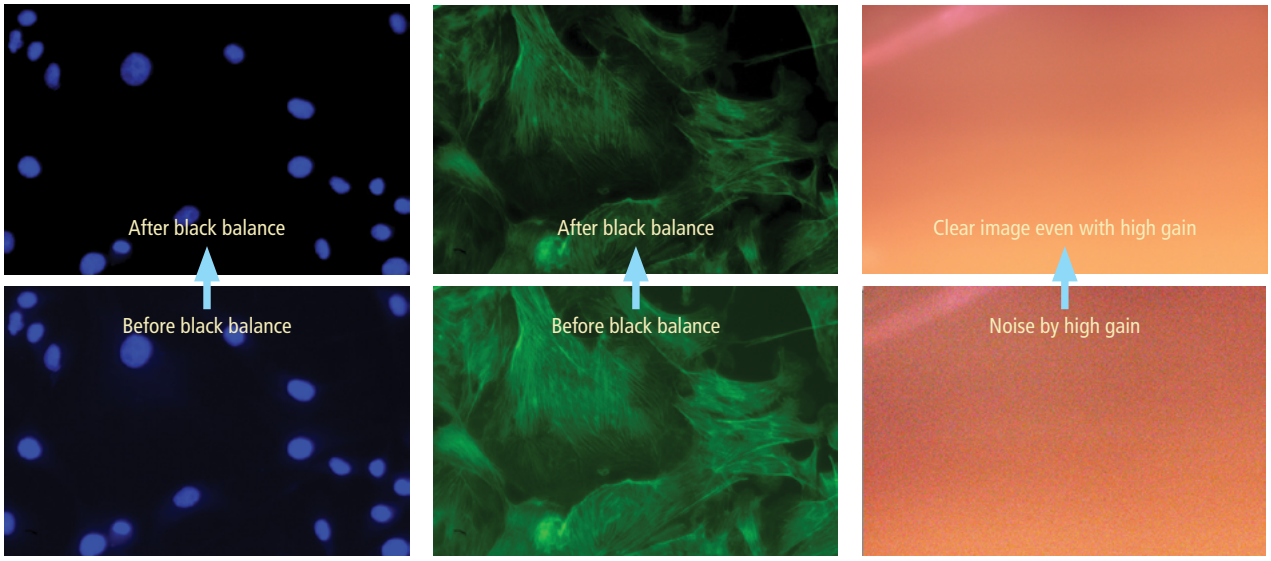
- The “Custom Dye” option has a rich list of 134 predefined dyes. The colors can also be modified using standard Windows colors. The Dye Selection dialog allows the user to select an emission wavelength and the corresponding color is automatically displayed. The window size can be freely adjusted by dragging the mouse. The intensity control allows specifying the weight intensity of the image in the final merged image.

Camera features specifically made for fluorescence applications by IMT iSolution Inc.

- Black Balance

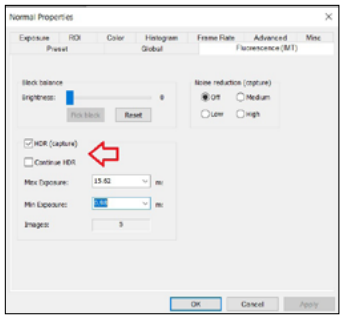
  When acquiring fluorescence images, the background is often not completely black, but rather takes on a green, red, or blue tint. This problem makes it difficult to acquire clear and distinct fluorescence images. IMT's “Black Balance” function enables real-time “Black Balance” adjustment regardless of the camera type. By using this function, users can acquire clear fluorescence images with a completely black background regardless of the camera type.
- Noise Reduction

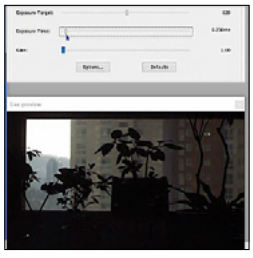
  When acquiring very dark images such as fluorescent images, the exposure time and gain value are increased. In this case, noise inevitably occurs. If you use the noise reduction function of IMT, you can acquire a clear picture with noise removed even if you increase the exposure time and gain value.



