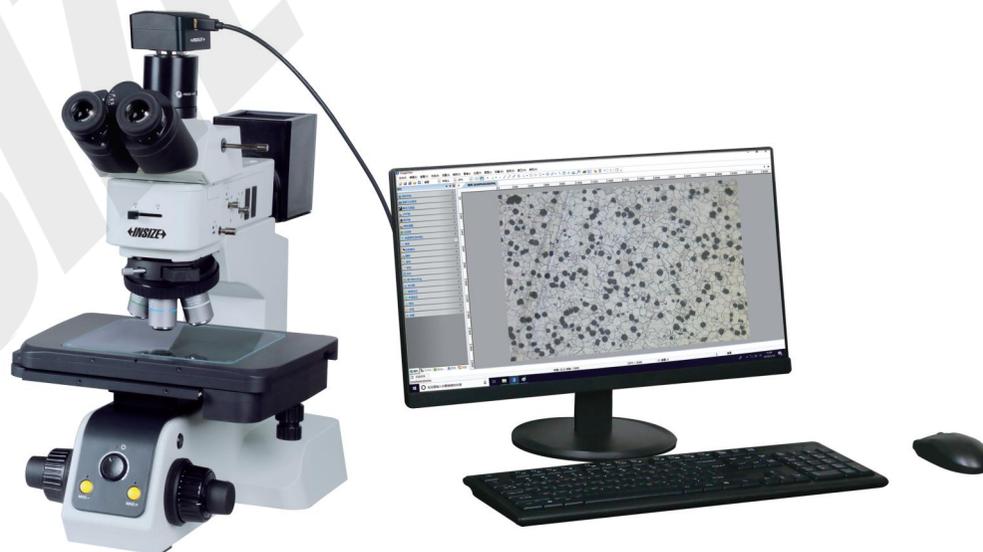ISM-MAS100

METALLURGICAL ANALYSIS SOFTWARE OPERATION MANUAL

INSIZE

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MN-ISM-MAS100-E

V0

Direction

1. Production recommendation

2. System calibration

3   Main function

4. Other function

5. View Info

6. Professional function

6.2 light fig of three dimension

6.3 Image Database

6.4 Picture contrast

7. Typical module description:

[001] The average grain size determination of metal (area method, intercept method) ... GB 6394-2002

[002] The average grain size of the metal_cut-point method

[011] Steel Determination of nonmetallic inclusions - Micrographic method using standards diagrams ... GB / T 10561-2005 / ISO

[011] determination of non-metallic inclusion content in steel - Micrographic method using standard rating chart GB / T 10561-2005 / ISO 4967:1998 / JIS g 0555:2003 (type C)

[039] metallographic examination of nodular cast iron - spheroidizing classification and evaluation GB/T

9441-2009(4.1)

[040] metallographic examination of nodular cast iron graphite size and evaluation GB/T 9441-2009(4.2)

[041] metallographic examination of nodular cast iron number of pearlite (suitable for less pearlite) GB/T 9441-2009(4.3)

[042] metallographic examination of nodular cast iron - pearlite quantity (suitable for more pearlite) GB/T 9441-2009(4.3)

[547] chromium nickel austenitic stainless steel weld ferrite content measurement method GB_T_1954_2008

[395] test method for volume fraction by system manual point counting ASTM_E562

<Metallographic Analysis Software> BOOK

1 Production recommendation

1.1 Productionbuildup:

- ProgramCD

- Dog

1.2 Runenvironment:

WINDOWS 7, WINDOWS 10

1.3 Software installation

- Software installation:

Software installation program running on the CD, follow the prompts to complete the installation of the software step by step.

- Dog driver programinstallation:

Run Dog driver program such as "HASPUserSetup.exe" on the CD.

- Camera installation:

According to the manufacturer's instructions.

1.4 Software authorization

- Currently my company all genuine software, all

you need to enter an authorization code to use.

- User client code (recommend using a mobile phone text message) to inform the seller, the seller will then inform the user authorization codes.

- After the user enters the authorization code, click on the "OK" button.

- Client code automatically generated by the hardware and the parameters of the computer operating system, when the computer hardware changes, or WINDOWS reinstall, you need to re-enter the authorization code.

**2 System calibration**

2.1 calibration process

- Click on the toolbar: Calibrate

- Two-way calibration at the same time, the software default equal horizontal and vertical
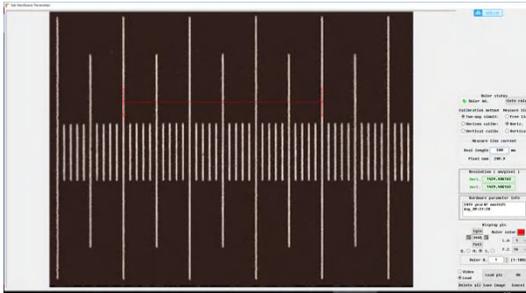
resolution

Select the "two-way simultaneous calibration", loaded micrometer image, drag the ruler, the actual length of the input scale coverage (as shown above, the actual length of the scale cover is 0.2 mm), enter the horizontal and vertical resolution will automatically get.

● Level Calibration: Get Horizontal resolution
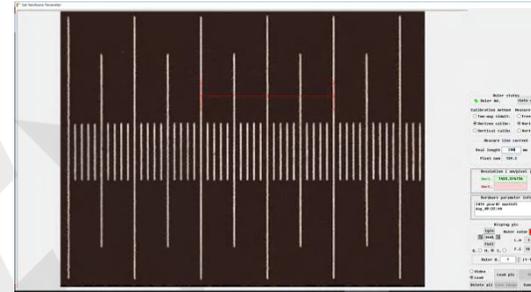
Select "Calibration level", into horizontal micrometer image, drag the ruler, enter the actual length of the scale covered (asfigure, the actual length of the scale cover is 0.3 mm), enter the horizontal resolution will be automatically.

● Vertical scaling: Get Vertical resolution

Select "Vertical calibration", into a vertical

micrometer image, drag the ruler, enter the actual length of the scale covered (asfigure, the actual length of the scale cover is 0.3 mm), enter the horizontal resolution will be automatically.

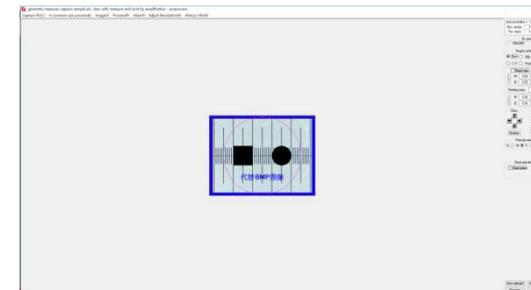- Calibration is complete, click "OK" to get the final calibration value:
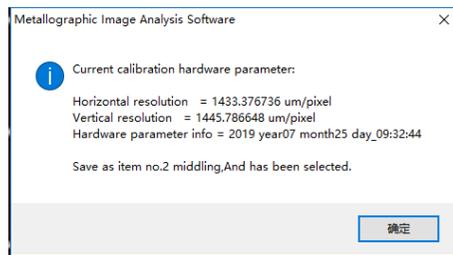
The calibration values will enter the calibration list:
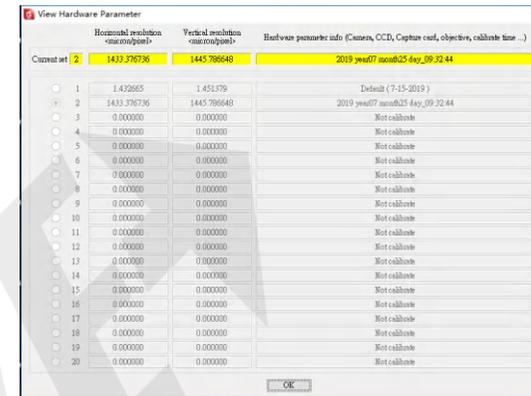
2.2 Calibration verification

- Click on the toolbar :

- First into the image preprocessing interface:

Click on "geometric measurements" to enter geometry measurement interface. In the interface,

with a straight measuring tools, the current ruler of the scale image is measured to see if accurate. Because of human error and drag the mouse, under normal circumstances, the measured value and real small error. In the figure below, to measure the true value of 100 micron length scale, the measured data of 99.36 micron length, can be considered, the measurement is accurate.
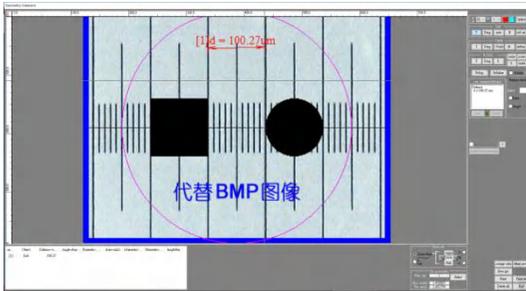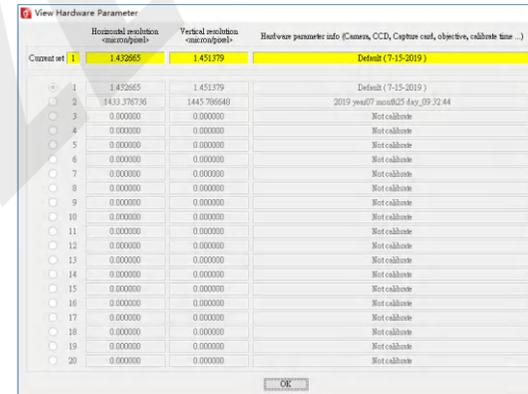

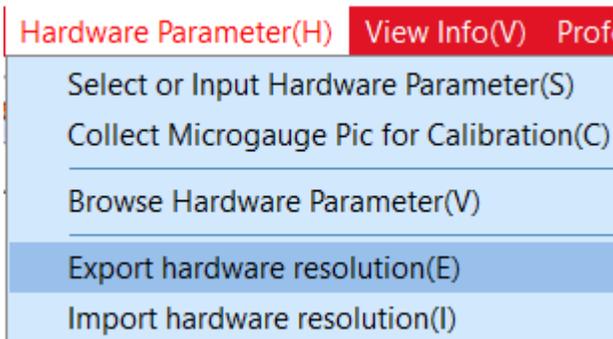
2.3 Check the hardware parameters

● Click the menu:
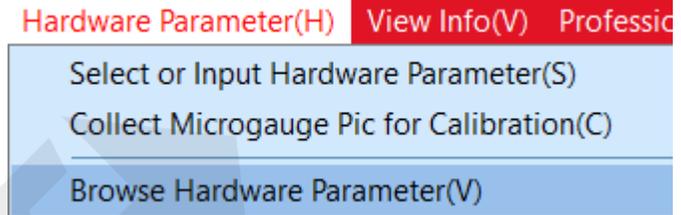
● You can browse default hardware parameter in this dialog box:
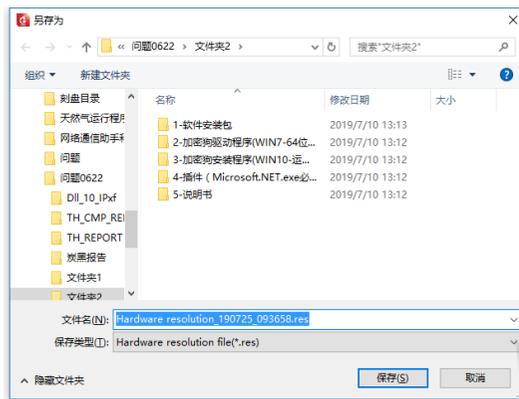

2.4 Export hardware resolution

● Click the menu:
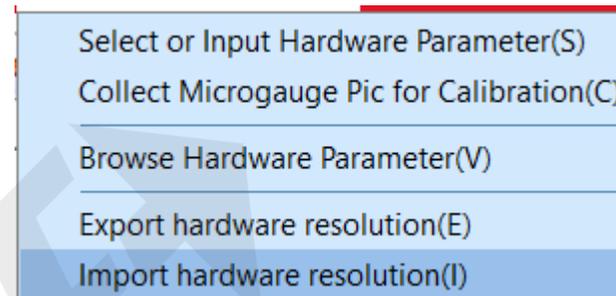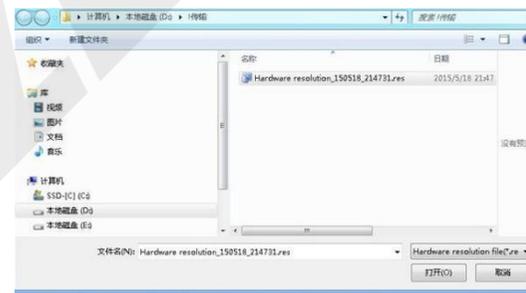
- You can export hardware resolution into a file:

2.5 Import hardware resolution

- Click the menu:

- You can import hardware resolution from a file:

3 Main function

3.1Assess grade

(1) Modules table

- Click the in the tool box:

- In the module selection screen, select the need to

analyze a small module (module section explains

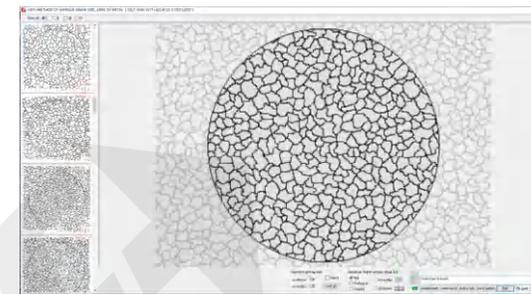visible Chapter 7 - case description):

(2) Compare ratings Principle:

In comparison rating interface, software has three

modes to choose from, each described below:

● "Full Window" mode:

Loading image, will be filled with the image

display area on the right, so that the user can observe

the loaded image detail. Screenshots are as follows:


● "Atlas multiple" mode:

Loading the image, and the pattern left by the

magnification power of the same size is displayed on

the screen, the user can intuitively be loaded and the

chart image in the image are compared, and the

obtained level.
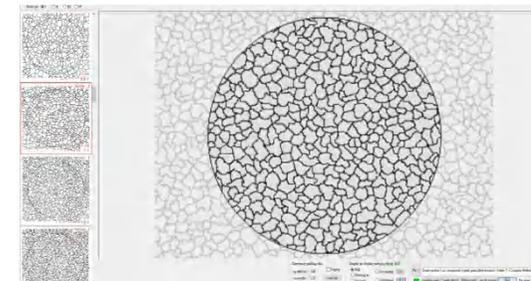
● "Original Size" mode:

Load the image, according to the size of the

actual camera when, without any scaling to the display area on the right.
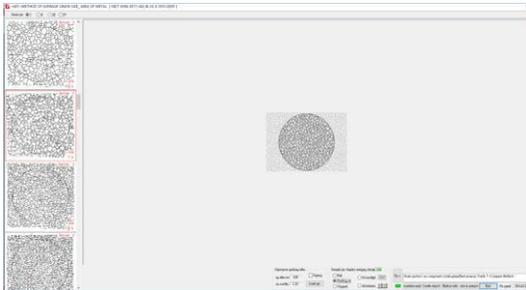

(3) Automatic rating

- Only when there is a quantitative criterion (such as formulas, percentage range, etc.) in the metallurgical standards, the module only with automatic rating feature.

- Because the actual sample preparation, the situation is more complex images captured almost impossible to make the same standard atlas image effects, therefore, requires the user to complete automatically when rating their own image processing, thresholding, etc.,

in order to find the microstructure associate.

- Automatic rating is to identify the microstructure, as long as identify the microstructure, the rating results necessarily correct.
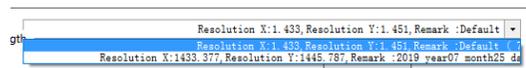
3.2 New report

- Click the in the tool box:

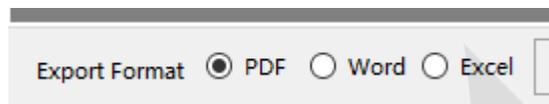- Select the desired report format
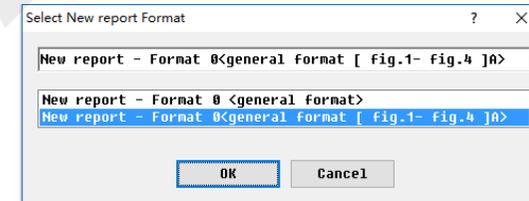
- Once selected, click "OK" to enter the editing interface of image information:

- When loading an image, you need to select the image corresponding hardware parameters

- After completion of graphic information entered, you can export the report to PDF, WORD, EXCEL three formats:

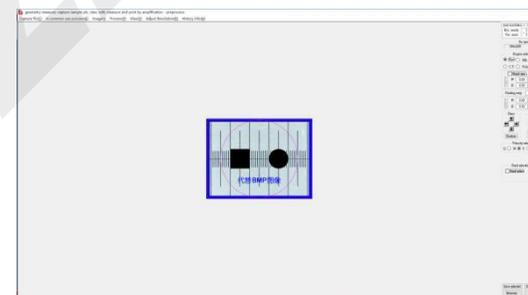Export Format ⦿ PDF ○ Word ○ Excel

3.3 Open report

- Click the Open in the tool box:

- Select the File:

- Open the File:

## 3.4 Gmage preprocessing

1) Commonly used treatment:

The software is often used image processing algorithms, To make a panel, Use rise more convenient.

