Editorial

High Quality and Productivity through Material Testing and Examination

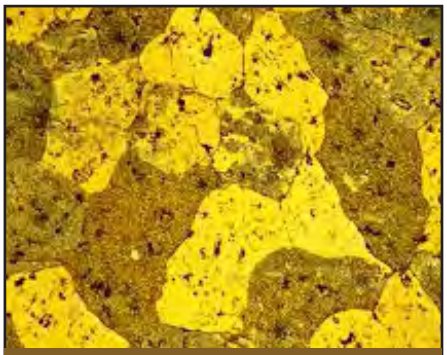
Metal and Materials play a vital role in the manufacturing sector of industry. The right quality of material will help to produce reliable products. Automotive, Aerospace, Telecommunication, Electronics consumer goods, Medical equipment and host of other products depend upon metals. Right from the extraction of metals from earth through metallurgy to the production of materials, the metals are studied for their material properties through microstructure examinations under microscopy for different estimations.

Material Microstructures :

A trained metallurgist can investigate a host of metallurgical failures using a Metallurgical Microscope or Hardness Tester . For example : Measurements and investigations of Grain Size , formation of pearlite , austenite , ferrite structures, cementite, fractures and cracks, inclusion rating , nodularity and plating thickness can reveal enormous information concerning the properties of materials. It must be kept in mind that there is a direct correlation between the microstructures and the material properties. Typically a microscopic examination employing magnification between 50 X to 1000 X is sufficient to provide most of the microstructure related information. Accurate measurement of Grain Size is critical to material microstructures and help to give correct physical and mechanical properties of materials . The American Society for Testing of Materials (ASTM) has laid out ASTM charts to measure the grain sizes. The very coarse grain sizes starting from 1 to finest sizes upto 10 are encountered in steels of special grade. Similarly nodularity and flake analysis of cast iron impregnated with carbon (graphite) disclose information on the proportion of nodules and give adequate confidence on the ductability and strength of the material.

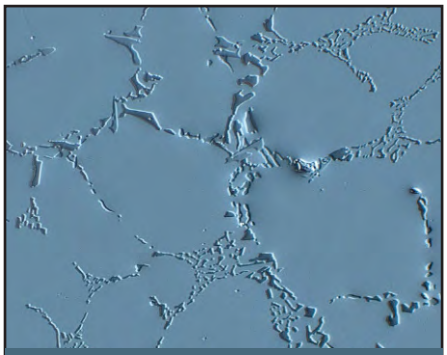
Cracks And Failure Analysis :

Similarly cracks and failure analysis deliver crucial information regarding the immunity of the metal/material during usage and under stress. Certain industrial sectors/products like automotive, aerospace, bridges structures , engineering and manufacturing demand zero tolerance for cracks and fractures because safety of human lives are involved and defective materials can lead to an air mishap in mid air or the collapse of a bridge under traffic stress or similar conditions. Employing stereo zoom microscopes and non, destructive techniques, the cracks and fractures evaluations can be done effectively and the measurement softwares can make accurate measurements and log the data into the computer system for periodical evaluation.



Microstructure of Aluminium

Pure Magnesium 100X, Polarization



Cast Aluminium 500X, DIC

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Invitation To Associate With 'Vaiseshika'

'Vaiseshika' is pleased to invite offers from qualified Individuals or Enterprises to work as **"BUSINESS ASSOCIATE"** for Vaiseshika range of instruments. Basic criteria for the interested parties is that the person must be technically qualified and well versed with the handling of field of instrumentation.

Hardness:

To the metals industry , the measure of hardness is considered as the resistance of the material to permanent deformation. To different industrial engineers hardness has different meanings. For a metallurgist , it is the resistance to penetration of the diamond indentor on the surface of the metal. For a petroleum engineer , the effective of the lubrication is directly proportional to the wear and tear of the metal surface. To a machinist, it means resistance to machining. Brinell, Knoop , Rockwell and Vickers Hardness Tests work on the relationship of load to the area or depth of indentation. Leeb Hardness Tests work on the principle of Rebound Tests. An object of standard mass and dimensions is made to rest on a material surface and the height of rebound is the indicator of hardness. Microhardness Testing is normally done with a diamond indentor employing a load not more than one kg. The Microhardness is evaluated by the length of the diameter of the rhombus generated by the diamond indentor on the application of a given load and the diameter of the Rhombic Indent is measured by a Filar Micrometer eye piece. In fact , the depth of the layer, affected by the surface hardening treatment is commonly referred to as the case depth . Surface heat treatment involves heating a steel part very rapidly above a given temperature, resulting in a thin layer of austenite on the surface. Thereafter the metal part is quenched which results in the formation of a thin layer of martensite on the surface. Carburizing , nitriding, cyaniding and carbonitriding are some of the common heat treatment industrial practices. Thus Hardness Testers are very useful tool of material investigations.

Stereozoom Microscopes

Stereo zoom microscopes provide a three-dimensional visualization or "stereo" image when looking through the microscope. The zoom feature on the stereo zoom microscope provides a range of viewing possibilities, and is the single feature that is most useful when selecting a stereoscope. The zoom knob on a stereo microscope provides magnification within a large .

Stereo zoom microscopes allow quick zoom from low to high magnification. Using a stereo zoom microscope makes it simple to view a sample in the entire field of view, then focus and zoom in on a particular part of interest.

Stereo microscopes have the notable feature of utilizing separate optical paths that lead up to each eyepiece. This method takes advantage of the human "stereoscopic vision," in which the physical separation between the eyes causes each eye to view a particular image at a slightly different angle. This slight difference creates a natural visual perception of depth and dimensionality.

Stereozoom Microscopes can help to evaluate the fractures and cracks in-situ positions also during the manufacturing process.

Our Expertise and Training Edge for you :

We train our customers to use our inspection microscopes and hardness testers. We provide maintainability upto ten years for most of our Microscopes and Hardness Testers. Our customers bear testimony to this fact when they compare 'Vaiseshika' with any other brand in India.

Anil Jain , Ph.D.
President

PCB Inspection Microscope

Auto Focus Stereo Zoom Microscope

Industrial Stereo Magnifier

ZOOM STEREOSCOPIC MICROSCOPES : SERIES 7004

7004B

DESCRIPTION :

Vaiseshika Zoom Stereoscopic Microscope Series **7004** is equally versatile for research institutes & industries.

Vaiseshika Zoom Stereoscopic Microscope is fully synchronized with Image Capturing Device (Camera) interface with computer. Windows based measurement software has now made possible to analyze & measure whatever you see through microscope.

