



AUTOMATIC PARTICLE SIZE ANALYSER



BAPSA-BICM-100

This microscope has all the high-end world class optics assembled with precision-engineered mechanical components for observation at higher magnifications.

The microscope is associated with high-class " Plan-chromatic " objectives to offer highest resolution for critical microstructures at high magnifications. for e.g. hardened & tempered , Spherodized, Lamellar peralite and other micros.

Mechanical assemblies' cleanliness measurement test set up By - Particle Size Measurements.

In today's highly quality conscious industrial atmosphere, clean assemblies play a vital role. Measurement of such cleanliness checking or quantification directly on parts of complex assemblies is not possible hence this indirect method adapted in industry for easy quality control of the process. With this method, degree of contamination is measured by means of analysis of residual dirt with an incident light microscope and specialized software associated with it. test procedure Components are washed and rinsed in suitable liquid.



The subject liquid is filtered by vacuum suction unit Filter is then scanned and mapped for analysis using following special microscope with dedicatedly designed automated stage for analyzing multiple fields. These multiple images are then grabbed by high resolution camera. Dedicated software provides the distribution of particles as per user defined approach. (ISO 16232)

Reports are generated as per the standard and can be customized.

Further they are archived with image data base maintenance software with required dedicated search engine.

IMPORTED OPTICAL MICROSCOPE: -

Body-

Trinocular Body can be rotated a full 360 degree and lock in any position desired, having a facility of dioptic andinterpupillary Distance adjustment. Mounted on pole type base.

Polarizing Outfit-

Analyzer rotatable at 360°. Polarizer & Analyzer can be slide in/out of the optical path.

Standard Accessories-

6V/20W halogen tungsten bulb, operating manual, dust cover, guarantee card and Styrofoam molded pack.

Trinocular Observation Head-

Siedentopf observation head inclined at 30° rotatable at 360°. Vertical phototube for micro photography.
Diopter adjustment ring on ocular tube (± 5).
Inter pupillary distance from 55mm to 75mm.

Eyepiece (Anti fungus)-

Wide field 10X (paired) F.O.V. 22mm.

Objectives (Infinity corrected)-

M Long working distance plan 5X
M Long working distance plan 10X
M Long working distance plan 20X
M Long working distance plan 50X

Magnification-

50X-500X

Illuminator -

The Epi illuminator has 6V-20W halogen lamp with variable brightness control, field diaphragm, aperture diaphragmand polarizer. Yellow, Blue & Green and ground glass filters are available on filter wheel mounted on epi – illuminator.



Mechanical Body-

Co-axial focusing system with large knobs, PRE-FOCUSING LEVER & TENSION ADJUSTMENT RING.

Reverse Quadruple nosepiece on ball bearing.

Mechanical stage is 210mm X 140mm. Moving range 75mm x 50mm.

The Mechanical stage has low positioned co-axial controls on ball bearing guide ways.

MOTORIZED STAGE WITH CONTROL PANEL: -

- a) Stage Size – 210 X 140 mm.
- b) XY Movement – 60 X 60 mm (Motorized).
- c) Motorized Z Axis.
- d) Resolution - 15 micron or better.
- e) Stage Control - Through software.

DIGITAL COLOR CMOS CAMERA- (5 MPIXEL)

Make- German-

S. No.	Description	Technical Specifications
1	Image Sensor	1 / 2.5" type CMOS
2	Effective picture elements	2592 x 1944 (H x V)
3	Maximum Frame Rate	5.8 at high resolution
4	Pixel Size	2.2 X 2.2
5	Shutter Type	Rolling / Global reset
6	ADC resolution / output	10 bit → 10 / 8 bit
7	SNR	>38 dB
8	Exposure Time	10 ms – 1 s

Camera Adapter-

Specially designed Camera adapter as per microscope photography port.

PARTICLE ANALYSIS SOFTWARE: -

- **Acquisition**- Automatic scanning and capturing the entire field of filter paper.
- **Image Generation**-Software generate a single image of entire filter paper (size 47mm). So as to analyze and deliver the results for their true sizes.
- **Separation**-Separation of particles as Metallic, Non-metallic and fibre.
- **Measurement**-Measurement of all the particles for their total number, size, perimeter, area.
- **Classification**-Distribution Metallic and Non-metallic particles as per their sizes in user defined size classes



- **Statistical Analysis**-Mean, Median, Standard Deviation etc statistical parameters can be obtained automatically from set of readings

Additional features-

All the results can be reported in units like micron, mm, cm, inch etc.