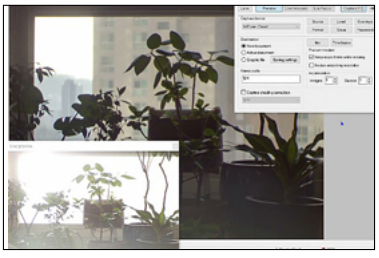
- HDR (High dynamic range)

  The camera cannot capture bright and dark subjects at the same time. In this case, it takes a series of photos with different brightness levels (exposure times) and merges them into one photo so that both the dark and bright parts are captured well. This is useful when the bright and dark parts need to appear at the same time.


• HDR (High dynamic rage) function

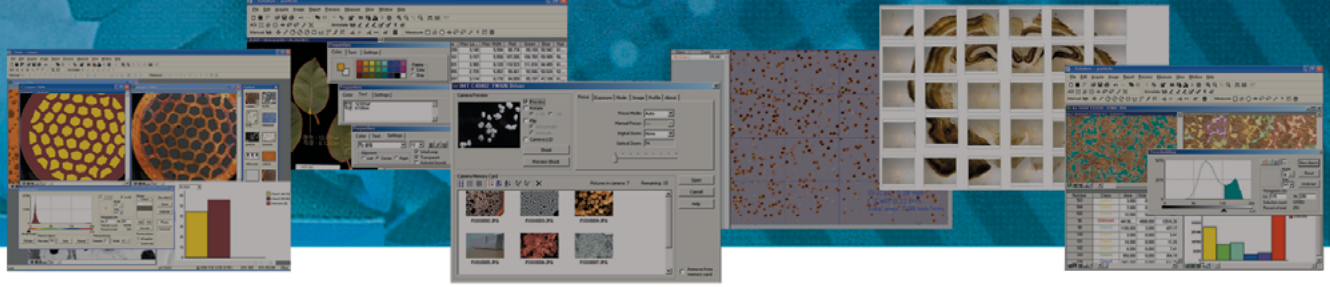

• Very dark


• Very bright


• All parts are visible

Count and Size

- IMT software detects specific objects and automatically counts them. You can detect objects and generate various data by dragging the mouse on the threshold menu. IMT software handles time-consuming calculation functions with simple mouse clicks, providing unparalleled speed and accuracy. The measurement tool provides 64 measurement parameters, including the equal circle diameter, ribbon length, line length, circle SF and ellipse SF, etc. It also provides automatic statistical output, alignment of measured data objects, generation of data tables for images, automatic correction of extracted objects, automatic separation of complex objects. All results or selected results are exported to Excel.

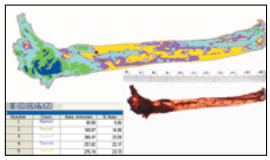


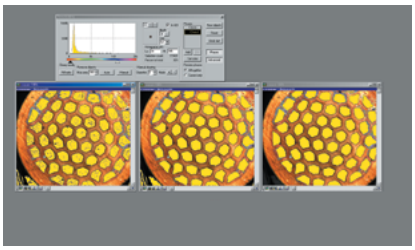
Creating Video File

- All versions have time-lapse capture function. You can save video recordings in AVI, MPG, MPEG and MOV formats. When recording video, the elapsed time is also captured, so you can check the capture time again when playing back the video images.

Phase Analysis & Advanced Thresholding

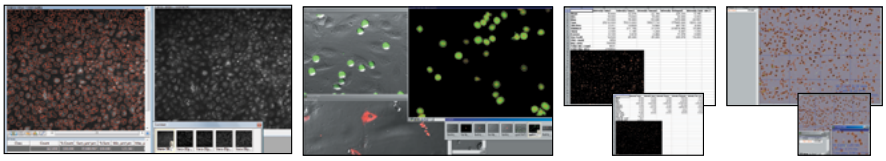
- It allows you to perform phase analysis on the entire image or within a specified region of interest (ROI), and threshold the image using Gray Scale, RGB, HSB or YUV. You can also manipulate the image automatically or manually using various tools such as “Fill Holes”, “Removal & Adding Objects”, etc. during the thresholding stage of the phase analysis. The phase analysis becomes more accurate because you can manipulate the image even after the thresholding stage. All results of the phase analysis are displayed simultaneously in the form of statistical data and charts. You can also export the image, object data, statistical data and charts directly to Excel.