2) Image processing:

Software provides the brushes, brightness adjustment, contrast and color adjustment, converted to gray image, gray levels, binarization processing, automatically reverse phase, sharpen, diffusion, median filtering de-noising, background brightness adjustment and background luminance equalization, RGB color separation, HLS color separation, gray level transformation, balanced, logarithmic increase, index of enhancement, linear enhancement, median smoothing and edge enhancement, edge detection, gradient, expansion, corrosion, opening operation and closing operation, critical binarization, threshold segmentation, critical threshold, accumulation threshold, the difference threshold, eliminate image processing tools such as a pen.
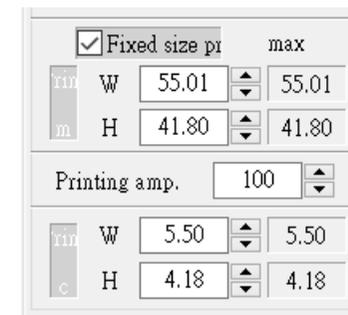
3) Regional options:

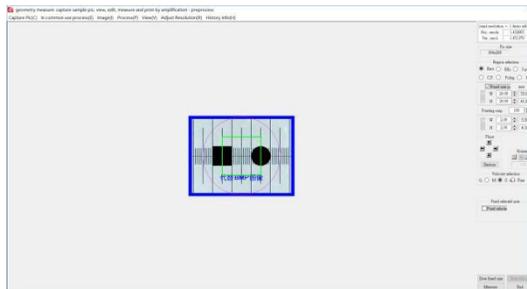The software provides the selection tools such as

---
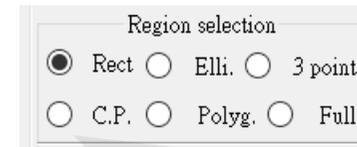
, Area selection is made to drag the mouse on the diagram.

4) Scale printing:

Set fixed printing size for selection, The following example:

- In this case, Scale of the width and height is set to 20 mm, Print the magnification is set to 100 times, Check the , Will appear the following effect:

- According to the micrometer scale visible on the map, Green, the actual width of the rectangular area and the height is 200 us, Pour the push back(200um×100=20mm), Initial setup and the actual effect is the corresponding
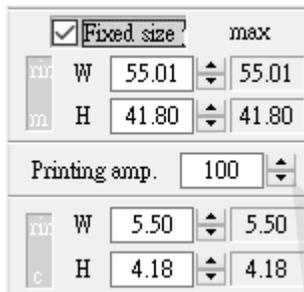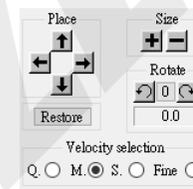

- Select [Save fixed size], The above the choice of the regional image stored in hard disk, After insert the image, print it out, with straightedge measuring area of whether the

width and height of 20 mm
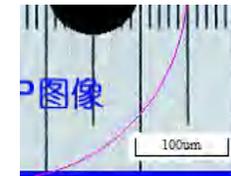
5) District mobile:

The software provides a tool such as

, Can be mobile, rotary district, also can adjust the speed of the district.
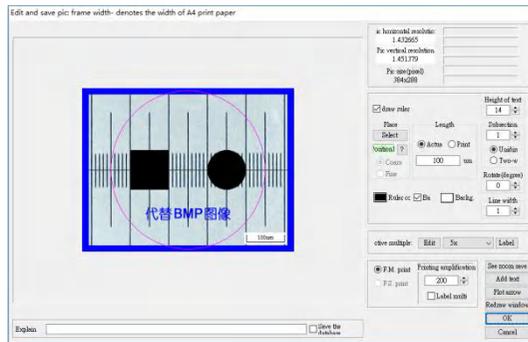
6) Set the pixel selection:

Can set district wide high pixel number, and then for selection.

7) Save selection or full figure:

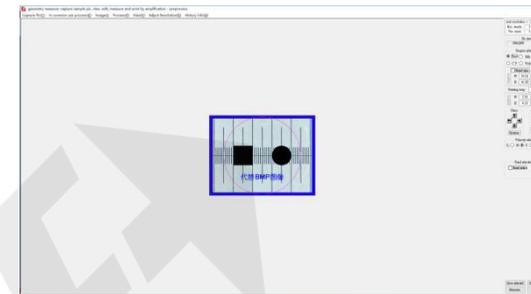District part can be saved as a BMP or JPG image,

save time, can set the print magnification of the image, can draw on figure scale, add text, draw the arrow, etc.
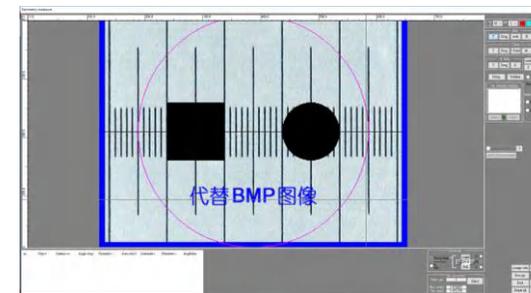

3.5 Geometrical measurement

- Click the [Measure] in the tool box:

- First enter the image pre-processing interface

- Click on "Measure" button to enter the geometric measurement interface. This module provides a distance, rectangle, circle, polygon, angle, angle between two lines a variety of measurement tools, line, curvature, etc., can be done to measure the basic geometry:
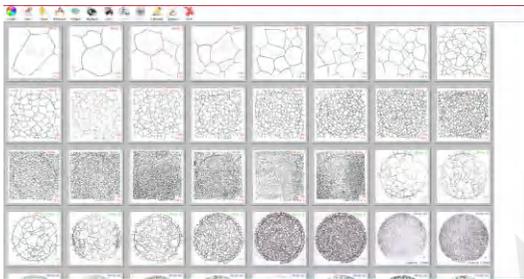

3.6View Gallery

- Click the ![Gallery](gallery icon) in the tool box:
- Select Gallery in the list:

- View Gallery:

3.7 Fixed Multiple Print
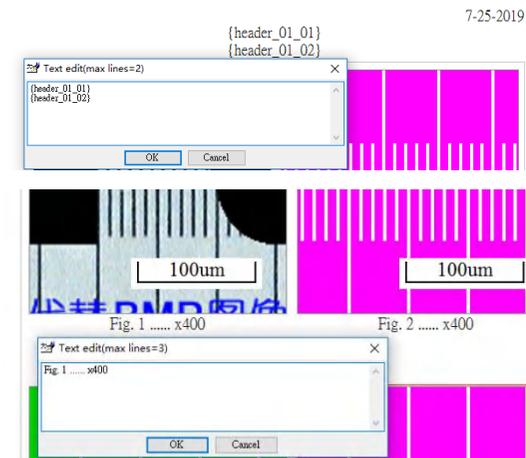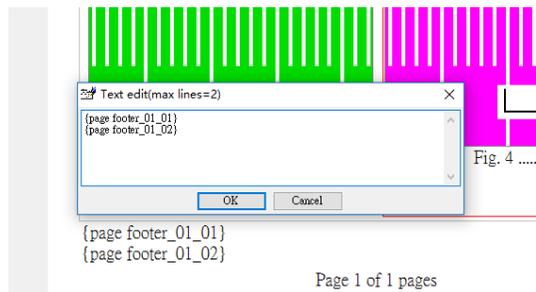
- Click the ![Multiple](multiple icon) in the tool box:
- You can load some images and theirnote in this

module:

- Move the mouse to the header, text area below the image, while the footer, the cursor will change, then click the right mouse button to bring up the text edit box.