FEATURES :

- Greenough Type Optical System
- Incident light and Transmitted light arrangement
- Fluorescent / LED Ring Light for daylight illumination
- Continuous zoom effect, Parfocal zoom objectives
- Trinocular head with C Mount Camera attachment
- Eye diopters adjustment of the viewer
- Full interface with PC through CMOS/CCD Camera

7004C

For Measurement Software Refer to Page 15

SPECIFICATION: / MODEL	7004B	7004C
Microscope Base/Stand	Standard Base with Illumination	Universal Stand without Illumination
Standard Magnification	7X- 45X or 6X -50X continuously variable with standard EP & Zoom Objective	
Zoom Objective	0.7X to 4.5X or 0.6 X to 5.0 X continuously variable	
Zoom Ratio	6.5:1 or 8.3:1	
Standard Eyepiece	High Eye Point Wide Field 10X / Ø 23	
Optical Magnification	3.5X to 270X or 3.0X to 300X with optional Eyepiece & Objectives	
Optional Eyepieces	WF Eye Piece Pair 15X, 20X & 30X and Micrometer WF Eye Piece Pair 10X, Least count: 0.1mm	
Optional Objectives	Auxiliary Objective 0.37/0.5X, 0.75X, 1.5X & 2.0X attachable below main objective	
Viewing Head (Inclined at 45°)	Trinocular (three parts, two for visual observation & one for camera attachment)	
Rotation of Head	0 to 360°. The binocular vision is convenient to observer and eliminates fatigue of eyes.	
Interpupillary Distance	Adjustable according to your eyes from 52mm to 76mm	
Diopter Adjustment	± 6	
Light Distribution	50:50 between camera pot & observation head	
Color Filter	Blue & Green etc **(optional)**	
Focusing	Coarse focusing with pillar clamp. Fine focusing with sensitive rack & pinion motion	
	through large knobs on both sides**. Fine focusing range 50 mm** approximately.	
Working distance	90-115 mm with standard objective.	
Illuminator	**Base Illuminator**	Transmitted Illumination of the Fluorescent lamp **/ LED**
	Outer Illuminator	Reflected Illumination of the halogen lamp **/ LED**

PARALLEL OPTICS ZOOM STEREOSCOPIC MICROSCOPES : SERIES 7004

7004E

WHAT IS PARALLEL OPTICS : Parallel Optics system in microscopy is basically consists of set of Plan Apochromatic Objectives.
An apochromatic objective infact corrects better for color and spherical aberration than either the **semi-plan** or the **achromatic objective**. Plan objectives have a flat field about the center 95% of the image. They also often have larger working distances. While plan objectives give you flatter fields than achromatic objectives.

7004F

FEATURES :

- Common main objective type Optical System
- Fluorescent/LED Ring Light for daylight illumination
- Parfocal zoom objectives
- Trinocular head with C Mount Camera attachment
- Full interface with PC through CMOS/CCD Camera
- Complete windows based measurement software

For Measurement Software Refer to Page 15

SPECIFICATION: / MODEL	7004E	7004F
Microscope Base/Stand	Standard Base with Illumination	Universal Stand without Illumination
Standard Magnification	(8X to 50X) or (08X to 64X) or (08X to 80X) with standard Eyepiece & Zoom Objective	
Zoom Objective	(0.8X to 5.0X) or (0.8X to 6.4) or (0.8X to 8.0X) continuously variable	
Zoom Ratio	(6:1) or (8:1) or (10:1)	
Standard Eyepiece	High Eye Point Wide Field 10X / Ø 22 or 10X / Ø 24	
Optional Magnification	Customized magnification of 4X to 480X can be provided on request.	
Optional Eyepieces	WF Eye Piece Pair 15X, 20X & 30X and Micrometer WF Eye Piece Pair 10X, L C : 0.1mm	
Optional Objectives	Auxiliary Objective 0.35/0.5X, 0.75X, 1.5X & 2.0X attachable below main objective	
Viewing Head (Inclined at 20°or 0-35°or 45°)	Trinocular (three parts, two for visual observation & one for camera attachment)	
Rotation of Head	0 to 360°, Binocular vision is convenient to observer & eliminates fatigue of eyes.	
Interpupillary Distance	Adjustable according to your eyes from 50mm to 76mm	
Diopter Adjustment	± 6	
Light Distribution	50:50 between camera pot & observation head	
Color Filters	Blue, Green etc. (optional)	
Focusing	Coarse focusing with pillar clamp. Fine focusing with sensitive rack & pinion motion	
	through large knobs on both sides. Fine focusing range 50 mm approximately.	
Working Distance	78 mm with standard objective.	
Illuminator	**Base Illuminator**	Transmitted Illumination of the Fluorescent / halogen lamp/LED
	Outer Illuminator	Reflected Illumination of the halogen lamp/LED

RING ILLUMINATORS : SERIES 360

'Vaiseshika' offers a range of **Ring- Illuminators,** with main microscope, to facilitate sharp, bright, flicker-free and clear inspection & illumination for assembly, inspection, imaging and machine vision. The cool illumination of these systems minimizes eye fatigue in observation for prolonged periods of time and does not radiate heat to the illuminated area. Major advantage of ring illuminator is that it provides illumination similar to **Coaxial illumination** which provides shadow free illuminated field, at relatively low cost.

MODEL / SPECIFICATION	360FL	360LED	360HL/360HLC
Illumination	Fluorescent Circular	LED Circular	Fibre Optic Halogen/coxial
Bundle Dia Meter	-----	-----	Ø 5mm or as per customer
Outer/Inner Dia	Ø98/Ø61mm	Ø98/Ø61mm	Ø 82/62 or as per customer
Power	8W	4.5W	150W
Input Voltage	220 Volts AV/50HZ	220 Volts AV/50HZ	220 Volts AV/50HZ
Output Voltage	-----	DC12V	21V
Brightness adjust	-----	0-100%	50-100%
Working Distance	50-250mm	50-250mm	50-250mm
Quantity of LED/Bulb	-----	64 nos. 144 nos. (LED)	01 (Halogen Bulb)
Brightness	16000-20000 Lux at ht.100mm	16000-20000 Lux at ht.100mm	Above 1 Lac Lux
Color of Light	6400K	6400K	-----

FIBRE OPTICS ILLUMINATORS : 181-1

Positionable Gooseneck Arm Illumination System : 'Vaiseshika' **Illuminator 181-1** is suitable for illumination requirements of microscopy at higher magnification (120x plus). A set of self supporting bifurcated light guide is the main highlight of this system. Opposed angle illumination always provide complete illumination of FOV and reduce shadow obstruction.