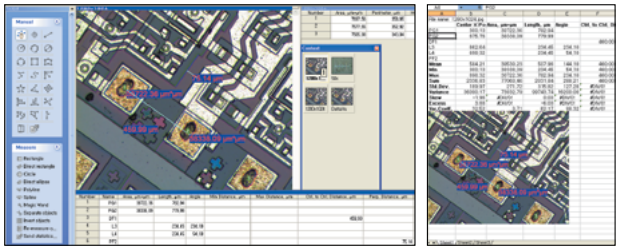
Cell Count and Intensity Analysis

- This feature allows you to automatically count stained or live cells having irregular shapes and clumps. With a simple mouse click, all cells are automatically counted. Seven types of intensity values (min, mean, max, integral, standard deviation, mode, median) are measured from the counted cells.



Densitometry

- Densitometry is a quantitative measurement of optical density. It identifies objects and records the optical intensity integral for each object using three different options: automatic, semi-automatic and manual. You can export the resulting data and images to MS PowerPoint with a simple mouse click.

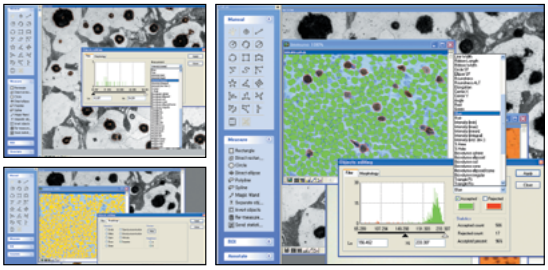


Unique and versatile measuring tools

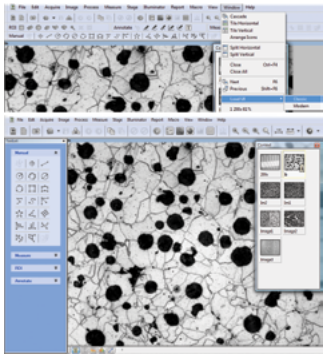
- You can measure straight lines and curves, diameters, radii, distances, areas, vertical distances, and more using unique and versatile measuring tools.

Objects Editing

- IMT software provides a special set of tools to improve the accuracy of object counting and measurement. It includes various morphological tools such as erosion, dilation, opening, closing, etc. It also allows for further editing by applying various filters. It provides object separation and editing, size, intensity and many other parameters. This makes it easy to identify and classify images that are difficult to analyze. The right set of filters and operations can be added to macros that are created for repetitive tasks.



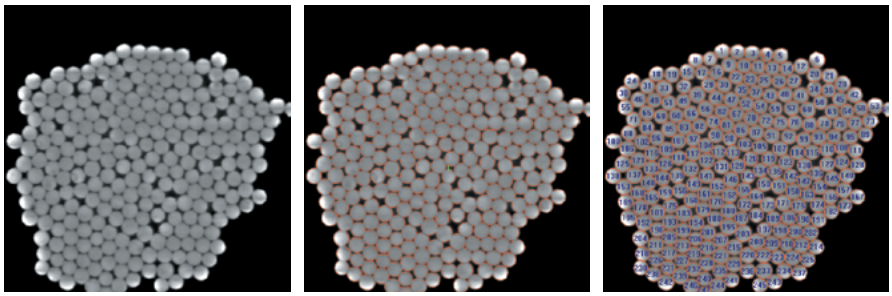
Dynamic User Interface



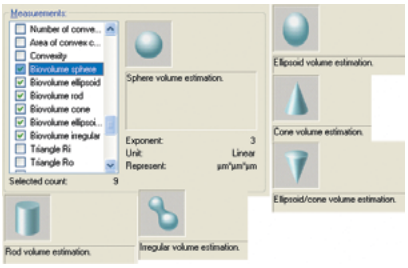
- The i-Solution series programs provide a user-centered environment. We have abandoned the developer-centered experience and provided an actual user-centered environment. We designed it so that users can directly select and edit the UI according to their own environment. We also created a graphic environment that anyone can easily recognize in various environments.

Auto Segmentation

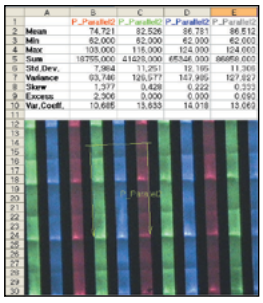
- After thresholding, overlapping objects are automatically segmented with a simple mouse click.