{page footer_01_01}
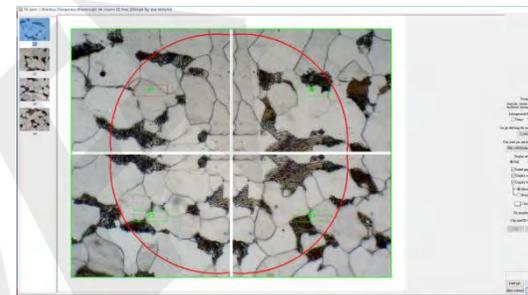{page footer_01_02}

Page 1 of 1 pages
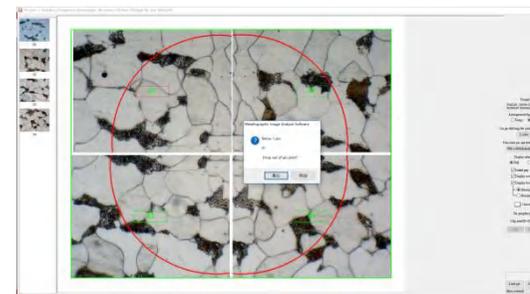
3.8 Image composed:

- Click the in the tool box:

- Click the "Load pic" button on the interface, select the desired image into the folder:

- After selecting the folder, click "OK" to enter the image synthesis of the main interface:

- After the image is loaded, displayed in the list on the left (see figure above), right-click on a sheet image, the maplike deleted from the list:

- Sort Figure Method: This software provides

Arrangement fig. method
◉ Drag a ○ Ranks

two kinds of ways to arrange map image row. If you select the "drag and drop", the user can use the mouse to the left side of the image in the image list and drag it to the appropriate position; if you select "Auto Arrange", the software will list on the left of the image is automatically arranged in the area to the right of the puzzle.
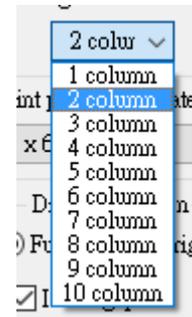
(The figure is select the "drag and drop" interface when)
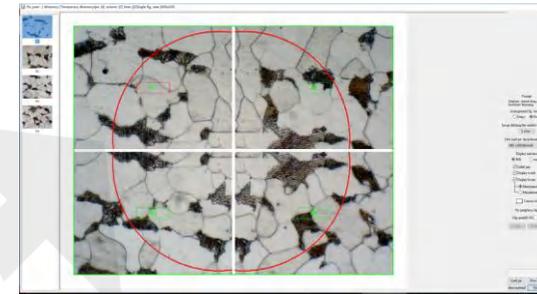
(The figure is to select "Auto Arrange" screen time)

● Number of puzzle columns: column adjustment puzzle, image position will change accordingly to suit the requirements of different stitching software several preset number of columns:
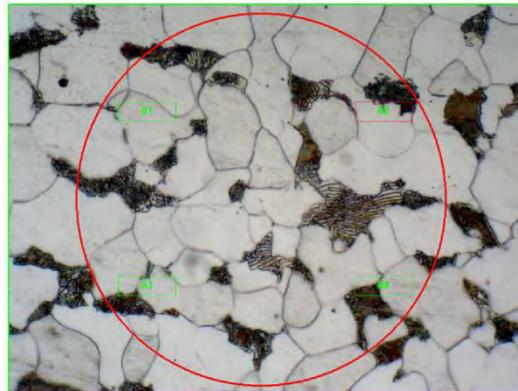
2 colur ∨
1 column
2 column
3 column
4 column
5 column
6 column
7 column
8 column
9 column
10 column

● Images Move: select one of an image can be

moved manually, by Joint pic: mouse drag, keyboard trimming .

- Effect pictured above before moving, the effect moved as follows:

- Display options: Display mode to select the image or picture is full.

- Initial gap: When an image is loaded choose whether to display the gap between images.

- Display overlap: When moving images, whether to show the overlapping portion of the shadow image.

- Display border: whether to display the image of a green border.

- Canvas color: Set the color puzzle floor.

- Cut Pixel: the edges of the image can be cropped.

3.9 Video equipment

- This module provides the following function keys, the following function keys can be easily loaded static image files can also be used to select the video equipment to capture an image, then the image processing, and the processed image is saved.

3.10 Specific modules

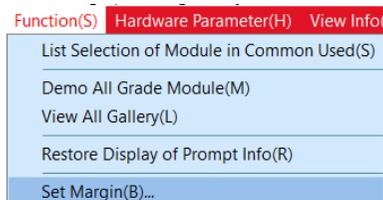Click here Special to enter customized special function modules.

4. Other function

4.1 Tool Box:
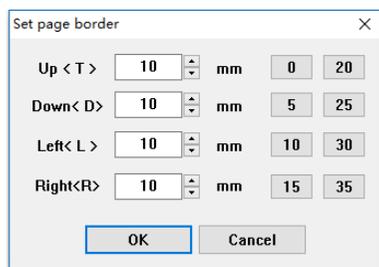
- The core features of the software are on the toolbar.

Grade　New　Open　Measure　Gallery　Multiple　Join　Special　Calibrate　System　Exit

4.2 Set Margin:

- Click the "Set Margin" "Function" menu:

Function(S)　Hardware Parameter(H)　View Info(
List Selection of Module in Common Used(S)
Demo All Grade Module(M)
View All Gallery(L)
Restore Display of Prompt Info(R)
Set Margin(B)...

- With this setting, you can change the report's margins:

Set page border

Up < T >	10	mm	0	20
Down< D>	10	mm	5	25
Left< L >	10	mm	10	30
Right<R>	10	mm	15	35

OK　Cancel

4.3 Print Setup

- Select "Print Setup""Function" menu:

Function(S)　Hardware Parameter(H)　View Info(V)　P
List Selection of Module in Common Used(S)
Demo All Grade Module(M)
View All Gallery(L)
Restore Display of Prompt Info(R)
Set Margin(B)...
Print Setup(R)...
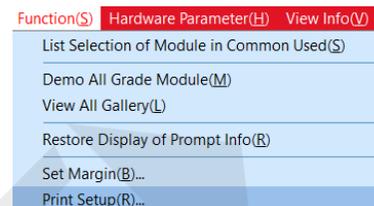
- With this setting, you can change printer settings:

打印设置

打印机
名称(N): Microsoft XPS Document Writer　属性(P)...
状态: 准备就绪
类型: Microsoft XPS Document Writer v4
位置: PORTPROMPT:
备注:

纸张　　　　　　　　　　方向
大小(Z): A4　　　　　　　●纵向(O)
来源(S): 自动选择　　　　○横向(A)

网络(W)...　　　确定　　取消
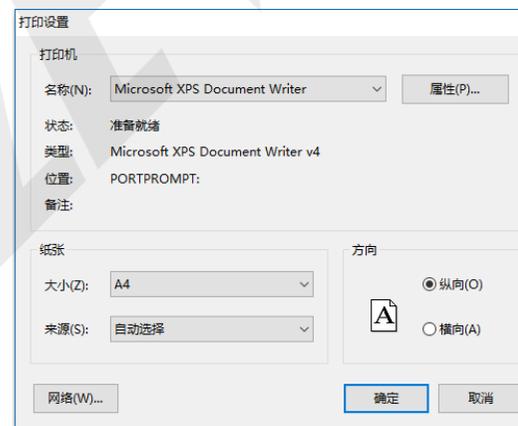
4.4 Select camera type

- In the "Function Select" menu, select the desired camera models (customer when ordering software, must inform the desired camera model). Here are some of the camera acquisition program
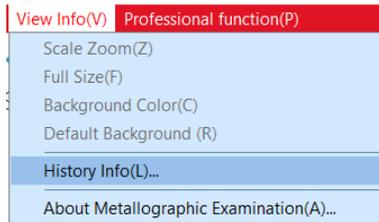
menu, check the item, as selected:

Use UCMOS05100KPA camera
✓ Use TOUPCAMSDK camera
Use TOUPCAMSDK Camera (new)
Use DirectX camera
Use TWAIN pic capture
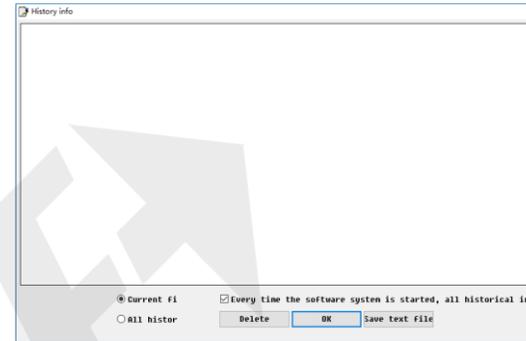
4.5 Exit: Exit software.

