

Metallurgical Microscope

MATRIX-1000M



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Metallurgical microscope MATRIX-1000M with Siedentopf trinocular head design, infinite optical system, reflected & transmitted illumination system meets performance demands of metal, plastic, electrical circuits & engineering industry. Its superior coaxial course and fine focusing tension adjustment knobs helps in better examination of samples.

Features

- Siedentopf trinocular 45⁰ inclined head

- Infinite optical system

- Focusable vertical tube for Digital Microphotography.

- 5 to 100X Infinite plan achromatic objectives

- 50 to 1000X Total Magnification

- 0.5X Video Coupler with LED illumination

- Easy to Use, user - friendly operations

Applications

It finds best applications the field of metal & mineral industry, for the inspection of thin metal plates, plastic films, electric circuits and opaque metal, minerals.

Specifications

Model no.	MATRIX-1000M
Optical System	Infinity Optical System (with Bright Field/ Dark Field, DIC, Polarizing units)
Viewing Head	Siedentopf observation Head Inclined at 45°, Interpupillary distance 53 to 75 mm
Reflected Illumination	Transmission Koehler illumination with alterable aperture diaphragm and center able field diaphragm; wide-range voltage 110-240V, single 12V/50W halogen lamb with adjustable brightness.
Transmitted Illumination	Transmission illumination with alterable aperture diaphragm and center able field diaphragm; wide-range voltage 100-240V, single 5W LED (warm), with continuous intensity. Blue filter $\phi 32$, Green filter $\phi 32$, Yellow filter $\phi 32$, Neutral filter $\phi 32$.
Working Stage	Double layer mechanical stage, size: 210X180mm, low positioned co-axial controls on ball bearing guide ways control by right hand, moving range: 50X50mm Metal plate, dia. 12
Objective	Infinity Plan Achromatic Objectives 5X (BF/DF)
	Infinity Plan Achromatic Objectives 10X (BF/DF)
	Infinity Plan Achromatic Objectives 20X (BF/DF)
	Infinity Plan Achromatic Objectives 50X (BF/DF)
	Infinity Plan Achromatic Objectives 100X (BF/DF)
Eyepiece	10X wide field eyepiece, focal length 25mm, field $\Phi 22$ mm.
Nosepiece	Quintuple nosepiece ball-bearing reversed nosepiece with positive click stops & smooth operation.

Specifications

Focusing	Low position coaxial focus system, coarse of 38mm per rotation & fine precision of 0.002mm
Camera	5 MP USB CMOS Camera, Color Format- Color, Chip Size ½ Inch, Lens Mount – C Mount Power Supply – Via USB, 5V/285 mA.
Package size	300x400x520 mm
Gross weight	15 Kg (Approx.)

MIAS® - METALLURGICAL IMAGE ANALYSIS SOFTWARE

Salient Features

- Based on Technology Transfer from Bhabha Atomic Research Centre (BARC)
- The software provides analysis of micro structure for Steel, Iron and Aluminum
- Follows ASTM standards
- Live image with single-button click image capture
- Easy to Use, user - friendly operations

Category	Specifications
Image functions	• Image rotation • Gray scale • Image flipping (horizontal or vertical) • Histograms • Invert • Brightness correction
Filters	• Laplacian • Sobel • Blur • Noise reduction • Edge detection and enhancement filters • Substraction • Morphology filters • Thresholding
Images	• Image database • Image database filtering by date and type (grains, phases, nodularity, inclusion etc) • Image view or Live view • Switch between image view and live view • Supports multiple image formats like JPEG, BMP, PNG etc
Grain size analysis	• User defined program • User defined image enhancement & grain detection functions • User can save program as configuration for future use • Automatically creates Grain Boundary structure • Planimetric method • Hayn Linear Intercept method • Hillard/Abrams Circle Intercept method • Manual grain analysis • Custom grain analysis functions • Supports grain editing/correction • ALA grain size (ASTM E930) analysis • Supports multiple samples