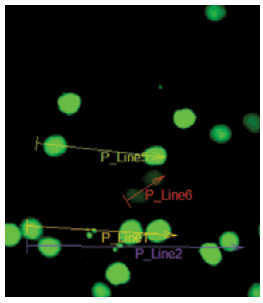


Stereometry for Biovolume



- The 3D volume of an object is calculated from 2D measurement parameters. This helps in estimating the 3D volume of various living organisms that rarely maintain a fixed shape.



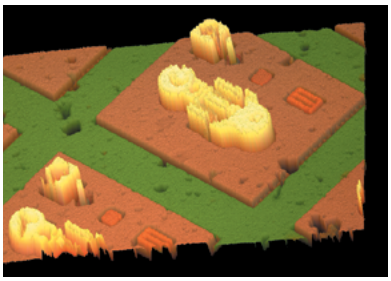


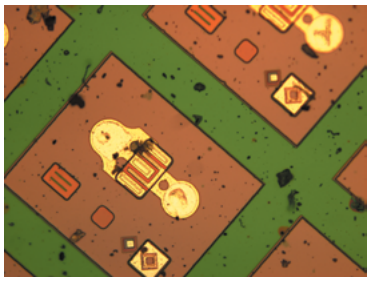
Line and Box Profile

- This feature displays a graph of pixel intensity values for each line drawn over the image. The X-axis represents the position of each pixel. The Y-axis shows the intensity values for the red, green, blue, and grayscale channels. Measurement data and statistics for all lines are exported to MS Excel.

3D Visualization

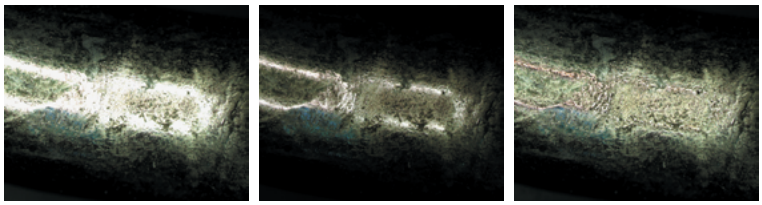
- A 3D image is generated based on the brightness of the image. This allows better visualization of the surface. The 3D image can be rotated 360 degrees around the XYZ axes.





Removing the Reflected Light

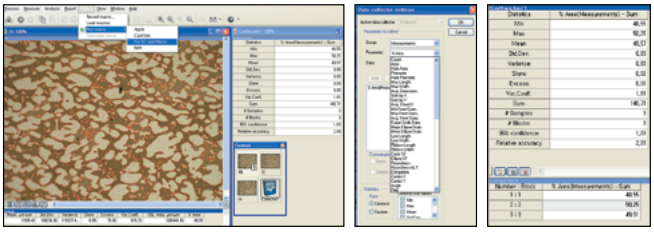
- This feature removes reflected light, such as when observing a metal surface. It combines a bright image with reflected light and a dark image without reflected light, creating a single image that shows the details of the specimen while eliminating the reflected light.



• Before • After Correction by Two Images • After Correction by Five Images

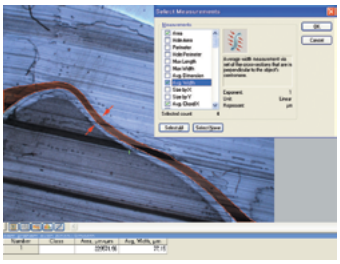
Data Collector and Macro

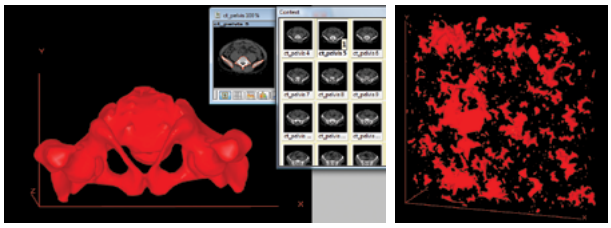
- IMT software provides data collection functionality to collect, store, accumulate and statically process data from one or more image documents. Data extracted from one image cannot be considered as having the same value as data from all specimens observed under a microscope. The data collection functionality provides a solution to this problem. It automatically collects statistical data while capturing images or using images already captured. Statistical data for the entire specimen can add reliability to the research results. Macros are very useful for recording and re-implementing repetitive tasks. The macro function allows you to record the performance of repetitive functions and execute the entire process at once with a single mouse click. This minimizes time loss and measurement error rates due to repetitive measurements. The created macros can also be edited, saved and deleted. The editing function allows step-by-step execution and modification.