Quick Calibration attachment system

Motorized Stage operating and programming software

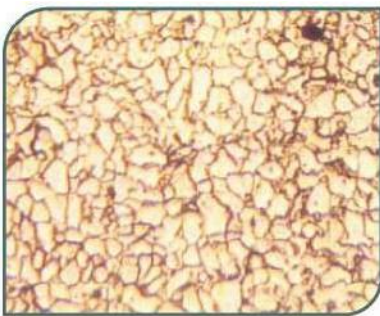
XY movement control of stage from PC

Customized report generation

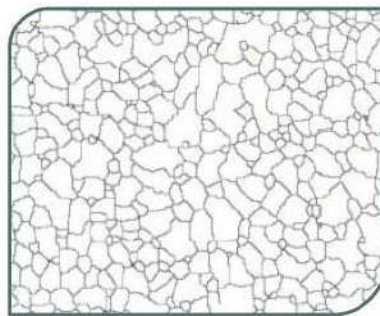
MICROSTRUCTURE ANALYZER SOFTWARE: -

Grain Size Estimation-

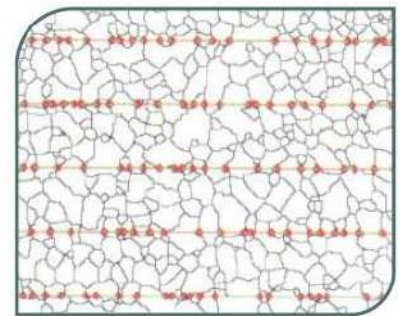
- With automatic grain boundary re-construction Analyzer can take any ordinary / practical image for processing. It cleans the same, automatically joins the broken grain boundaries and makes the image perfectly suitable for further automatic analysis. Does not call for manual intercept marking.
- Options exist for intercept method (parallel lines or concentric circles depending on the aspect ratio of grains), planimetry method, comparison method. Also results can be obtained in the form of grain size distribution, individual grain area, its perimeter, L/ D ratio, mean lineal intercept length, average grain size, largest grain size in microns etc.
- Grain size analysis of ceramic, Copper and other materials can be determined as per the individual method.



Original Image



Processed Image



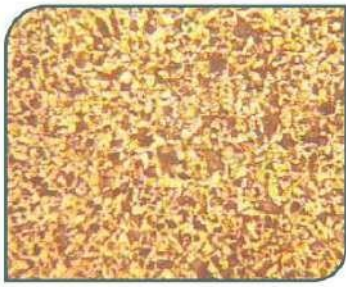
Grain Size 6.5

Phase Analysis-

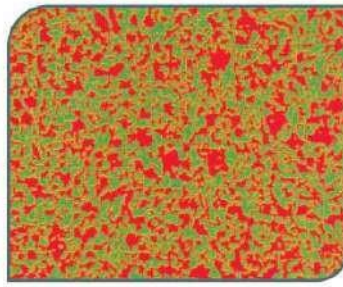
- Based on the gray level difference as many phases can be identified and measured to its fine perfection based



on thresholding gray levels. With automatic and manual methods histograms can be generated.



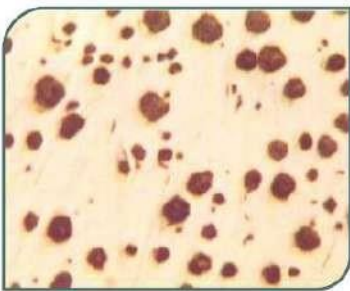
Original Image



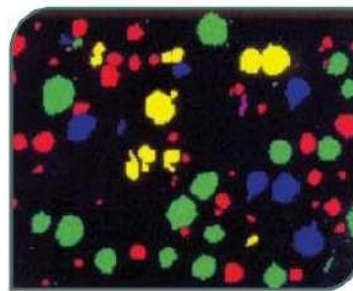
Processed Image

Nodularity analysis-

- Graphite features as per their shape factors are separated in type I to Type VII.
- Image stitching facility can be used if analysis is required on total 1 mm sq. by stitching/tiling of images.
- Under the etched condition one can directly estimate percentage of graphite, pearlite and ferrite.
- Distribution can be obtained as per the size.