Category	Specifications
Particle size analysis	• User defined configurations with filter conditions • Image enhancement functions for particle detection • Analyze and detects particles based on defined configuration/filter • Analyze particles for length, area, circularity/elongation/roundness, Ferret length/major axis, minor axis • Can detect area, length, width, circularity/roundness/shape factor, ferret length, perimeter of various particles of different shapes like fiber, impurities on filter etc • Can group particles identified into different buckets (user defined) by length, area, roundness, width, circularity etc • Supports multiple samples
Coating thickness measurement	• User defined configurations with filter conditions • Image enhancement functions • Automatically identifies coating boundary • Gives MIN/ MAX/ AVG/ STD DEV of results • Can measure thickness at user selected points, all points or at user selected intervals • Supports multiple samples
Porosity analysis	• User defined image enhancement and filter functions • User can save program as configuration • User can switch to LIVE video to further analyze a feature through focus adjustment • User can group selected features into different buckets based on size and shape • Supports multiple samples
Nodularity	• User defined configurations with filter conditions • Nodularity by count, Nodularity by area and Nodule density • Group results by Nodule size 1 to 8 • Can export results for Phase analysis • Automatically detects Nodules based on set filter conditions • Supports multiple samples

Category	Specifications
Inclusion	• User defined configurations with filter conditions • Detects Inclusions and group by type (A, B, C, D) and further by THIN/THICK • Detection of Oversized Inclusions • Supports multiple samples
Phase analysis	• User defined configurations with filter conditions • Can import results from Nodule/Flake analysis for Graphite/Phase report • Can detect and isolate Nodules in the image automatically or manually • Supports Phase splitting • Supports Manual point count method • User can save configurations for future use • Supports multiple samples
Flake analysis	• User defined configurations with filter conditions • Detects and group Flakes by type A, B, C, D and E • Detects and group Flakes by size (1 to 8) • User can manually set Flake types/correction • Can export results for Phase analysis • Supports multiple samples
Dendrite Arm Spacing (for Al)	• User defined configurations with filter conditions • Image enhancement functions • For analysis on Aluminum • Supports multiple samples
Decarburization analysis	• User defined configurations with filter conditions • Image enhancement functions • Decarburization on Steel • Supports multiple samples
2D measurements	• Supports all 2D measurements like length, width, distance between points, angle, area, perimeter • Supports tools for boundary detection like Line, Circle, Arc, Angle, Curve, Closed curve
Reports	• Reports in PDF and Excel format

OPTIONAL PURCHASES

Metallographic Specimen Mounting Machine



Touch Screen Automatic Mounting Machine

Model	AM-30
Mould Diameter	30 mm
Heating temperature range	100-200° C
Holding Time Range	0-999 sec
Cooling Method	Water Cooling
Pressure	Automatically
Mould Preparation Capacity	Single Mould
Electric Power	650W, 220V, 50Hz
Dimensional Weight	350 X 450 X 470 mm, 48kg



Touch Screen Manual Mounting Machine

Model	MM-30	MM-45
Mould Diameter	30 mm	45 mm
Temperature Adjusting Range	90-200° C	
Cooling Method	Air Cooling Fan	
Pressure	Manually by hand wheel	
Mould Preparation Capacity	Single Mould	
Electric Power	650W, 220V, 50Hz	
Dimension / Net Weight	440 X 253 X 310 mm, 32kg	

Metallographic Polishing Machine



Double Disc Polishing Machine (Advanced)

Model	MPM-2D
Disc Diameter	203 mm
Grinding/Polishing Speed	50-1000 RPM
Power	550W, 220 Volt
Head Rotating Speed	50 RPM
Sample Force	0-40 N
Sample Capacity	1-3 Nos.
Dimension/Net Weight	700 X 600 X 278 mm, 45kg



Double Disc Polishing Machine

Model	MPM-2D(V)
Disc Diameter	203 mm
Disc Diameter (Optional)	10 Inch, 12 Inch
Grinding/Polishing Speed	50-1000 RPM
Sample Force	0.5 HP High Torque Motor
Power	550W, 220 Volts
Dimension/Net Weight	800 X 600 X 278 mm, 47kg

Metallographic Specimen Cutting Machine

MATRIX metallographic sample cutting machine is widely used to cut the various types of metal materials. These machines are equipped with cooling system which clear up the heat produced during sample cutting and avoid deformation of metal structure because of heating influence.



