

Vardhan Metallurgical Microscopes



Vardhan Metallurgical microscopes are very sturdy, rugged & designed for industrial use. They are widely being used in Foundries, Forging, Automobile, Heat treatment, Engineering & Educational institutes. Every Vardhan metallurgical microscope can be interfaced with computer for instant photography & image analysis. Microscopes are available in Inverted stage, Erect stage & Portable types. Inverted stage design eliminates the need for specimen mounting & leveling thus saving in specimen preparation time.

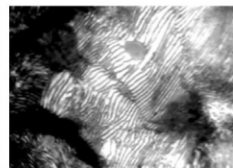
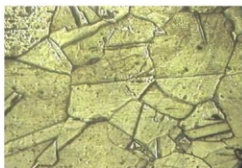
Microscope	RV3	Design	Inverted Stage
Mechanical stage	140x 170mm with graduated X & Y movement & annular discs		
Coarse Focusing	By Rack & Penion	Fine focusing	Least count 0.002 mm
Nose piece	Revolving , three objectives can fit at a time		
Binocular Head	45 degree inclined , with interpupillary & diopter adjustments		
Illumination	Bright field	Lamp used	12V 50W Halogen
Eyepiece pairs	Huygenian , 5x, 10x wide field , 15x wide field		
Objectives	4x, 10x, 20x, 40x	Optional Extra	60x, 100x Dry
Power supply	Built in the base	Input Voltage	220V A/C 50 HZ
Computer Interface	Direct	CCD Camera	1/4" Sony Built in
Image analyzer	Optional Extra	Instrument size	400x340x330 LxBxH mm
Net weight	13 Kgs	Gross weight	18 Kgs



Microscope	VMM4	Design	Inverted Stage
Mechanical stage	140x 170mm with graduated X & Y movement & annular discs		
Coarse Focusing	By Rack & Penion	Fine focusing	Least count 0.002 mm
Nose piece	Revolving , three objectives can fit at a time		
Binocular Head	45 degree inclined , with interpupillary & diopter adjustments		
Illumination	Bright field	Lamp used	12V 50W Halogen
Eyepiece pairs	Huygenian , 5x, 10x wide field , 15x wide field		
Objectives	4x, 10x, 20x, 40x	Optional Extra	60x, 100x Dry
Power supply	Built in the base	Input Voltage	220V A/C 50 HZ
Computer Interface	Optional extra	CCD Camera	Optional extra
Image analyzer	Optional Extra	Instrument size	400x200x330 LxBxH mm
Net weight	12 Kgs	Gross weight	17 Kgs



Microscope	INBT2	Design	Inverted Stage
Mechanical stage	125x 150mm with graduated X & Y movement & annular discs		
Coarse Focusing	By Rack & Penion	Fine focusing	Least count 0.002 mm
Nose piece	Revolving , three objectives can fit at a time		
Binocular Head	45 degree inclined , with interpupillary & diopter adjustments		
Illumination	Bright field	Lamp used	12V 50W Halogen
Eyepiece pairs	Huygenian , 5x, 10x wide field , 15x wide field		
Objectives	4x, 10x, 20x, 40x	Optional Extra	60x, 100x Dry
Power supply	External	Input Voltage	220V A/C 50 HZ
Computer Interface	Optional extra	CCD Camera	Optional extra
Image analyzer	Optional Extra	Instrument size	400x200x330 LxBxH mm
Net weight	7.5 Kgs	Gross weight	15 Kgs



Vardhan Metallurgical Microscopes

Microscope	ESM1T	Design	Erect stage
Mechanical stage	140x 170mm with graduated X & Y movement		
Coarse Focusing	By Rack & Penion	Fine focusing	Least count 0.002 mm
Nose piece	Revolving , three objectives can fit at a time		
Trinocular Head	45 degree inclined , with interpupillary & diopter adjustments		
Illumination	Bright field	Lamp used	6V 20W Halogen
Eyepiece pairs	Huygenian , 5x, 10x wide field , 15x wide field		
Objectives	4x, 10x, 20x, 40x	Magnification	* Refer table
TV	9 CMS LCD (Works only if CCD Camera is attached)		
Power supply	Built in the base	Input Voltage	220V A/C 50 HZ
Instrument size	0x200x330 LxBxH mm		Weight- Net 8Kg Gross 15 Kg
Optional Extras			
Objective 60x	Objective 100x Dry	CCD Camera	Computer Interface
Image Analyzer Software			Eyepiece Camera