Original Image



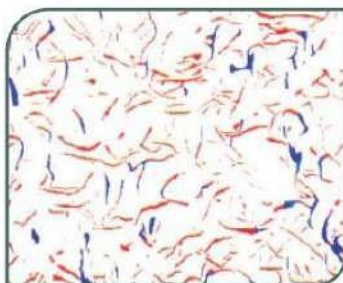
Processed Image

Flake analysis-

- Graphite flakes are classified in size class from 1 to 8 as per their length. Min, Maxflake length and distribution curve can be plotted. Also separation of the flakes as A, 8, C, D is possible in normal cases.



Original Image



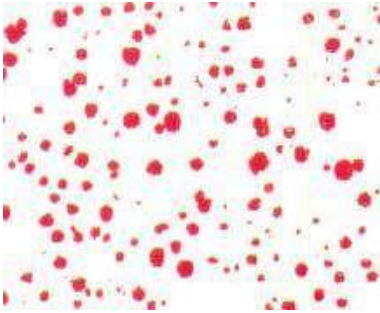
Processed Image

Particle count and size classification-

Individual particles in the given field of view can be marked, separated as per their sizes. Distribution curve

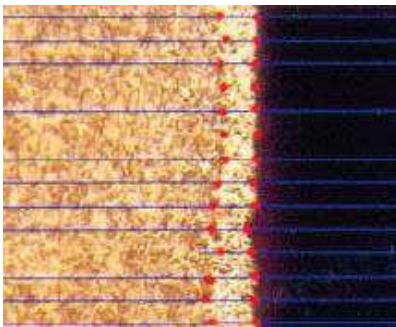


can be plotted.



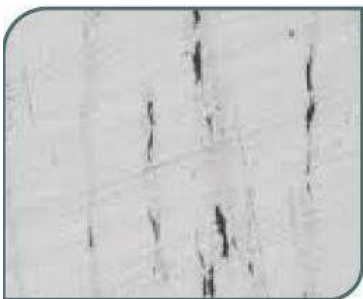
Linear Measurements-

Measurements like plating, coating, decarburization, interlamellar distance, degree of banding etc. are done manually or automatically depending on the image contrast. Arbitraryline measurement helps measuring distance in any direction.

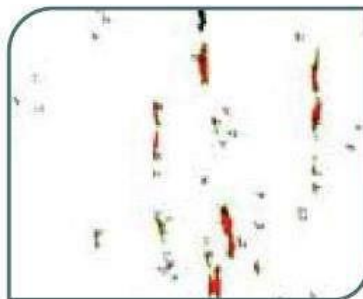


Inclusion analysis-

Given a good polish, accurate results can be obtained by separating and rating inclusions. One can also intermediately see the classification and can correct or edit the same. Advanced modules can also correct few artifacts like scratches on the samples. Automatic motorized stage measurement option can compile the results of multiple fields and the same can be expressed in desired format.



Original Image



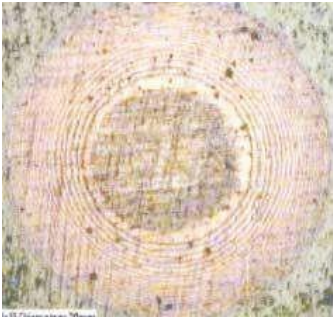
Processed Image

Multilayer coating measurement (Tribology)-

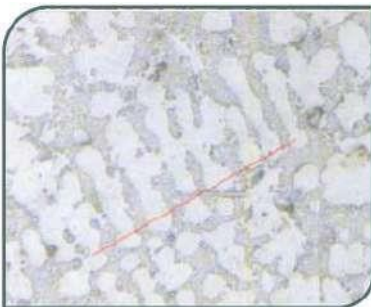
In the study of measurement of multilayers of CVD coatings software measures layers' thickness



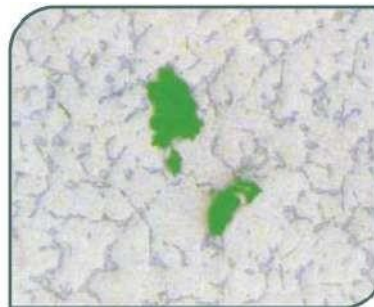
automatically. This is supported by ball crater instrument with necessary accessories.



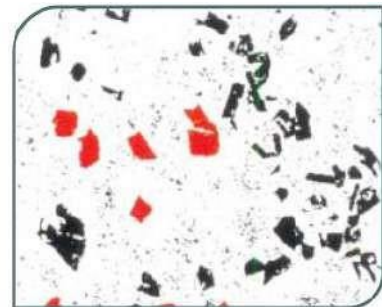
Aluminum module-



SDAS Measurement



Porosity Measurement



Cuboids Measurement