Average Width Measurement

- Automatically measures the average, maximum, and minimum width of objects of various shapes. Measures the cross-section of all pixels perpendicular to the center of the object.





3D Reconstruction

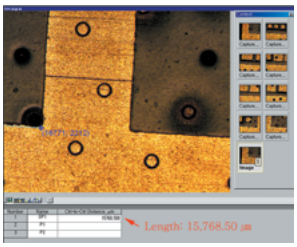
- Three-dimensional pictures are created based on the Z stacked images. 3D images are observed by 360 degree rotation on the X/Y/Z axis.

Software Improvement and Development

- Each image has its own unique properties. It is not possible to meet all analysis goals with limited options. IMT i-Solution Inc. can provide the optimal algorithm to meet the user's request. A unique algorithm is created for each application.

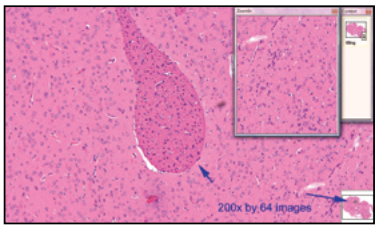
Large size object measurement

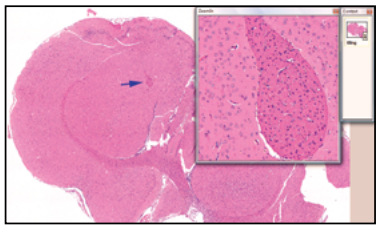
- Until now, users could only measure images within the microscope field of view (FOV) without a secondary tool, such as a measuring stage with a linear scale attached. This feature overcomes these limitations and provides a new and advanced tool for image measurement. The software tracks the movement of objects within the image at high speed and then uses the results to automatically extrapolate the distance between the two objects. The expensive and time-consuming measurement steps previously used to measure specimen that exceed the full screen size are no longer necessary. Image & Microscope Technology (IMT) holds the patent for this technology.



Virtual Microscope and Image Analysis

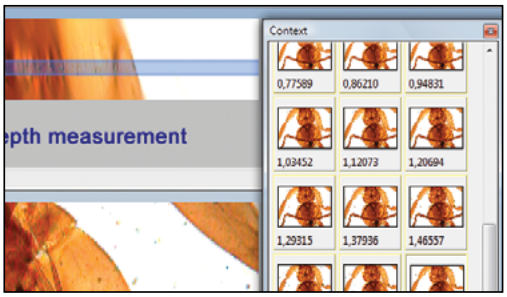
- Automatic image stitching can be performed in conjunction with image analysis. The “Run Macro for Each Frame” option allows you to run an existing macro for each acquired image before moving to the next step position for automatic image stitching. The Auto Focus Correction feature allows you to choose from a variety of methods to achieve the correct focus for each frame before taking the picture. Multiple Z-stack images can be acquired for combined focus enhancement (extended depth of focus) and automatic image stitching. This feature can also be used with images taken with a stereo microscope.

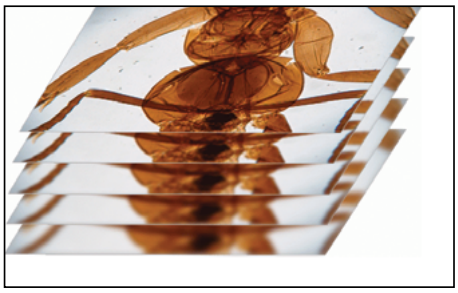





Z-Depth Measurement

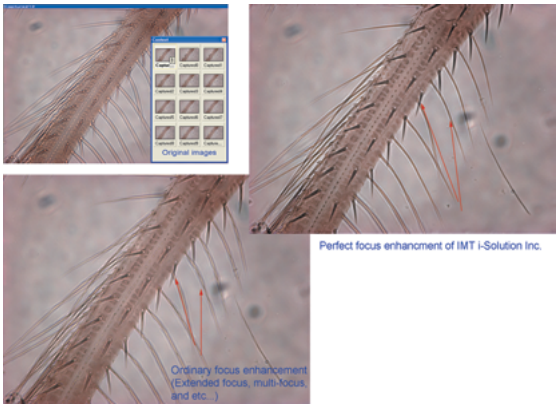
- The Z-Depth Measurement feature allows each image to be captured at its own Z position. This allows depth measurements to be taken across the entire image set. This command also allows cross-sectional measurements across the entire image set in the Z-stack.