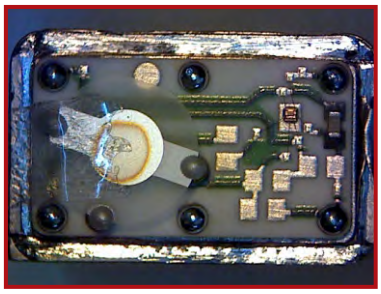
181-1

GOOSENECK ILLUMINATOR

MODEL / SPECIFICATION	181-1
Length	Gooseneck arm 500mm each (2Nos) or custom built
Bundle Diameter	Ø 5mm or as per customer
Outer Diameter	Ø 12 or as per customer
Power	150W
Input/Output Voltage	220 Volts AC/ 21V
Brightness Adjust (Cont.)	50 to 100 %
Qty. of Bulbs/Illumination	1/Above 160000 Lux

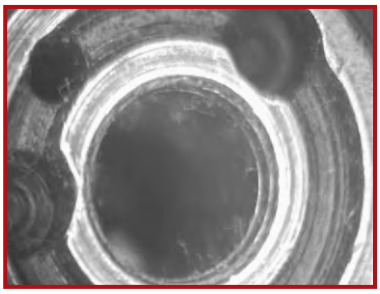
LED Option also available.

MICRO PHOTOGRAPHIC IMAGES CAPTURED ON STEREO ZOOM MICROSCOPE

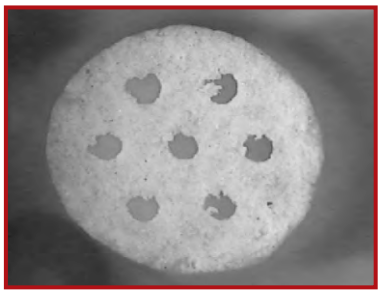


Printed Circuit Board

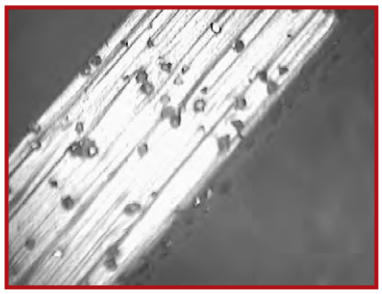
Printer head pins of a dot matrix printer
(Black holes in the figure shows missing pins)



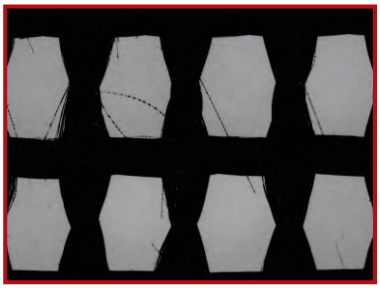
Inside view of diesel injector



Sectional view of a bullet
(Ballistic sample)



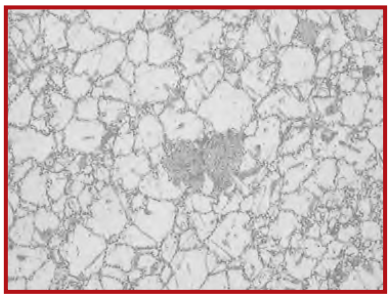
Diamond particles on diamond
cutter wheel



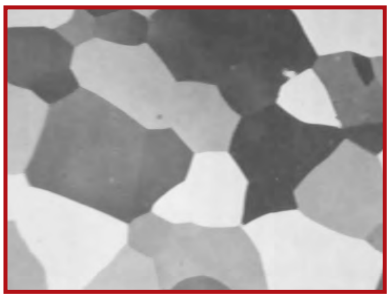
Magnified view of micron filter paper
(Automobile Industry)

MICRO PHOTOGRAPHIC IMAGES CAPTURED ON METALLURGICAL MICROSCOPES

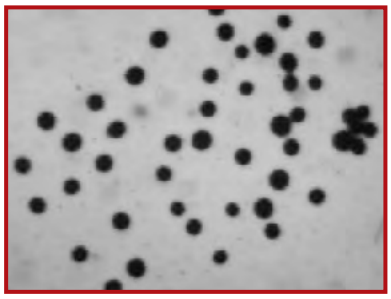
Angle



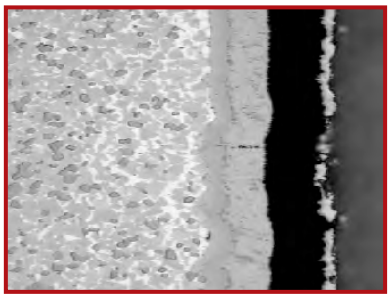
Grain



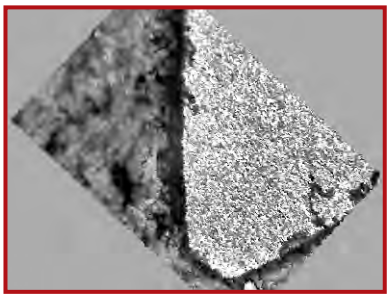
Phase



Count



Thickness Measurement



Decarbization

INVERTED METALLURGICAL MICROSCOPES : SERIES IMS 7001

IMS 7001A

'Vaiseshika IMS 7001A inverted Metallurgical Microscope is often favoured by metallurgists, and industrial users for metallographic specimen examinations.

FEATURES:

- Special design for large & thin size specimen
- Coaxial coarse and fine focusing
- Spring loaded objectives at higher magnification to avoid damage to optics or specimen
- PC interface facility

SPECIFICATION :

Magnifgication	Standard : 50x to 400x Optional : 25x to 2000x
Standard Eyepieces	WF 10X / Ø 18mm
Optional Eyepieces	5X, 15X & 20X Micrometer 10X Grain size measurement WF 10X
Standard Objectives	Achromatic 05X, 10X, 20X & 40X
Optional Objectives	Achromatic 60X, 100X (Oil)
Light Distribution	50:50%
Nose Piece	Quadruple (Backward ball bearing)
Polarizer & Analyzer (Optional)	Set of polarizer & Analyzer attachment
Mechanical Stage	Size :170x135mm & Travel : 30x3Omm Stage plate : Ø10mm, Ø20mm
Illuminator	12V/50W, Hologen lamp, adjustable brighness

For Measurement Software Refer to Page 15

INVERTED METALLURGICAL MICROSCOPES : SERIES IMS 7001 ADVANCED VERSION

IMS 7001D

'Vaiseshika' state of the art Inverted model IMS 7001D has high class infinitive, plan achromatic objectives provide wide field of operations and applications to the customers. Backward, inner locating nose piece is a relief while moving objectives.