5. View Info

5.1 History Info

- In the "View Info" menu, click on "history" to enter the following interface, which related to data retention software for image analysis.
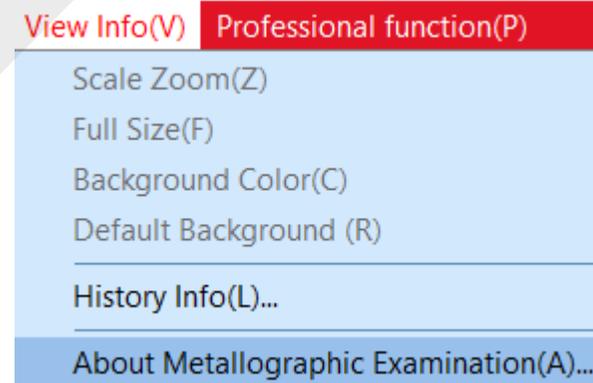
View Info(V) Professional function(P)
Scale Zoom(Z)
Full Size(F)
Background Color(C)
Default Background (R)

History Info(L)...

About Metallographic Examination(A)...

- History Info BOX:

History info

○ Current fi   ☑ Every time the software system is started, all historical inf
○ All histor   Delete   OK   Save text file

5.2 Edition statement

- Select "About…" in the menu:

View Info(V) Professional function(P)
Scale Zoom(Z)
Full Size(F)
Background Color(C)
Default Background (R)

History Info(L)...

About Metallographic Examination(A)...

- About Box:

6. Professional function

6.1 Picture focus

Multiple images of different depth merged into one clear image in the screen below, the majority are four different depth of field images, the next part is the result of a confocal after:
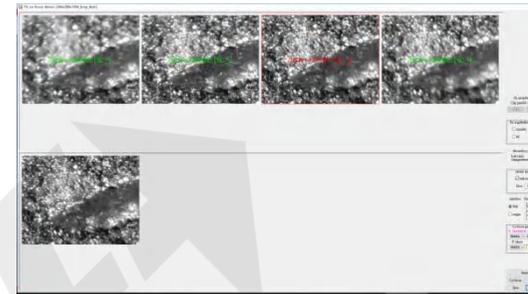

6.2 light fig of three dimension

● According to different pixels in the image plane of the tone to construct a three-dimensional effect of the image plane.

● In the following example, a metallurgical sample loading plan (upper right part of the screen is a thumbnail image of the microstructure),Software according to the RGB values of each pixel, which automatically generates a three-dimensional schematic diagram.

● After generate three-dimensional diagrams to visually observe the effect of the sample, for

example, the surface is smooth and so on.
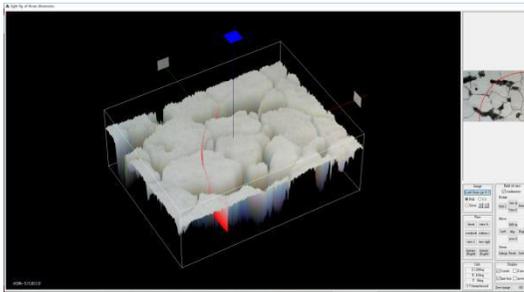
6.3 Image Database

The image file can be loaded into the software

image database can be loaded into another image to

the right image contrast:
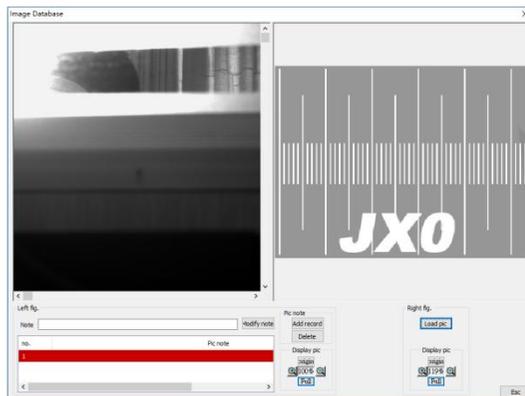
6.4 Picture contrast

In the upper part of the interface into the image,

the lower half of the image files into the database to

compare:
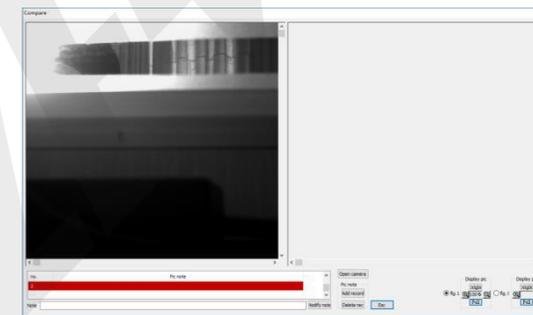
7. Typicalmoduleexplain

[001] Average grain size of metal _ Method for the

determination of average grain size of metal (area method) ...

GB / T 6394-2002 (5.2) & JIS G 0551: 2005

1. Compare Rating:

● The original image：
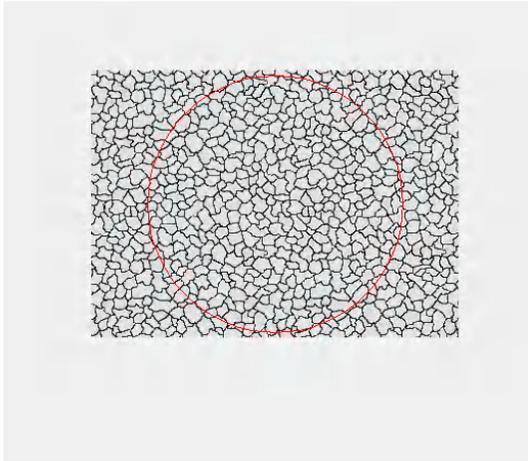
- Into the image contrast interface, select the "map multiple", after visual comparison, that the level of 5, in the left of the image list, click on the corresponding map 5:
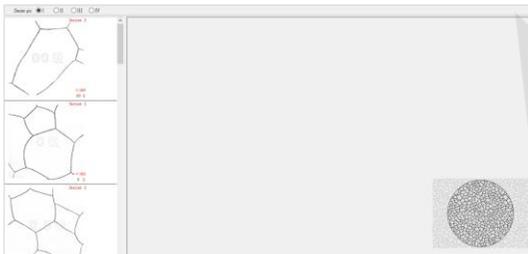
- The level will be displayed in the lower-right box:
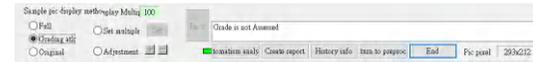
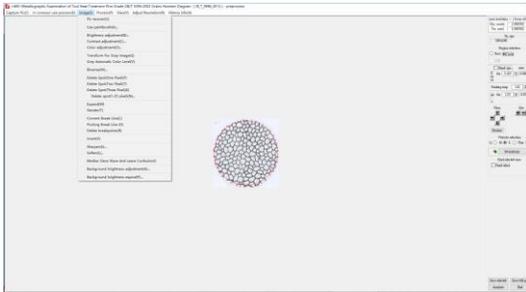- Click "Generate Report" button, select "Format 0" General Format Figure 1- 4 "A":
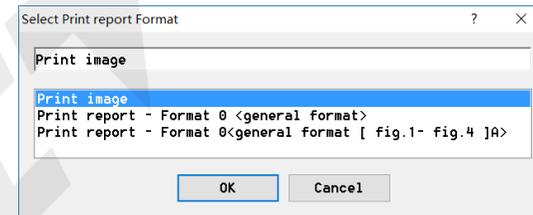
- The format can be sampled images and images in the map, printed on a report:
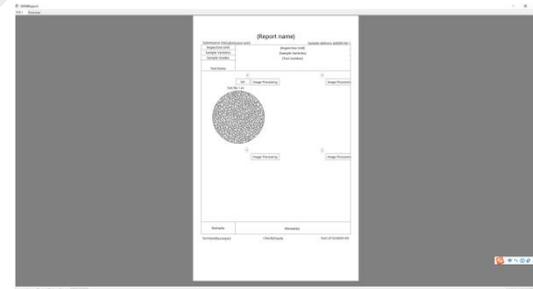
1. Area method rating

- After loading the image, in the image preprocessing interface, make the "Convert to Grayscale Image" and

"Grayscale Auto Levels"。

- Click "Auto Rating" to enter the analysis interface, the software will automatically search out the grain according to the search parameters, and calculate the level and other related parameters。