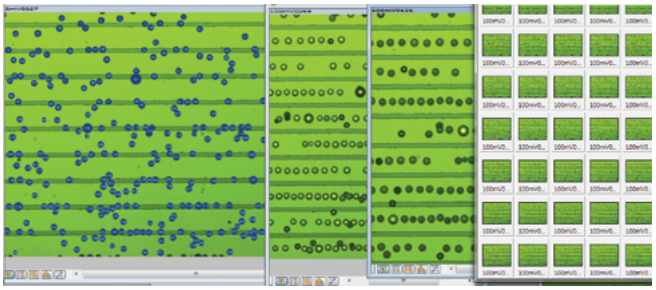
Perfect Focus Enhancement

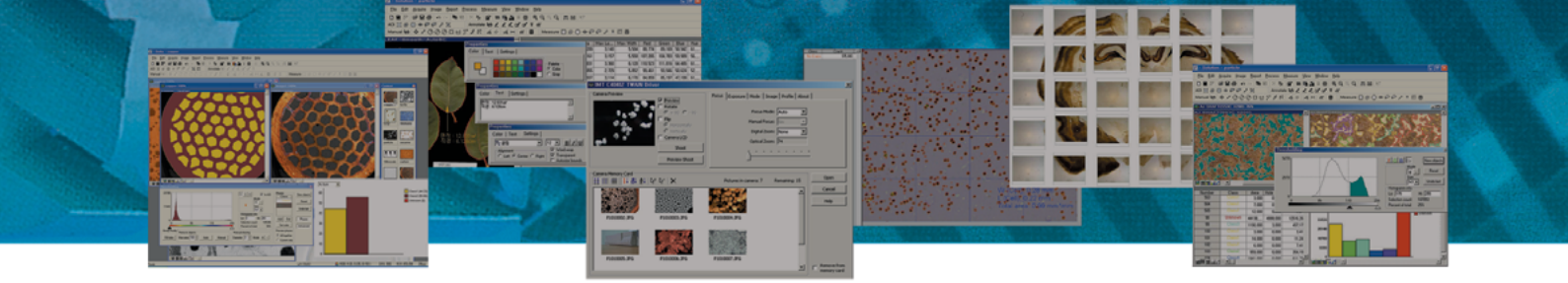
- IMT software provides perfect focus enhancement which uses different theory and algorism from ordinary similar functions in other software. Better crisp details are seen by perfect focus enhancement.



Z-Direction Object Tracking

- Changes in measurement values are tracked based on user-specified parameters. Z-direction and X/Y are considered. Automatically detects and tracks moving objects in X/Y and Z-directions over time.





In addition to the features mentioned so far, i-Solution / DT-L / DT / DT-M also include the following features:

Phase analysis
Densitometry
Live cell count
Illuminator control
Particle analysis
Live focus enhancement (Live extended focus)
Live image stitching
Objects counting by volume.

DT-L / DT / DT-M, excluding i-Solution, include the following additional features:

Graphite analysis of spheroidal cast iron
{ASTM E2567-16a, ASTM A247_2010, ASTM A247-67(1998), ISO/TR 945-2: 2011, JIS G5502(2001), KSD 4302(2002)}, ductile cast iron, gray cast iron, compact graphite cast iron

Grain Size Measurement
ASTM E112-24/13/12 (2024 / 2013 / 2012), ASTM E1382-97 (2023), ISO 643: 2024 / 2019 / 2012, KSD 0205. JIS G0551

Verification of Software Accuracy
IMT software has a software accuracy verification for grain size measurement according to the standard photos provided by ASTM.

Chart Navigator
Grain size ASTM, Grain size ASTM_precise, Twin Grains ASTM, ASTM A247_2010 Distribution, ASTM A247_2010 Flake Size Grade, ASTM A247_2010 Graphite Form, ASTM A247_2010 Nodule Size Grade, ISO TR 945-2_2011 Graphite Form, Sintered Cast CGI (Compact Graphite Iron).

