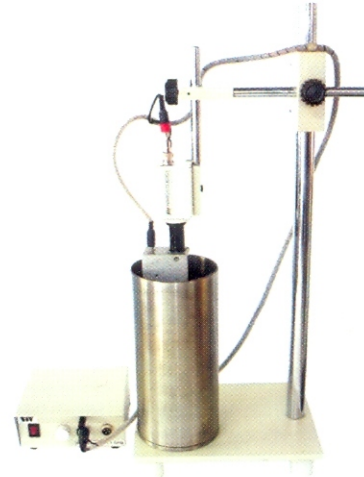


# Measure Hatch Angle by Vardhan SPM04

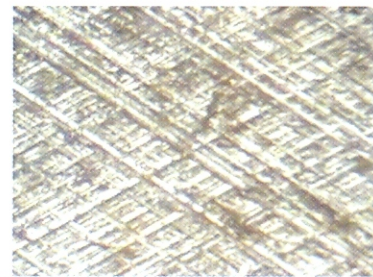
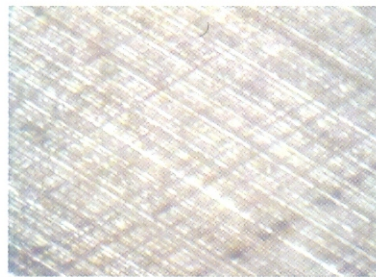
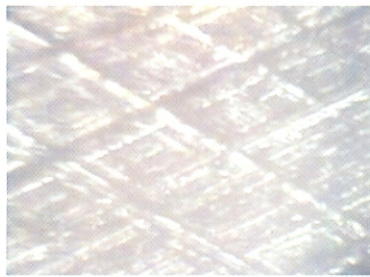
Measures Exact Angle of Honing (Hatch Angle) in honed cylinder liners by Computerized method



**Vardhan SPM04** is a specially designed microscope with a high resolution CCD camera to view, instantly photograph & measure exact angle of honing ( Hatch Angle) in honed grey iron cylinder liners used in internal combustion engines. The honing texture consists of two sets of approximately parallel, stochastically placed grooves at different angles to the cylinder axis. Engine oil consumption, longitivity and noxious emissions highly depend on the quality of this grove texture.

**Vardhan SPM04** is interfaced with your own computer. The Honing texture image is crystal sharp & can be directly seen on the computer monitor. The image can be saved as a traceable record, exact angle of honing is measured by a user friendly software. This novel set up completely replaces the old method of testing the liner surface by fax film.

Honing patterns in cylinder liners photographed by Vardhan SPM04 Microscope



## Actual Users of SPM4 Microscope

Ashok Leyland Ltd	Chennai	Western Auto Spares	Ahmedabad
AEIP Precision Pr. Ltd.	Chennai	Blue Star Group	Rajkot
Simpson Ltd.	Chennai	J. J. Autocomp P. Ltd.	Rajkot
Cylinder liner agencies	Chennai	Kirloskar Copeland Ltd.	Karad
Nagel Spl. Machines Ltd.	Bangalore	Kirloskar Copeland Ltd.	Atit
Jay engineering	Harihar	Paranjpe Metal Shapers P. Ltd.	Shirwal
S. S. Foundry	Harihar	Bajaj Auto Ltd.	Pune
Prarthana Engg. P. Ltd.	Shimoga	L & T John Deere P. Ltd.	Pune
Pearlite Liners P. Ltd.	Shimoga	Kores India Ltd. (PEFCO)	Pune
Liners India Ltd.	Vijaywada	Kirloskar Oil engines Ltd.	Pune
Kushalava Int. Ltd.	Vijaywada	Kinetic Engineering Ltd.	Ahmednagar
Elgi Equipments Ltd.	Coimbatore	Bajaj Auto Ltd.	Aurangabad
Federal Mogul Corp.	Minnesota, USA	Force Motors Ltd.	Pithampur
Swaraj Engines Ltd.	SAS Nagar		

# Measure Hatch Angle by Vardhan SPM04

## Specifications SPM 04

Base	200 x 250 mm (L x B)	illumination	Oblique by Two LEDs attached to probe
Vert. Column	Dia. 25mm L 450 mm	Power Supply	Input 220 V A/C.
Bracket	Can be moved up & down	Out put	12.0 V DC for Camera
Alignment	CCD Camera can be moved	Output	4.5 V DC for LEDs
	Vertically & Horizontally inside	Magnification	Total System Magnification is 100x
	The cylinder liner.	Size	200 x 250 x 450 (LxBxH) mm
Probe I Or	For Liner ID > 55 mm & above	(Standard for Four wheelers engine liners)	
Probe II	For Liner ID > 38mm & above	(Standard for Two wheeler engine liners)	

## Computer interface attachment

Converts optical image from the microscope & sends it to the computer. Images with outstanding clarity can be seen on the computer monitor & saved as traceable record. 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.

## CCD Camera Specifications

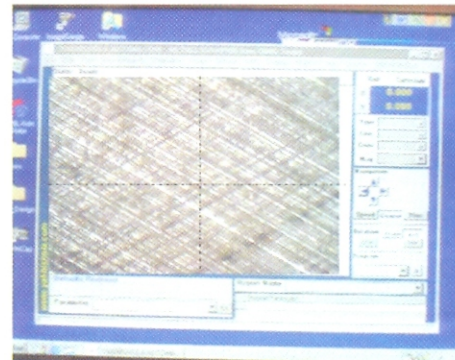
CCD Camera	Sony or Latest Equivalent
Pick up element	1/4" CCD Image sensor
Number of pixel	512(H)x582(V) PAL
Resolution	640 TV lines
Min.Illumination	5 Lux/F2.0
S/N Ratio	More than 45db (AGC off)
Electronic shutter	1/60(1/50) to 1/1000000 auto
BLC function	Auto detect
White balance	Auto
Video balance	1 Vpp, 750
Power source	DC 12V
Current consumption	150 ma

### Following Material is to be provided by you

- ◆ Computer 2.6 GZ, 1GB RAM, 100GB HDD  
CD ROM Drive with Windows XP system  
& Inkjet Printer HP PSC 1410 or equivalent  
Or
- ◆ 14" Color TV with Video In socket

## Measuring Software

- ◆ User friendly Licensed software
- ◆ Calibration Facility
- ◆ Measurement of Distance, Angle, Circle properties (Radius), Straightness, Parallelism, Perpendicularity
- ◆ Full fledge Help Facility
- ◆ SPC (statistical process control), Cause effect Pareto Analysis, X Chart, R Chart, X Bar Chart, Histogram, Cause effect chart, Process statistics & SPC Help
- ◆ Cross hair tool, Rectangle tool, Circle & double line tool
- ◆ Line width, type & color change, Annotation & Edit Mode
- ◆ DRO function, Cartesian & also Polar Coordinates
- ◆ Rotatable Image & also Rotatable coordinates
- ◆ Report generation & Printing



**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 , Technical Specifications are subject to change without any notice

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



A-4 Woodland Society, Welasilly Road, Behind Nabard,  
Shivajinagar, Pune, Maharashtra, India, Pin Code : 411005

Phone : +91-020-65285508, Mobile : +91 9823076590, Email ID : vidyeshme@gmail.com