Microscope	SPM1M	Design	Erect stage
Mechanical stage	140x 170mm with graduated X & Y movement		
Coarse Focusing	By Rack & Penion	Fine focusing	Least count 0.002 mm
Nose piece	Revolving , three objectives can fit at a time		
Monocular Head	45 degree inclined , with port for fitting CCD camera		
Illumination	Bright field	Lamp used	6V 20W Halogen
Eyepiece pairs	Huygenian , 5x, 10x wide field , 15x wide field		
Objectives	4x, 10x, 20x, 40x	Magnification	* Refer Table
TV	9 CMS LCD (Works only if CCD Camera is attached)		
Power supply	External	Input Voltage	220V A/C 50 HZ
Instrument size	400x200x330 LxBxH mm	Weight- Net	8 Kgs Gross 15 Kgs
Optional Extras			
Objective 60x	Objective 100x Dry	CCD Camera	Computer Interface
Image Analyzer Software			Eyepiece Camera



Microscope	PMM1	Design	Portable
Coarse Focusing	By Rack & Penion	Illumination	By 3V LED
Eyepiece	Huygenian , 5x, 10x wide field , 15x wide field		
Objectives	4x, 10x,	Magnification	* Refer Table
Power supply	External	Input Voltage	220V A/C 50 HZ
Instrument size	150x200x330 LxBxH	Weight-Net	7 Kgs Gross 10 Kgs
Optional Extras			
Eyepiece Camera			



			Comparative chart for all Vardhan Metallurgical Microscopes														
Eyepiece	Objective	Magnification	Model	Eyepieces			Objectives						Computer interface CCD Camera	Image Analyzer Software	Magnification With CCD Camera		
				5x	10x	15x	4x	10x	20x	40x	60x	100x			Objective	Magnification	
5x	4x	20x	RV3	Y	Y	Y	Y	Y	Y	Y	Y	Extra	Extra	Built in	Extra	4x	100x
5x	10x	50x		Y	Y	Y	Y	Y	Y	Y	Y	Extra	Extra	Extra	Extra	10x	250x
5x	20x	100x		Y	Y	Y	Y	Y	Y	Y	Y	Extra	Extra	Extra	Extra	20x	500x
5x	40x	200x		Y	Y	Y	Y	Y	Y	Y	Y	Extra	Extra	Extra	Extra		
10x	4x	40x	VMM4	Y	Y	Y	Y	Y	Y	Y	Y	Extra	Extra	Extra	Extra	40x	1000x
10x	10x	100x		Y	Y	Y	Y	Y	Y	Y	Y	Extra	Extra	Extra	Extra	60x	1500x
10x	20x	200x		Y	Y	Y	Y	Y	Y	Y	Y	Extra	Extra	Extra	Extra		
10x	40x	400x	INBT2	Y	Y	Y	Y	Y	Y	Y	Y	Extra	Extra	Extra	Extra		
15x	4x	60x	ESM1T	Y	Y	Y	Y	Y	Y	Y	Y	Extra	Extra	Extra	Extra		
15x	10x	150x	SPM1M	Y	Y	Y	Y	Y	Y	Y	Y	Extra	Extra	Extra	Extra		
15x	20x	300x		Y	Y	Y	Y	Y	Y	Y	Y	Extra	Extra	Extra	Extra		
15x	40x	600x	Portable	Y	Y	Y	Y	Y	Y	Y	NA	NA	NA	Extra	Extra		

Vardhan Microscopes Accessories

CCD Camera Specifications

CCD Camera	Sony or Latest Equivalent
Pick up element	1/3" CCD Image sensor
Number of pixel	512(H)x582(V) PAL
Resolution	640 TV lines
Min.Illumination	5 Lux/F2.0
S/N Ratio	More than 45db (AGC off)
Electronic shutter	1/60(1/50) to 1/100000 auto
BLC function	Auto detect
White balance	Auto
Video balance	1 Vpp, 75Ω
Power source	DC 12V
Current Consumption	150 ma

Computer Interface attachment



Every Vardhan microscope can be interfaced with a computer for instant photography & subsequent image analysis work. CCD camera converts optical image from microscope & sends it to computer. Images with outstanding clarity can be seen on computer monitor & saved as traceable records. In absence of computer the Images can be seen on a TV . Computer interface attachment consists of a high resolution CCD camera, Opto mech. coupler & Frame grabber card (fits into the computer PCI slot), Camera power & video out cord & power supply for the camera.

Following Material is to be provided by you

- ◆ Computer 2.6 GZ, 1GB RAM, 100GB HDD, CD ROM Drive ,Windows XP /
- ◆ Inkjet Printer HP PSC 1410 or equivalent

Image Analyzer Software Analyses Microstructure with repeatable accuracy, Generates & Prints reports.