SPECIFICATION :

Magnification	Standard : 100X to 1000X Optional : 12.5X to 2000X
Standard Eyepieces	WF 10X / Ø22mm
Optional Eyepieces	5X, 12.5X, 16X, & 20X Micrometer 10X Grain size measurement WF 10X
Standard Objectives	**Infinity, Plan, Achromatic** 10x, 20x, 50x & 100x (all BD)
Optional Objectives	**Infinity, Plan, Achromatic** 5x, 40x, 60x, 80x & 100x (Oil)
Viewing Head	Sidentop **Trinocular** (three Parts) inclined at 45°
Light Distribution	50 : 50%
Nose Piece	Quintuple (Backward inner locating)
Polarizer & Analyzer	Set of polazizer & Analyzer attachment
Mechanical Stage	Size 242 x 200mm, Travel 30mm x 30mm
Illuminator	6 V/30W, 220 Volts AC/50Hz, Halogen

FEATURES:

- Infinitive, Bright/Dark field, Plan, Achromatic objectives and wide field eyepieces, give clear pictures and wide field view
- Universal anti reflected coated optics ensuring full contrast, flat field image with natural color reproduction

OTHER OPTIONS AVAILABLE: IMS 7001B, C & E

UPRIGHT METALLURGICAL MICROSCOPES : SERIES UMS 7001

UMS 7001A

'Vaiseshika' UMS 7001A has been designed to conduct microstructure examination of metallographic specimen. Optical detection of surface irregularities/inclusion and faults in metals can also be observed with the microscope. PC interface facility available.

FEATURES:

- Special design for large & thin size specimen
- Coaxial coarse and fine focusing
- Spring loaded objectives at higher magnification to avoid damage to optics or specimen

SPECIFICATION :

Magnification	Standard : 100X to 400X Optional : 25X to 2000X
Standard Eyepieces	WF 10X / Ø 18mm
Optional Eyepieces	5X, 15X & 20X Micrometer 10X Grain size measurement WF 10X
Standard Objectives	Achromatic 10X, 40X
Optional Objectives	Achromatic 5X, 20X, 60X, & 100X (Oil)
Viewing Head (Inclined at 45°)	Trinocular (three parts)
Light Distribution	100:0%
Nose Piece	Quadruple (Backward inner locating)
Polarizer & Analyzer	Optional
Mechanical Stage	Size : 128 x 86mm & Travel : 30x30mm
Illuminator	6V30W, 220 Volts AC, Halogen lamp

For Measurement Software Refer to Page 15

UPRIGHT METALLURGICAL MICROSCOPES : SERIES UMS 7001 ADVANCED VERSION

UMS 7001C

'Vaiseshika' Upright Model UMS 7001C has Universal anti reflected coated optic ensuring full contrast, flat field image with Natural colour reproduction

FEATURES :

- Coaxial coarse/fine focus system with tensional adjustable and up stop, minimum division of fine focusing:0.2µm
- Reflected vertical illumination and set polarizer device in Trinocular Tube
- Kohler illumination system

SPECIFICATION :

Magnification	Standard : 50X to 800X Optional : 12.5X to 2000X
Standard Eyepieces	High point, extra WF 10X/Ø22mm
Optional Eyepieces	5X, 12.5X 16X & 20X Micrometer 10X Grain size measurement WF 10X
Standard Objectives	**Infinity Plan Achromatic** 5,10,20,50 & 80X
Optional Objectives	40X, 60X, 100X
Viewing Head (Inclined at 30°)	Sidentop Trinocular (three Parts)
Light Distribution	100:0%
Nose Piece	Quintuple (Backward Ball-bearing inner locating)
Polarizer & Analyzer	Available
Mechanical Stage	Two layer & three-axis moveable Size: 280x270mm & Travel:204x204mm
Illumination	6V/30W, 220 Volts AC

OTHER OPTIONS AVAILABLE WITH DARK FIELD & DIC : UMS 7001 B, D, E & F

VERSATILE SPECIMEN CUTTING MACHINES : SERIES 7001CM

7001CM

7001CM-50

7001CM-100

Vaiseshika' offers a versatile range of specimen cutting machines **series 7001**. Vaiseshika' Machines are engineered for precision yet are powerful & ergonomic in use.

In metallography, the structure of the sample, to be taken, should not be changed. Cutting of the sample is the first step during sample preparation. Preservation of specimen to be cut, for observation, is essential.

These machines adopt slow-high speed rotating grinding wheel to cut specimen. Some of the models are equipped with cooling system to prevent the heat damage, to the sample, during cutting.

MODEL / SPECIFICATION	7001CM	7001CM-50	7001CM-100
Specimen Size	25 X 25mm	50 X 50mm	Ø 100mm
Cutting Disc	355 X 3mm	300 X 32 X 2mm	350 X 32 X 2.5mm
Speed in RPM	3800	2800	2800
Coolant Facility	Available	Available	Available
Motor Capacity	2300 Watts	2.6 KWatts	3.0 KWatts
Input Voltage	220 Volts AC/50 Hz.	220 Volts AC/50 Hz.	380 Volts AC/50 Hz.
Phase	Single	Single	Three
Dimensions	635 X 560 X 788mm	740 X 465 X 390mm	720 X 700 X 620mm
Weight	40 Kg. Apx.	70 Kg. Apx.	194 Kg. Apx.
APPLICATIONS	Precision Cutting of Cooper, Brass, Steel, Alloy Steel in range of cross sections	Manual cut-off machine designed for wet cutting large and small, regular or irregular shaped metallic, Ceramic or composite material.	

CUTTING CONSUMABLES

GRINDING CONSUMABLES

ALUMINIUM OXIDE CUT-OFF WHEELS

SPECIMEN MOUNTING PRESS : SERIES 7001MP

After cutting the specimen, the next step is mounting. The aim of mounting is to handle small or odd shaped specimens and protect fragile materials, thin layers or coating during preparations as well as to provide good edge retention. Mounting produces specimen with uniform size so that it is easier to handle while analyzing them.

Basically, two methods are available : HOT MOUNTING, COLD MOUNTING

- **Hot Mounting :** The specimen is mounted under heat and pressure with a hot mounting press. Cold Mounting is preferred for samples which are sensitive to damage from heat and pressure (like coating, PCB etc.)
- **Cold Mounting :** resins are easy to use and requires mixing which is then poured into a mould and allowed to set.

DIGITAL HOT MOUNTING PRESS

7001MP

MOULD DIAMETER	Standard : 45mm, Customized Size : Facility Available
INPUT VOLTAGE	220 Volts / 50 Hz
POWER	650 Watts
DIMENSION	340 x 260 x 430mm
WEIGHT	33 kg.

Consumables	Diameter of Mould	Heating Temperature	Inlaying Time	Cooling Time
Formaldehyde Powder (White)	45mm	130°C	25 minutes	15 minutes
Ebonite Powder (black)	45mm	135-150°C	20 minutes	15 minutes

SPECIMEN GRINDING & POLISHING MACHINES : SERIES 7001PM

7001PMS-200S/250S

7001PMD-200S/250S

'Vaiseshika' This Series of models are designed and manufactured on the basis of International advanced metallurgical sample preparation methods and sample preparation conditions. These are equipped with beautiful and practical FRP shell, in standard parts which never rust.