Automatic Cutting Machine

Model	ACM-100X
Display	LCD Display with high resolution backlight
Cutting Capacity	100mm
Cutting Method	Manual & Automatic
Way of infeed	Arbitrary adjustment
Infeed distance	Arbitrary Set, Adjustment and fixture position
Reset Mode	Automatic
Cooling System	Water Cooling with 3 ways
Effective workpiece Length	200 mm
Spindle Speed	2800 RPM
Coolant Tank Capacity	65 liters
Cutting wheel dimension	350mm X 2mm X 32mm
Motor	4 HP (3 kw), 380V, 50Hz
Dimension / Net Weight	1650 X 680 X 740 mm, 150kg

Model	ACM - 60	ACM - 80
Front Cover	Fully Enclosed	
Cutting Capacity	60 mm	80 mm
Cutting Method	Manual	
Cooling System	Water Cooling	
Spindle Speed	2800 RPM	
Coolant Tank Capacity	50 liters	
Cutting wheel dimension	250mm X 2mm X 32mm	
Motor	2.9 HP (2.2 kw), 380V, 50Hz	
Dimension / Net Weight	700 X 650 X 560 mm, 117kg	



Abrasive Cutting Machine



Manual Control Cutting Machine

Model	MCM - 35	MCM - 50
Cutting Capacity	35 mm	50 mm
Cutting Method	Manual	
Cooling System	Water Cooling	
Spindle Speed	2800 RPM	
Coolant Tank Capacity	50 liters	
Cutting wheel dimension	250mm X 2mm X 32mm	
Motor	1.4 HP (1.1 kw), 380V, 50Hz	2.9 HP (2.2 kw), 380V, 50Hz
Cutting Capacity	30 mm	55 mm
Net Weight	60 kg	80 kg