Coating Thickness Measurement

Particle Shape and Size Analysis

Raw material particle count and diameter analysis

DAS-ARP1947-2007-08

DT and DT-M, excluding i-Solution and DT-L, include the following additional features:

Non-metallic inclusion rating analysis
EN 10247 (2007), ASTM E2283, ASTM E45 (2002), E1122, E1245-03 (2008), DIN 50602 (1985), ISO 4967(1998), KSD 0204 (2002), KSD 0204(1982), JIS G0555 (1977), JISG 0555 (2003).
Two analysis approaches, stereometry and JK, are implemented.

Multi-phases Grain Measurement
DT and DTM provide better "Grain size measurement" environment.Grains with multiple phases, such as aluminum alloys, are also automatically detected and measured.

ASTM E1181-02: 2023
Standard Test Methods for Characterizing Duplex Grain Sizes

ASTM1268-19 Banding Analysis
Evaluation of Banding or Directionality of Microstructure according to ASTM E 1268-19

Volume Fraction by Systematic Manual Point Counting (ASTM E 562-05)
The volume fraction of retained austenite and ferrite is commonly measured.

Rusting degree analysis (ASTM D 610-2008 and JIS H 8681-2: 1999)

Glass Fiber Measurement
Yarn Filament analysis
Fruit size analysis

DT-M, excluding i-Solution, DT-L and DT, includes the following additional features:

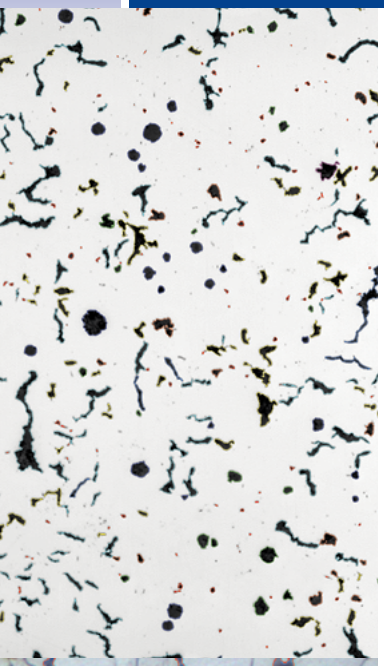
All motorized control stage applications including NMI (Non-metallic inclusion rating analysis), Filter contamination analysis, and etc.

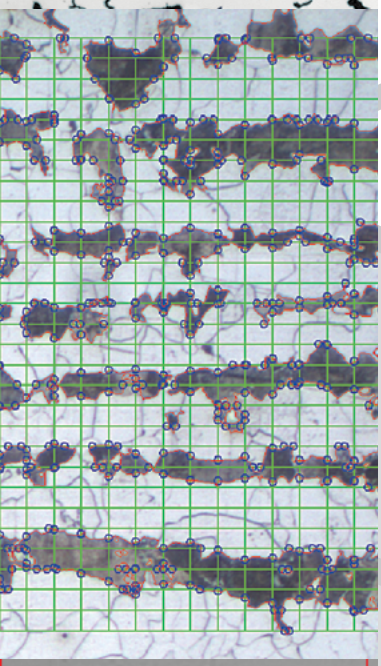
3D Reconstruction and Measurement
3D Surface Analysis

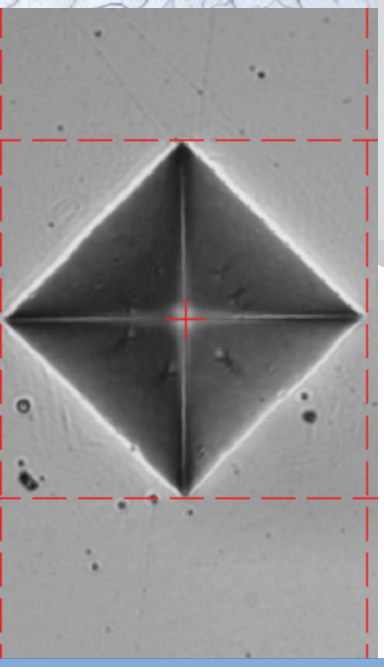
Virtual slides, automatic X/Y/Z positioning, etc.
Customized application support
Customized reports
Z-depth measurement

DT-M / DT / DT-L
i-Solution™
iSolution AutoPlus
iSolution Lite

MHT-M / MHT-Premium / MHT AutoPlus







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