  In actual use, due to the sample preparation level and the camera background, such as the impact of uneven light, the search results and analysis of the standard chart is the effect of the gap.
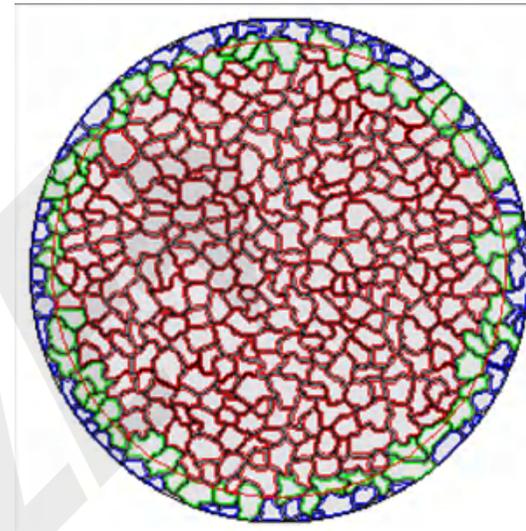

- Search out the grain, can automatically get the shape parameters, and can automatically determine which in the net, which in the network:

| Grain	Perimet...	Area um2	L-Axis ...	S-Axis ...	dia um	In	Cut	Out
53	81.95	259.09	32.30	14.96	18.16	I		
54	148.94	1232.42	45.68	44.76	39.61	I		
55	149.58	1134.39	56.26	27.38	38.00	I		
56	151.13	1561.53	48.29	46.98	44.59	I		
57	116.54	826.28	36.76	30.10	32.44	I		
58	82.60	378.13	30.17	20.19	21.94	I		
59	72.28	357.12	25.10	19.25	21.32		C	

- Search parameters and results as shown below, in use, by setting different search parameters, you can get

different results, which specific results are appropriate,

by the user under the circumstances.
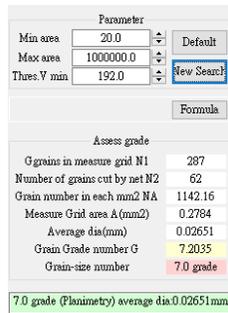
[002] the average grain size of metal cut-off point method ...

GB / T 6394-2002 (5.3)

- The software provides a variety of stub tools (in this case,
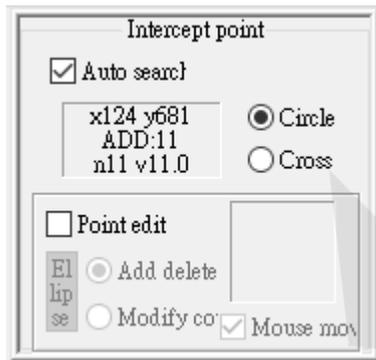
  select the 500mm line tool):
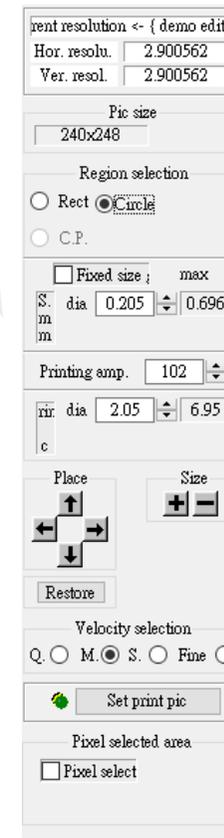
- The image is loaded into the module, do not need to do

  any image processing, select the appropriate tool, the

  software will automatically analyze the cut-off position,

and calculate the results:
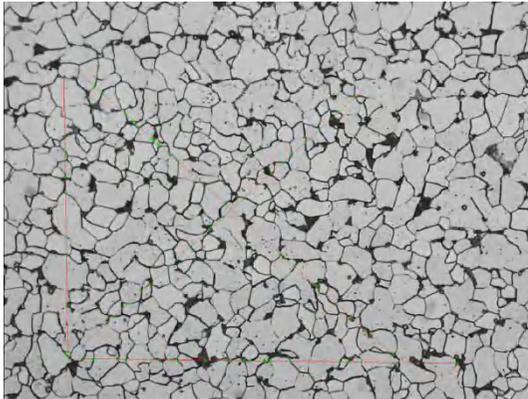
- The cut-off point can be searched automatically or manually added and removed:

- After the cut-off adjustment is complete, the level will automatically be:

[011] non-metallic inclusions in steel content measurement standards diagrams microscopic test method ... GB / T 10561-2005 / ISO 4967: 1998 / JIS G 0555: 2003

- The original image：
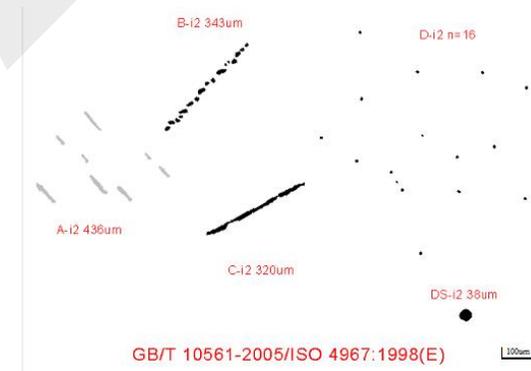
- Adjust the search parameters, search out the impurities:

GB/T 10561-2005/ISO 4967:1998(E)
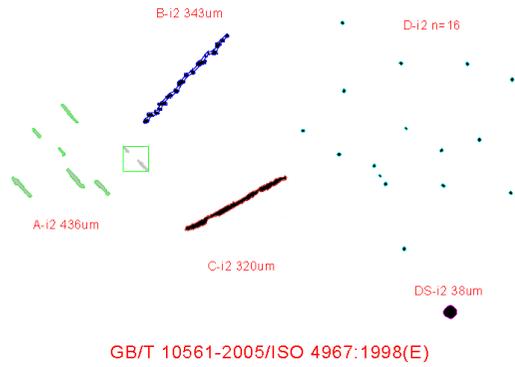
● The search parameters and rating results are as follows:
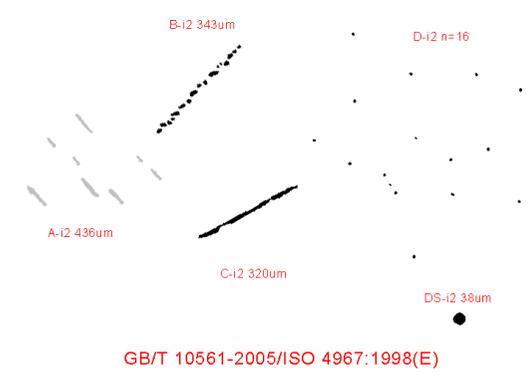

● Right-click any of the impurities, you can manually change the properties of the impurities:
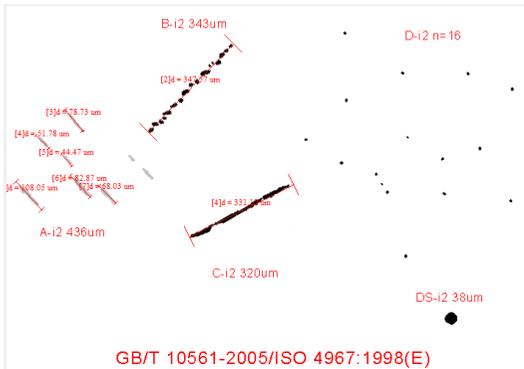

[011] non-metallic inclusions in steel content measurement standards diagrams microscopic test method ... GB / T 10561-2005 / ISO 4967: 1998 / JIS G 0555: 2003 (C type)

● The original image：

GB/T 10561-2005/ISO 4967:1998(E)

- C-type impurities obtained by dragging the mouse to obtain data:

In the interface, select the "assessment of only C", and then drag the mouse to measure each of the C Series impurities can be, data and level will also be:
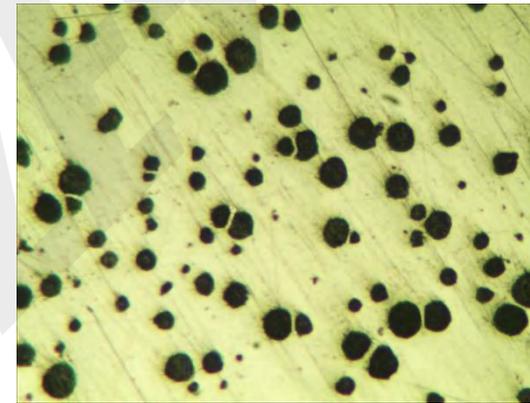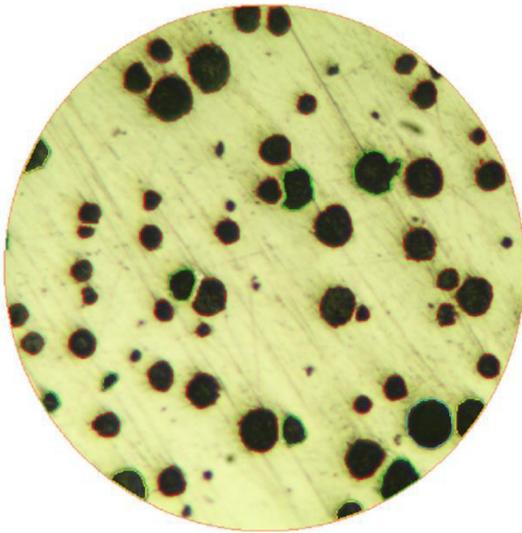

【039】metallographic examination of nodular cast iron

- spheroidizing classification and evaluation GB/T 9441-2009(4.1)

- Original image：

- After loading the module, adjust the search parameters, search out the graphite, and then apply the calculation formula of spheroidization rate in the standard to calculate the spheroidization rate。

- search parameters, spheroidization rate and level are as follows; three graphs can be loaded to analyze the spheroidization rate and calculate the average value：

- Right click to select and modify a particle type：
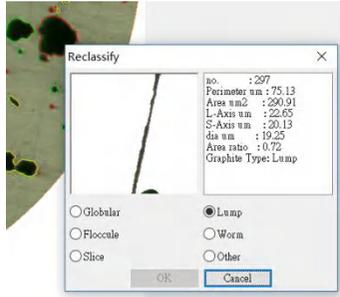
- The overall interface of the software is as follows：
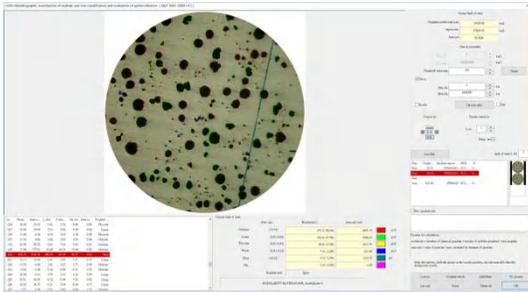
【 040 】 metallographic examination of nodular cast iron graphite size and evaluation GB/T 9441-2009(4.2)

- Before the sample is corroded, the graphite image is collected, and the image is clear at this time：

- The image analysis interface is as follows：

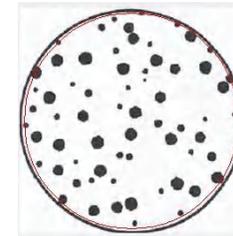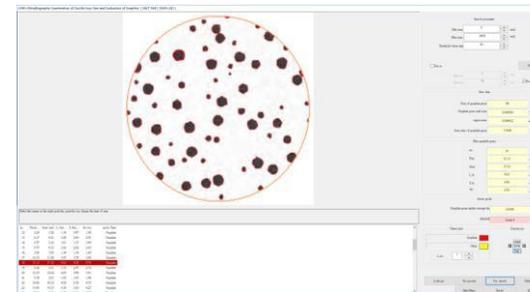- Search parameters：

Search parameter

Min area	0	um2
Max area	4000	um2
Threshold value step	90	

☐ Dia ra.   Preset

Min dia	0	um
Max dia	70	um ☑ Boundary grain

● Analysis data obtained：

Stat. data

Sum of graphite grain	66	
Graphite grain total area	0.000500	mm2
region area	0.006412	mm2
Area ratio of graphite grain	7.80%	

Max graphite grain

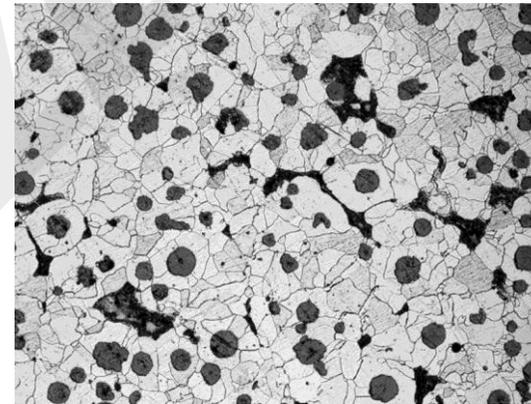|		
no.	18	
Peri.	15.13	um
Area	17.33	um2
L.A.	4.83	um
S.A.	4.56	um
dia	4.70	um

Assess grade

Graphite grain reality average dia	0.0038	mm
GRADE	Grade 8	

【041】 metallographic examination of nodular cast iron number of pearlite (suitable for less pearlite) GB/T 9441-2009(4.3)

● Analyze after sample corrosion, the original image is as follows：

● Select area, set search parameters and search：

Search parameter

Min area	1000	um2
Max area	100000	um2
Threshold value	100	
Min dia	1	um
Max dia	1000	um

◉ Area   ○ dia   Preset

● Effect after search：
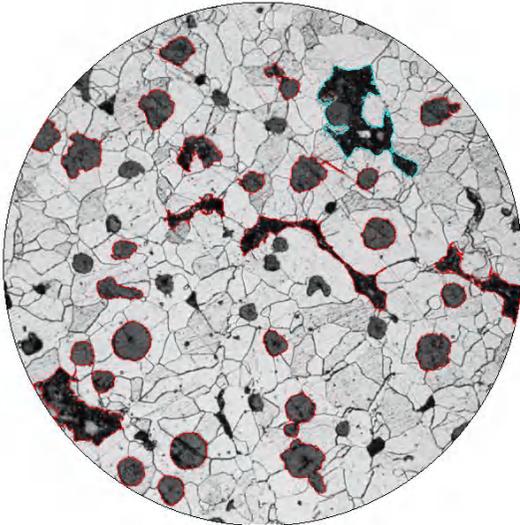
● Analysis data obtained：

Graphite areamm2	0
Total areamm2	4.482319
Black grain areamm2	0.608525
Pearlite areamm2	0.608525
Pearlite pct.	13.58%
GRADE	Pearlite 15

Before sample corrosion, analyze the graphite area with module 21, fill the data into the "graphite area" box, the percentage of pearlite area = pearlite area / (total area of

search area - Graphite area) * 100%, the software will automatically calculate the value, and then apply the standard to get the grade。

【042】Mtallographic examination of nodular cast iron － pearlite quantity (suitable for more pearlite) GB/T 9441-2009(4.3)
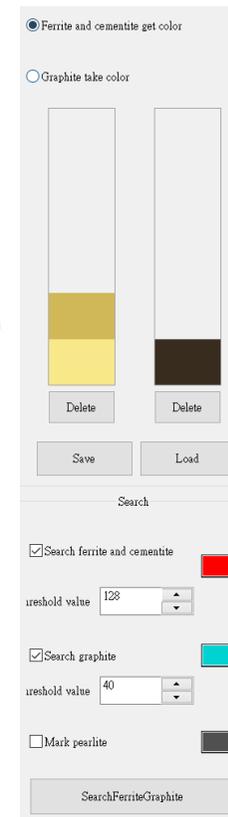
● Load original sample：
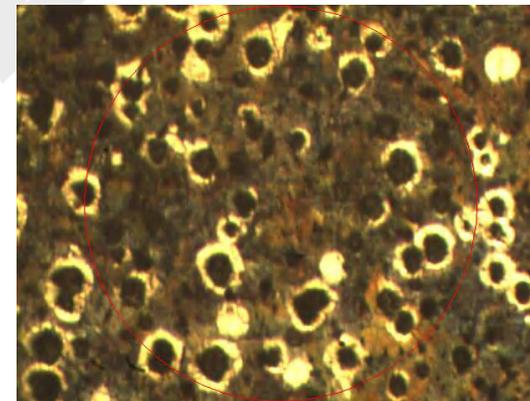
● Use the pipette tool to extract the color of ferrite and graphite respectively, and debug the threshold value. The software will automatically search out these two kinds of

tissues, and then deduct the area of these two kinds of

tissues with the total area, and then get the area of

pearlite。
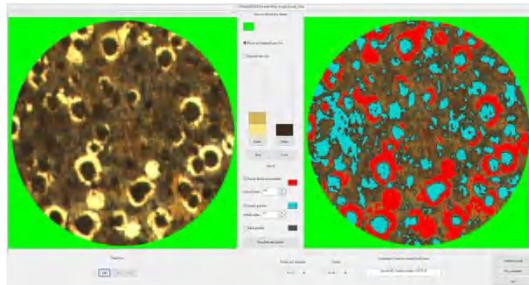
- Color extraction and threshold adjustment：