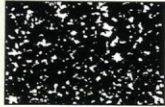
Modules Available Statistical process control (SPC), Report archives, Help


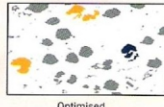
PARTICLE SIZE	Analysis based on size, shape factor, count etc.
ASTM E 1112	Determining average grain size by linear intercept
ASTM E 1077	Case depth / Decarb depth measurement
ASTM E 112	Measurement of JK Inclusion rating
ASTM E 562	Phase Volume Fraction, Measuring percentage of Ferrite, Pearlite, Carbide, Retained Austenite etc.
ASTM A 247	Microstructure of graphite




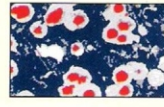
S.G. Iron Nodularity & Nodule count Size & class distribution (1 to 8)

Cast iron Flake size & Flake count Size & class distribution (1 to 8)

VARDHAN WORKS PVT. LTD.		
Part Name : Rocker Heat/Job No. : 1 Sample No. : 1	IMAGE ANALYSIS REPORT METALLOGRAPHY Phase Volume : ASTM E-562	Material : Nodular Iron Date : 11/2/2003
Microstructure Image :		
		
Original	Optimised	
Magnification : 100 X		
Result		
Phases		Percentage
Ferrite Content : (in the Matrix)		14.65
Pearlite Content : (in the Matrix)		55.35
Graphite Content : (in the volume Nodules)		7.25
Field / Portion :		
Sample Portion		
Description / Remarks :		
Edge Portion		
Checked by		

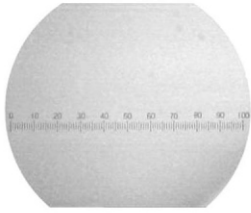
VARDHAN WORKS PVT. LTD.		
Part Name : Rocker Heat/Job No. : 1 Sample No. : 1	IMAGE ANALYSIS REPORT METALLOGRAPHY Graphite Analysis : ASTM A-247	Material : Nodular Iron Date : 11/2/2003
Microstructure Image :		
		
Original	Optimised	
Magnification : 100 X		
Result		
Percentage Nodularity is		66.169
ASTM Size	1 2 3 4 5 6 7 8	
Percent	0.000 9.000 0.000 73.231 19.288 3.388 2.148 1.946	
Nodules		
Maximum Size at 100 X (in mm)		Count per sq. mm
15.978		150.141
Type	Well Formed	Well Formed
Percent	88.482	8.649
		2.869

Field / Portion :		
Sample Portion		
Description / Remarks :		
Center Portion		
Checked by		

VARDHAN WORKS PVT. LTD.		
Part Name : Heat/Job No. : S2 Sample No. :	IMAGE ANALYSIS REPORT METALLOGRAPHY Phase Volume : ASTM E-562	Material : Steels Date : 5/2/2003
Microstructure Image :		
		
Original	Optimised	
Magnification : 500 X		
Result		
Phases		Percentage
Matrix		84.199
Retained Austenite		15.801
Field / Portion :		
Sample Portion		
Description / Remarks :		
Case Area		
Checked by		

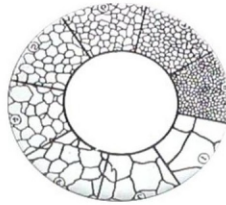
Vardhan Microscopes Accessories

Set of Graduated Eyepieces



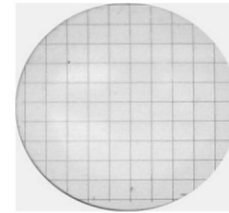
10mm scale divided into 100 parts in 5x & 10x Eyepieces for measuring case depth Or decarb depth

Grain size comparison eyepiece



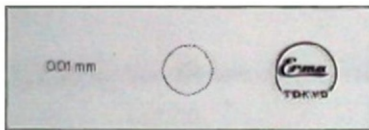
ASTM size 1 to 8 Reticule in 10x Wide field eyepiece for comparing ASTM Grain size

Grid eyepiece



10x 0 Grid reticule mounted in 10x Wide field eyepiece for viewing distribution Pattern

Test Scale



1 mm glass scale divided into 100 Parts used for calibration of the Graduated eyepieces & Image analyzer software

Eyepiece Camera



High resolution 12 Mega pixel Olympus make or equivalent 4x zoom Digital camera fitted with 10x eyepiece for photographing microstructure. Directly fits in the place of eyepiece on any microscope. Pictures can be transferred to the computer.

CCD Camera with Adopter



1/3" CCD camera with Optical adopter which can be attached to all microscopes Transfers the image to TV & or Computer For Image analysis. Used with VMM4 / ESM1T / INBT2 / SPM1 M Microscopes

Specimen leveler



For mounting uneven specimens in plasticine Clay (when using an erect stage microscope)

Lens Cleaning Tissue books



For cleaning microscope optics

Spare Halogen Lamp

Genuine quality spare lamps

Vardhan Microscopes are always very rugged & designed to work on the shop floor itself & are backed by easy availability of spares & an efficient after sales service network.

◆ Due to continuous R &D, Specifications are subject to change without notice

Dealers For: **VARDHAN WORKS PVT. LTD.**



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