MODEL / SPECIFICATION	7001PMS-200S/250S	7001PMD-200S/250
No. /Dia of Discs	1/200mm or 250 mm	2/200mm or 250 mm
Rotation Speed	50-600 RPM(Stepless)	50-600 RPM(Stepless)
Coolant Facility	Inlet & Outlet	Inlet & Outlet
Motor Cap./Phase	250 Watts / Single	550 Watts/Single
Input Voltage	220 Volts AC/50Hz	220 Volts Ac/50Hz.
Dimensions	615x380x270	690x715x310
Weight	30Kg.	45Kg.

MICRO VICKERS HARDNESS TESTERS : SERIES 7005
WITH COMPUTER INTERFACE AND MEASUREMENT SOFTWARE (OPTIONAL)

7005B

'Vaiseshika' Digital Micro Hardness Tester also referred as Vickers Hardness Tester, Type: 7005 B&C are precision hardness testing machines which integrate the technology of optics, mechanics and computer.

APPLICATION & USES

- High precision hardness testing of small specimens such as sheet, foil, coatings, ceramic products
- Hardness measurement of Steel, ferrous-nonferrous metals, cemented carbide, sheet metal, metallographic structure.
- Glass, chip and ceramic material, precious stone, human tooth & jaws for anthropological studies.
- Measurement of case hardness & case depth by sectioning a part and making a series of indentations to describe a profile of change in hardness

For Measurement Software Refer to Page 15

DETAILS

SPECIFICATION / MODEL	7005 B	7005 C
Hardness Range	1HV-4000 HV (Read Out: On Digital LCD Screen)	
Hardness scale	HV0.01, HV0.025, HV0.05, HV0.1, HV0.2, HV0.3, HV0.5, Hv1, (HV2-Optional)	
Conversion Scale	HRA, HRB, HRC, HRD, HK, HBS, H15N, H30N, H45N, H15T, H30T, H45T	
Testing Force	10gm (0.098N), 25gm (0.245N), 50gm (0.49N), 100gm (0.98N), 200gm (1.96N), 300gm (2.94N), 500gm (4.9N), 1000gm (9.8N), (2000gm (19.6N)-Optional) Test force error: ±1.0%	
Loading speed	≤50µm/sec	
Indenter	Standard Rectangular pyramid diamond indenter (136º±0.5º)	
Eye Piece	Digital Filar Micrometer Eyepiece 10X, Resolution: 0.01µm, Maximum Travel: 200 µm	
Objective	10X & 40X	
Magnification	100X (For Observation) & 400X (For Measurement)	
Loading method	Automatic (Loading, dwell and unloading)	
Dwell Time	Adjustable 1-99s (In increment of 1 second)	
Turret	Manual	Auto
Maximum Sample height	85mm	
Throat depth	115mm	
X-Y Testing Table	Dimensions:100×100 mm, Travel : 25×25 mm, Resolution : 0.01 mm	
Illuminator	LED Cold light source (can be continuous used for 24 hours without heat generation,	
Power Supply	220V AC + 10%, 50-60 Hz	
Instrument size and Net weight	~ 490×185×515mm (L×W×H), 43kg	
Data Output	Built-in Printer, Built-in RS -232 interface	

Knoop, Twin (Vicker + Knoop) Models also available

ROCKWELL HARDNESS TESTERS : SERIES 7005RHT

7005 RHT-D

DIGITAL

7005 RHT-E

ELECTRONIC

'Vaiseshika' Rockwell Testing Machines are highly reliable, accurate and durable hardness testing machines. These machines are used for determining the hardness of ferrous and non-ferrous metals with high reliability and accuracy.
'Vaiseshika' Rockwell Testers are available in three models i.e. Digital, Electronic and Manual.

SPECIFICATION

Rockwell Scale a) 7005 RHT-D b) 7005 RHT-E	HRA, HRB, HRC, HRD, HRE, HRF HRG, HRH, HRK, HRL, HRM, HRR only HRA, HRB & HRC Rockwell Scales
Preliminary Test Force	10kg
All Testing Force (in kgf)	60, 100 & 150
Hardness Indication	LCD Display for D & Analog for E & M
Dwell Time	Adjustable 1 - 60 S
Accuracy	Conform to GB/T230; ASTM E-18; ISO6508

Auto Hardness Conversion for 7005 RHT-D Only	HRA, HRB, HRC, HRD, HRF, HV, HK, HBW I-IR15N, HR30N, HR45N, HR15T, HR30T, HR30T, FIR45T
Max. Height of Specimen	175mm
Instrument throat	165mm
Dimensions (LxWxH)	520x215x700mm
Gross/Net Weight	120 / 90Kg
Power Supply	Ac220v / 50Hz; 110 / 60Hz

BRINELL HARDNESS TESTERS : SERIES 7005BHT

7005 BHT-UP

ULTRA PRECISION

7005 BHT-P

PRECISION

'Vaiseshika' Brinell Testing Machines are highly reliable, accurate and durable hardness testing machine. These machines are used for determining the hardness of ferrous and non-ferrous metals with high reliability and accuracy. Vaiseshika Brinell Testers are available in three models i.e. Ultra Precision, Precision and Electronic.

SPECIFICATION : 7005 BHT-UP

Testing Force (in Kgf)	62.5, 100, 125, 187.5, 250, 500, 750, 1000, 1500, 3000
Testing Range	(8 ~ 650) HBW
Max. Height of Specimen	225mm
Instrument Throat	135mm
Magnification of Microscope	20x Digital Microscope

Power Supply	AC200V / 50Hz; 110V / 60Hz
Dimensions (LxWxH)	893x720x470mm
Gross/Net Weight	160kg / 130kg
Accuracy	Conform to GB/T230.2; ASTM E-18 ISO06508

DIGITAL SHORE DUROMETER: SD 7005A

FEATURES:

- SHORE A DUROMETER, SD 7005A-A: It is designed for testing the hardness of soft rubber, printer roller and other elastomer material.
- SHORE C DUROMETER, SD 7005A-C: It is designed for measuring hardness of Foam, Sponge, Shoes with incorporates material etc.
- SHORE D DUROMETER, SD 7005A-D: It is designed for testing the hardness of hard rubber, such as thermoplastic plastics, bowling plastic floor and so on.

MATTERS NEEDING ATTENTION:

- Thickness of specimen>6mm, no more than 3 layers; Test area >feet area (diameter 18mm).
- Test 3 times and calculate the average as test result.
- Usually, use A/D. When the hardness of A>90, use D.