- Analysis data：

Ferrite and cementite	Graphi.	Percentage of pearlite content classification
18.21 %	19.09 %	Pearlite 65: Pearlite number = 62.70 %

【547】Cromium nickel austenitic stainless steel weld ferrite content measurement method GB_T_1954_2008：

1、 Load the image to be rated (check the rating method "horizontal measurement","horizontal + vertical measurement (average)", and select the rotation angle)：
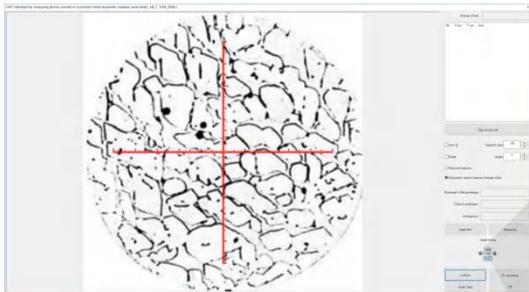
Set the threshold value, click the "search" button to get the percentage of your measurement, and click the "insert data" button to add the measured data to the data list for statistical counting
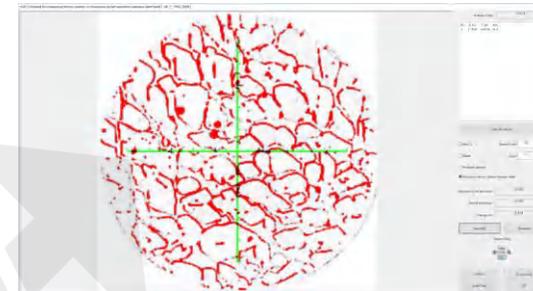
Put the same sample's picture again for statistical analysis, and the software will carry out statistical analysis on the data inserted many times

Calculate the average value (according to the "GB-T 1954-2008 measurement method for ferrite content of chromium nickel austenitic stainless steel weld", the same sample needs to select not less than 10 representative field of view for analysis and take the average value). Therefore, it is necessary to measure the average value several times。

Special note: according to the standard "GB-T 1954-2008 chromium nickel austenitic stainless steel weld ferrite content Measurement method "when the ferrite has obvious directional distribution in the field of view, the ruler can be

measured once at an angle of 45 ° with this direction. The

reference image is as follows：
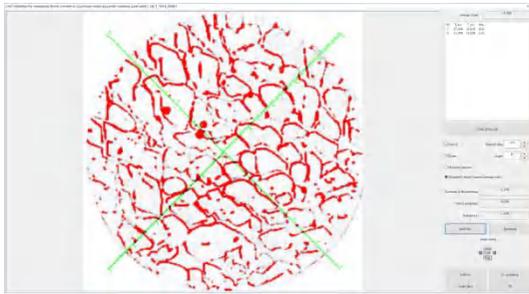
【395】test method for volume fraction by system manual

point counting ASTM_E562

1、Software main interface：
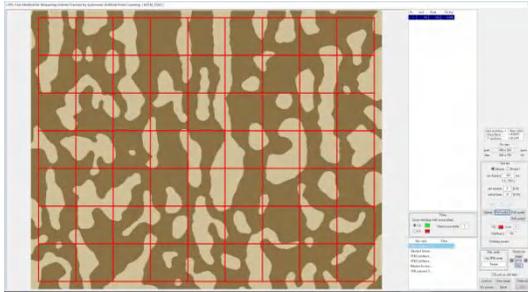

2、Enter organization name：
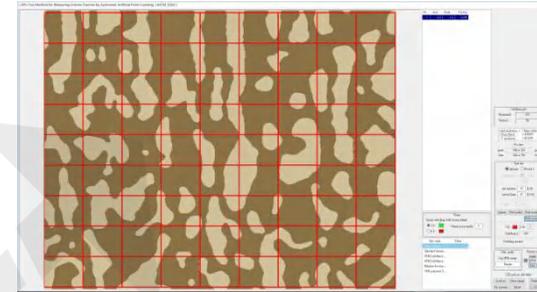

1、Grid selection：

2、Full mode selection：

● Filling mode 1: the grid line spacing is constant, and the

number of horizontal lines and vertical lines are
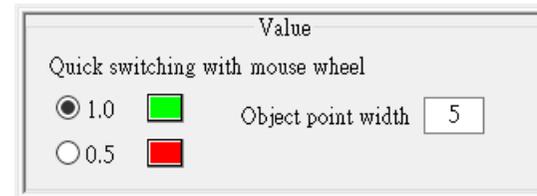
automatically set to be filled：

- Full mode 2: automatic setting of line spacing and line number：
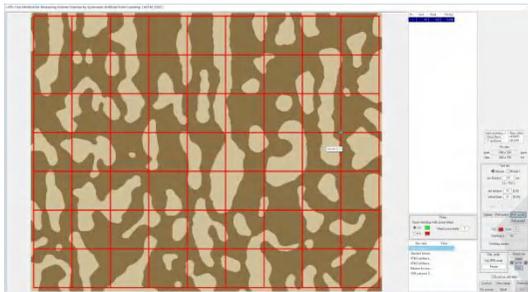
- Filling mode 3: the number of lines is constant, and the line spacing is automatically adjusted and filled：
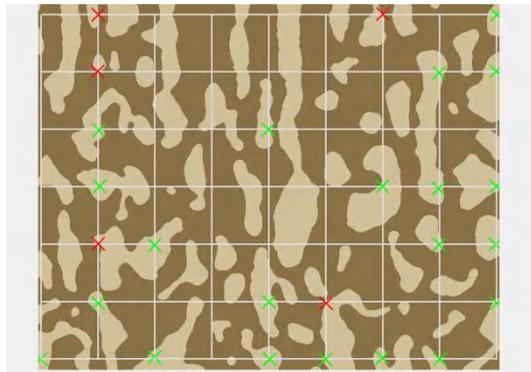
- Use the left mouse button to determine the number of points in the corresponding grid, and use the right mouse button to cancel the number of points：
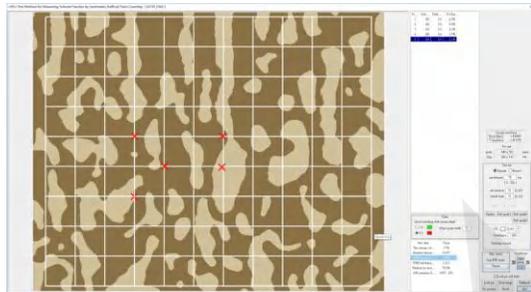

Select 1 as the whole point and 0.5 as the half point:

- Counting image：

6、data statistics：

- checked ☑Load pic add field, multiple images need to be

  analyzed continuously to get statistical data：

- Data

Field of view	Grid points Pt	Fie...	Pct.Ppi
1	120	3.0	2.5%
2	120	0.0	0.0%
3	120	2.5	2.1%
4	120	2.0	1.7%
5	120	2.5	2.1%

- Statistics：

| Stat. item	Value
The average vol...	1.7%
Standard deviati...	0.977
95%Confidence ...	2.776
95%Confidence ...	1.213
Relative Accurac...	72.8%
10% precision fi...	1657 - 255

7. Click end to return results：

Annex I:Remove the registry

In some cases, such as when authorization fails, you need to delete software registry, after deleting the registry, and then start the software, the software will return authorization.Metallography is an example of the following software is installed on

the Win7 operating system, deleting the registry process.

● Click the "start" menu:
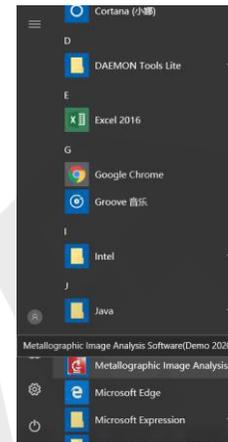
● In the "Search" box, enter regedit, press the enter key

● Delete software registry key, hardware resolution registry keys to delete:

- After deleting, then run software authorization code input box will appear.