Our NABL Scope of Calibration

Sr. No.	INSTRUMENT NAME	CALIBRATION METHOD	RANGE/SCALE	CMC(±)
1	Uniaxial Testing Machine	IS 1828-1, ISO7500-1 & ASTM E4	5N - 3000 kN (Compression) 20N - 1000kN (Tension)	0.25 %
2	Displacement of cross-head-travel of Uniaxial Testing Machines	ASTM E2309	0 to 600 mm	50µm
3	Speed of cross-head-travel of Uniaxial Testing Machines	ASTM E2658	0 mm to 500 mm	0.5 mm/min
4	Rockwell Hardness Testing Machine	IS1586-2, ISO6508-2 & ASTM E18	HRA, HRBW, HRC	0.65 HRA, 0.68 HRBW 0.60 HRC
5	Rockwell Superficial Hardness Testing Machine	IS1586-2, ISO6508-2 & ASTM E18	HR 15N, HR 30N, HR 45N HR 15T, HR 30T, HR 45T	0.82 HR15N, 0.82 HR30N 0.86 HR45N, 1.10 HR15T 1.10 HR30T, 1.10 HR45T
6	Brinell Hardness Testing Machine	IS1500-2, ISO6506-2 & ASTM E10	2.5/62.5, 2.5/187.5, 5/250 5/750, 10/500, 10/1000 10/3000	2.60%, 2.10%, 2.00% 1.61%, 1.40%, 1.40% 1.60%
7	Vickers Hardness Testing Machine	IS1501-2, ISO6507 & ASTM E92	HV5, HV10, HV 20, HV30	2.60%, 1.30% 1.20%, 1.20%
8	Micro Vickers Hardness Testing Machine	IS1501-2, ISO6507-2 & ASTM E384	HV0.1, HV0.2, HV0.3, HV0.5, HV 1	3.7 %, 3.0 %, 3.6 %, 3.5 %, 2.6 %
9	Test Force Verification of Hardness Tester	IS, ISO & ASTM Relevant Standard	0.2 kgf to 3000 kgf	0.4%
10	Indentation Measuring system of hardness Testers	IS, ISO & ASTM Relevant Standard	0 to 7 mm	0.4%
11	Testing Cycle of hardness Testers	IS, ISO & ASTM Relevant Standard	0 to 180 sec	0.8 Sec.
12	Leeb / Dynamic Hardness Tester (DHT)	ASTM A956	'D' scale	7 HLD
13	Durometer (Shore Hardness Tester)	ASTM D2240	Shore A & D	0.5 Shore
14	Charpy & Izod Metal Impact Testing Machine	ISO148-2, BS131-4, IS3766, ASTM E23	up to 750 J	0.50%
15	Charpy & Izod Plastic Impact Testing Machine	ISO13802 - 2, ASTM D256, ASTM D6110	up to 50 J	0.65%
16	Extensometer	IS12872, ISO9513 & ASTM E83	0 to 25 mm travel	2.0 µm
17	Microscope	ASTM E1951	Magnification Up to 1000 X	1%
18	Erichsen Cupping Fixture	IS10172	0 to 20 mm	10 µm
19	Profile Projector	JIS B 7184	Linear : 0 to 200 mm Magnification : 10 to 100 X Angular Scale : 0° to 360°	15 µm, 0.7%, 5°, 30 min of arc

Major Customer List

- IIT Delhi
 - Eastman Impex, Ludhiana
 - Udehra Fastners, Ludhiana
 - Rajendra Forge, Ludhiana
 - S.S.Steel, Rajpura
 - Sriram Foundry, Pantnagar
 - Sriram Foundry – Plant 1, Kolhapur
 - Sriram Foundry – Plant 2, Kolhapur
 - MSME Testing Laboratories, Okhla New Delhi
 - ELCA Labs, Pune
 - ELCA Labs, Thane
 - ELCA Labs, Kohlapur
 - SGS Labs, Manesar
 - Mosdorfer, Nasik
 - QH Talbros, Gurgaon
 - QH Talbros, Manesar
 - QH Talbros, Chennai
 - QH Talbros, Dehradun
 - Caparo Fasteners, Choupanki
 - Knor Bremse, Faridabad
 - Amar Udhyog, Faridabad
 - Karan Automotives, Faridabad
 - Ample Auto, Manesar
 - Panasonic, Jajjar
 - Vishwakarma Foundry, Faridabad
 - Imperial Auto, Faridabad
 - Regional Testing Centre, Mumbai
 - SPM Auto, Pune
 - EMI Tranmissions, Nashik
 - Rico Castings, Ludhiana
 - Autokast Foundry, Kerala
 - Sunmax Auto, Manesar
 - Texmaco Ltd, Kolkatta
 - Sharu Steels, Ludhiana
 - GKN Driveline, Dharuherra
 - Royal Enfield, Chennai
 - Subodh Technologists & Metallurgical Services, Mumbai
 - Mack Springs, Ambarnath, Mumbai
 - Cochin University of Science and Technology, Cochin
 - Amal Jyothi College of Engineering, Kerala
 - Resilient Auto, Ludhiana
 - Malke Group, Mohali
 - New Star, Industry
 - Deenbandhu Chotu Ram University of Science and Technology, Sonipat
- In addition to this, we supply the software (labelled in their names) to other OEMs in India who package this with their hardware and supply in India as well as export
- We supply 10-12 systems a month to the OEMs in India, who export or sell in India/ Abroad.

ESTEEMED CUSTOMERS



BHARAT FORGE



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