SD 7005 A

MODEL / SPECIFICATION	7005A-A	7005A-C	7005A-D
Test Range	0-100HA	0-100HC	0-100HD
Available Test Range	10-90HA	10-90HC	10-90HD
Indenter Shape	Flat cone point (0.79mm) 30°Included Angle	2.5mm Spherical	Sharp cone point (SR0.1mm) 30°Included Angle
Resolution	0.1HA	0.1HC	0.1HD
Power Supply	Runs on by one 1.5V cell battery		
Statistics	Avrg. shore value, min-max		
Accuracy	± 1%		
Weight	0.5 kg		
Operating Temperature	0~40°C		
Dimensions	162x65x28mm		

PORTABLE LEEB HARDNESS TESTERS : SERIES 7005LHT

7005 LHT-D

`Vaiseshika' Portable LEEB Hardness Tester 7005 LHT-D is light weight, hand held and portable instrument which can betaken for on site/in-situ testing of hardness of various type of metals and metal alloys. .

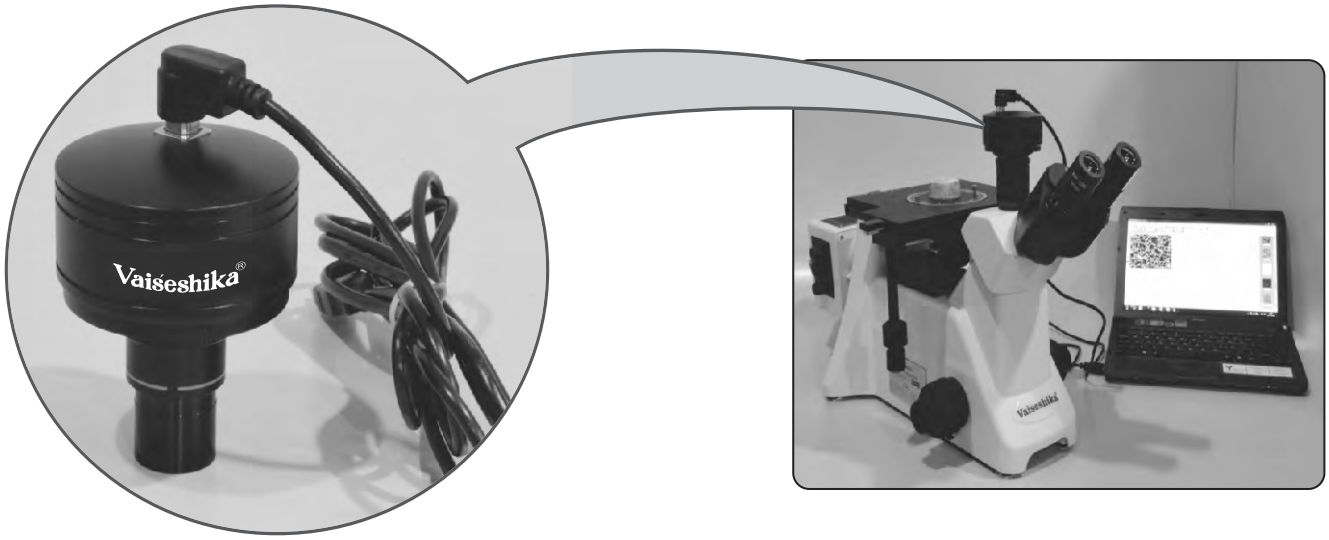
FEATURES :

- USB PC interface for test data analysis
- Battery operated
- Computer interface
- Selectable unit of hardness

SPECIFICATION :

Measuring Range	HLD (170-960)
Impact Directions	Up, down, horizontal, standing up, standing down
Measuring Materials	Steel and cast steel, cold work tool steel, Stainless Steel, grey cast iron Nodular cast iron, cast aluminium alloys, brass (copper-Zinc alloys), bronze (copper-aluminium alloys/copper-tin alloys), wrought copper alloys
Hardness Scales	Leeb, Brinell, Rockwell A,B,C, Vicker, Shore, LCD Display
Memory	500 group (32 every group)
Dimensions	132mm 76mm 33mm
Weight	345 gm
Power Supply	AC220 / 50Hz; 110V / 60Hz / 3 Volt 2AA Alkaline batteries

MICROSCOPY CAMERAS : SERIES 7001



7001-5N/10N

Image Capturing Device Mounted On Microscope

'Vaiseshika' offers a range of cost effective cameras with very good color reproduction and high speed working. Its driver software algorithm makes perfect color reproduction. These devices can be widely used in Industrial inspections, Microscopy observations, Machine vision & Astronomical applications.

MODEL / SPECIFICATION	7001-5N (5 Megapixels)	7001-10N (10 Megapixels)
Sensor	1/2.5" Color, CMOS	1/2.3" Color, CMOS
Sensor Resolution	2592x1944, 5Mpix	3584x2748, 10Mpix
Pixel Size	2.2µm x 2.2µm	1.67µm x 1.67µm
Sensitivity	0.53V/lux-Sec 550mm	0.31 V/lux-Sec-55mm
A/D Conversion	12bit	10bit
S/N Ratio	40.5dB	34 dB
Exposure Time	0.294-2000ms	0.4-2000ms
Frame Rate	5fps@2592x1944 18fps@1280x960 60fps@640x480	1.9fps@3584x2748 8fps@1792x1374 27fps@896x684
Spectral Response	380-650nm	380-650nm
Readout Noise	8 e-	7 e-
Scan Mode	Progressive Scan	Progressive Scan
Shutter	Electronic	Electronic
Optional Interface	C/CS mount	C/CS mount
Data Interface	USB2.0 (480 Mbit/Sec)	USB2.0 (480 Mbit/Sec)
Power Supply	DC 5V ± 5%	DC 5V ± 5%
Power Consmption	approx. 2.0W	approx. 2.0W
Operating Temp.	0°C - 60°C	0°C - 60°C
Operating System	Windows XP/ 7(32/64 bit)	Windows XP/ 7(32/64 bit)

OTHER VARIANTS AVAILABLE

TAB with in-built Camera

HDMI Camera with SD Card

USB 3.0 & CCD Sensor Options also available

IMAGE ANALYSIS & MEASUREMENT SOFTWARES FOR MICROSCOPY & HARDNESS : SERIES 7001/4/5

FOR STEREO ZOOM MICROSCOPES : 7004-NS-SZM

'Vaiseshika' offers Measurement Software with Stereo Zoom Microscopes having multifaceted capabilities known as Measurement Tools

- **Calibration**: This tool is used for calibration through calibration scale. This is done only once when we use with microscope
- **Length**: This tool is used for measuring length. it can measure any given length in the image. It calculates according to your selected scale name, chosen from drop list.
- **Curved Length**: We can measure any cells by simply moving the mouse on the cell and marking area through free hand, it will calculate the result.
- **Angle**: This tool is used for measuring angles of three selected points.
- **Area**: This tool is used for measuring area in square, rectangle, ellipse, polygon, circle and by arrow keys with zoom preview on the screen.
- **Radius**: This tool is used for measuring three points radius.
- **Perimeter**: This tool is used for measuring perimeter of irregular shape.
- **Counting**: This tool is used for automatic counting of cells. It has three intensity ranges for counting manual by selecting area, automatic dark objects and automatic bright objects. It counts in Total Count, Max Dia, Min Dia, Max Area, Min Area, Percentage. It can be searched out with different colors. It shows labels with numbers on every cell. I t m a y count length, width and area.

FOR METALLURGICAL MICROSCOPES : 7001-NS-MET

'Vaiseshika' offers microstructure and grain size analysis Measurement Software with Metallurgical Microscopes having capabilities like Measurement Tools and Metallography Tools. Application Program is set in simplest way so that inexperienced operator can also make analysis with minimum training.

METALLOGRAPHY TOOLS : Broad features of this tool are :

Count And Classification	Nodules	Non Metallic Inclusion
Threshold Particle Measurement	Porosity	Phase
Density	Graphite Flakes	Annotaion
Phase	Grain Size	Filters
Coating Thickness	Grain Crack	Report
Decarburization		

FOR VICKERS HARDNESS TESTERS: 7005-NS-MHT

'Vaiseshika' offers Hardness Measurement Software, used in Sheet Metal Industry, Metal Forging Industry, Oil & Gas industry , Material Science, Auto Industry & Manufacturing and where ever Micro Hardness Testers are used. This software is must for precision measurement & detailed analysis of Hardness Testing.

HARDNESS MEASUREMENT TOOLS : Broad features of this tool are :

Vicker Hardness

The Vickers hardness test measures length of the diagonals of indentation left in the surface in which a square based diamond pyramid, Hardness measurement is done from indentation image. Result of hardness testing is obtained in Vickers value. We can measure the **Case depth** & **Case Hardness** with this software.

Knoop Hardness

It is an indentation in which a rhombic based diamond pyramid, having an included longitudinal edge angle of 172.5° and an included transverse edge angle of 130° is forced into the surface. The knoop hardness HK is calculated by measuring length of the long diagonal, by software **7005-NS-MHT**

Brinell Hardness

The Brinell hardness test is an indentation in which a hard metal ball is forced into the surface of test piece. The mean diameter of the indentation is measured in HBW, by software **7005-NS-MHT.**

Your Hardness Solution under one software

MEASUREMENT TOOLS : ARE COMMON FEATURES IN ALL THE THREE SOFTWARES

MAGNASCOPES

'Vaiseshika' Magnascopes are industrial magnifying instrument consists of a circular solid frame having circular magnifying lens of 120mm diameter. The lens magnification is 2.5X/5X. The lens is free from chromatic aberrations. Flexible arms, controlled by rugged springs, hold the circular frame and the lens at any desired placement.

Uniform illumination of the field of view and the object are attained through a circular, rugged and elegant Japanese Fluorescent Lamp. The illumination is having a cool and soft effect on human eyes during continuous and long observations. This eliminates the fatigue in human eyes during investigation.

7009

7010

COMMON FEATURES FOR ALL

- Stereoamic magnifier
- Shadowless strain free illumination
- Fatigue free-vision
- Flexible arms
- 22W Cool Day Light
- Impressive economy

SPECIFIC FEATURES

7009 (Table Top)

- Unique internally lIluminated base for inspection of translucent objects like films in transmitted light and printed circuit boards
- Dual illumination from base and top
- Separate control for each lighting

7010 (Vice Base)

- Unique vice base with clamping facility
- Ideally suited for clamping the entire Magnascope on the edge of the working table of the technician
- Versatile inspection tool for Assembly Line Production
- Clamping arrangement has a clearance gap of 90mm maximum travel

SPECIFICATION

Magnification of the system	:	2.5 X and 5 X (optional)
Field size (at 2.5X)	:	113 Sq.cm.
Field size (at 5X)	:	33.15 Sq. cm.
Free working distance (at 2.5X)	:	120 mm
Free working distance (at 5X)	:	70 mm
Working voltage	:	220V AC, 50 Hz
Bulb rating	:	15W, fridge type
Fluorescent tube	:	22W, Day Light
Finish	:	Durable powder coated paint and chrome plating.

Please note that Magnascope with given field size and free working distance can not be manufactured beyond 5X magnification. Anybody claiming magnification more than 5X must be scientifically verified for its truthfullness.

LED Option available

MACHINE & WORK LIGHT SYSTEMS

QUARTZ HALOGEN LAMP : JW-55NTL

IP65

'Vaiseshika' Machine Lighting is a wonderful machine light

- Fitted with coil transformer for high power transmission and resisting unstable voltage
- The reflection lense built on luminaire head affords high lighting efficiency, which concentrates light on the working object.
- Works on 220 volt AC power and accepts 50W/75W halogen bulb.
- Luminaire head can rotate through an angle of 310° and up/down 250°
- Totally enclosed lighting head provides prevention for explosion, dust, coolant and lubricants at workplace
- Excellent economy and ease of operation are built-in the system
- Quartz Halogen Lamp gives soft illumination without irritating to the eyes
- Lamp is provided with 1.8 meter cord and plug

LAMP HEAD DIA : 125 mm

ARM LENGTH : 800 mm

JW-55NTL

IP20

JHL-20FT JHL-35FT

GOOSENECK ARM : JHL-35FT/20FT

- Engineering plastic shade and base provides complete insulation for maximum operator safety. transformer built-in base
- LED 1W x 3pcs, Various lighting angles to select 30°, 45°and 60°
- Available with magnetic base or mounting angle plate (optional)
- Double shade design permits fast heat dissipation
- Great light output, soft illuminating without irritating to the eyes
- The gooseneck arm provides vibration resistance performance
- Economical model, yet quality constructed. Ideally suited to machine tools and machinery without big working area

  LAMP HEAD DIA : 75 mm

  ARM LENGTH : 500 mm

Low voltage 24V AC/DC operation models are available, on request.

ROUND TUBE ARM : JWL-55RNTL

- Various lighting angles to select 25°, 60° and 80° Standard angle is 60°
- Power of each LED bulb is 2W x 6 pieces
- 3W bulb is available on request
- LED driver is built in the base for directly connecting to AC (100V-260V)
- LED driver can be externally mounted for increasing LED bulbs
- Reinforced lense for high crack-resistance
- Reinforced lense provides clear (transparent) or sand blasted (foggy) surface to choose from
- Well prevention for explosion, dust, coolant and lubricant.
- Long service life upto 40,000 lighting hours
- Suitable for temperature range -30°C to + 60°C
- Free of infrared ray and ultraviolet ray radiation

  LAMP HEAD DIA : 125 mm

  ARM LENGTH : 800 mm

JWL-55RNTL

BIOLOGICAL MICROSCOPES : SERIES BL 7007

'Vaiseshika' Biological Microscopes have been designed for research quality work in the field of medicine, agriculture and industry. This series is equipped with excellent **Plan, Infinity** achromatic objectives and wide field eyepieces. The shape of the unit is concise and fluent. Ideal ergonomic design is adopted, such as low-lying focusing knobs, backward nosepiece and integrated handle. It makes the operation of the instrument easier having wider space. They are the ideal microscopes in medical treatment, teaching demonstration and scientific research.

BL 7007E

BL 7007F

BL 7007G

MODEL / SPECIFICATION	BL 7007E	BL 7007F	BL 7007G
Magnification	40X to 1000X with standard eyepieces & objectives and 40X to 1600X with optional eyepieces & objectives		
Standard Eyepiece	WF10X/Φ20-22 mm		
Optional Eyepiece	Micrometer 10X/Φ22 mm with L.C =0.1 mm & WF 16X		
Standard Objectives	Infinity Plan Achromatic : PL 4X/0.10, 10X/0.25, 40X/0.65(spring) & 100X/1.25 (spring, oil)	Plan Achromatic : PL 4X/0.10, 10X/0.25, 40X/0.65(spring) & 100X/1.25 (spring, oil)	Infinity Plan Achromatic:PL 4X/0.10, 10X/0.25, 40X/0.65(spring) & 100X/1.25 (spring, oil)
Optional Objectives	Infinity Plan Achromatic Objective 20X, 60X	Plan Achromatic Objective 20X, 60X	Infinity Plan Achromatic Objective 20X, 60X
Observation Head	Sidentop Trinocular, Inclined 30°, Interpupillary distance : 55mm to 75 mm, adjustable angle for eyepiece		
Light Distribution	50: 50%, between camera port & binocular eyepieces.		
Filters	Blue & Frosted glass	Blue & Frosted	
Optional Filters	Green & Yellow	----	
Focusing	Coaxial coarse/fine focus with tension adjustable and up stop, fine focusing : 2µm		
Polarizer & Analyzer	Available (Optional)	----	
Mechanical Stage	Double layer with coaxial X-Y movement, Size: 193mmx155mm Travel: 75mmx50mm	Double layer with coaxial X-Y movement, size: 210mmx140mm Travel: 75mmx50mm	
Illumination	6V/20W Halogen, 220V, 50 Hz AC With adjustable brightness		6V/30W Halogen, 220V, 50 Hz AC With adjustable brightness
Condenser	Abbe condenser NA 1.25, Rack & pinion adjustable		
Collector	----	Collector for halogen lamp illumination and integrated field diaphragm	
Phase contrast unit (Optional)	Centering Telescope		
	Infinity Plan Achromatic 10X, 20X, 40X, 100X	Plan Achromatic 10X, 20X, 40X, 100X	Infinity Plan Achromatic 10X, 20X, 40X, 100X
	Pullboard phase contrast condenser	Turnplate (I,II), Flashboard, Pullboard phase contrast condenser	

Spectrum of Prestigious Projects, Organizations and Institutions using Vaiseshika Calibration Standards

SUKHOI SU-30 & PRESTIGIOUS AVIONICS PROJECTS

- SU-30 Sukhoi Aircraft, Jaguar Aircraft, MIG Aircraft, Light Combat Aircraft (LCA)and Advanced Jet Trainer (AJT), Advanced Light Helicopter (ALH) Projects of the Hindustan Aeronautics Limited at their factories at Bangalore, Barrackpore,Hyderabad, Korwa, Kanpur, Koraput, Lucknow and Nasik.

POLAR SATELLITE & SPACE RESEARCH PROJECTS

- Polar Satellitte Launch Vehicle, Geosynchronous Launch Vehicle and National Satellite Projects at the Space Research Stations of Vikram Sarabhai Space Centres at Ahmedabad, Thiruvananthapuram, Mahendragiri and Sriharikota.

NUCLEAR POWER PROJECTS

- Nuclear Power Generation Projects and Research Centres at Kota (Rawatbhatta), Surat (Vyara), Mysore, Bulandshar (Narora), Thane (Boisar) & Bhabha Atomic Research Center at Mumbai.

INDIAN AIR FORCE, INDIAN NAVY & INDIAN ARMY

- Base Repair Depots of Indian Airforce at Chandigarh, Coimbatore (Sullur), Jabalpur, and Tughlakabad and Indian Airlines Limited, Kolkatta and Mumbai. Indian Navy, Port Blair and Army Base Workshop, Agra etc.

NATIONAL HYDEL & SUPER THERMAL POWER PROJECTS

- Bhakra Dam, Bhakra Beas Project; Korba Super Thermal Power Project, Korba; Koyna Dam Maintenance Division, Satara; National Thermal Power Corporation Limited, New Delhi; National Hydroelectric Power Corporation Limited, Chamera (Himachal Pradesh); Super Thermal Power Project, Kahalgaon; Thermal Power Project, Dhenkanal (Orissa); Vindhyachal Super Thermal Power Project, Sindhi and Karnataka Power Corporation Limited.

Prestigious Industrial Organizations in India

National Metrology Institutions

NATIONAL, REGIONAL, STATE & NABL/ISO 17025 ACCREDITED CALIBRATION LABORATORIES IN INDIA & OVERSEAS COUNTRIES

- More than 50 NABL Accredited Laboratories in India and ISO 17025 laboratories in Bulgaria, Dubai, Saudi Arabia & Singapore. electronics Test and Development Centres (ETDC) at Bangalore, Aurangabad, Chennai, Goa, Guwahati, Hyderabad, Mohali, Mumbai, Pune and Solan.

भारतीय अन्तरिक्ष अनुसंधान संगठन
अन्तरिक्ष विभाग
भारत सरकार
अन्तरिक्ष भवन
न्यू बी ई एल रोड, बेंगलूरु - 560 094. भारत

इसरो ISRO

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Scientific Secretary, ISRO/Director, SCP

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bhaskaranarayana@isro.gov.in

Ref: ISRO:SS:54

December 15, 2009

Dear Dr. Anil Jain,

I wish to acknowledge the receipt of your letter dated 21.11.2009 addressed to Chairman, ISRO and convey his hearty thanks for your greetings and good wishes.

We are aware of the expertise of Vaiseshika in the field of designing and commissioning of calibration standards that are required for many critical facilities in our country including few ISRO Centres.

We wish Vaiseshika, a sustained growth with further innovative capabilities to reach new heights.

Best wishes,

Yours sincerely,

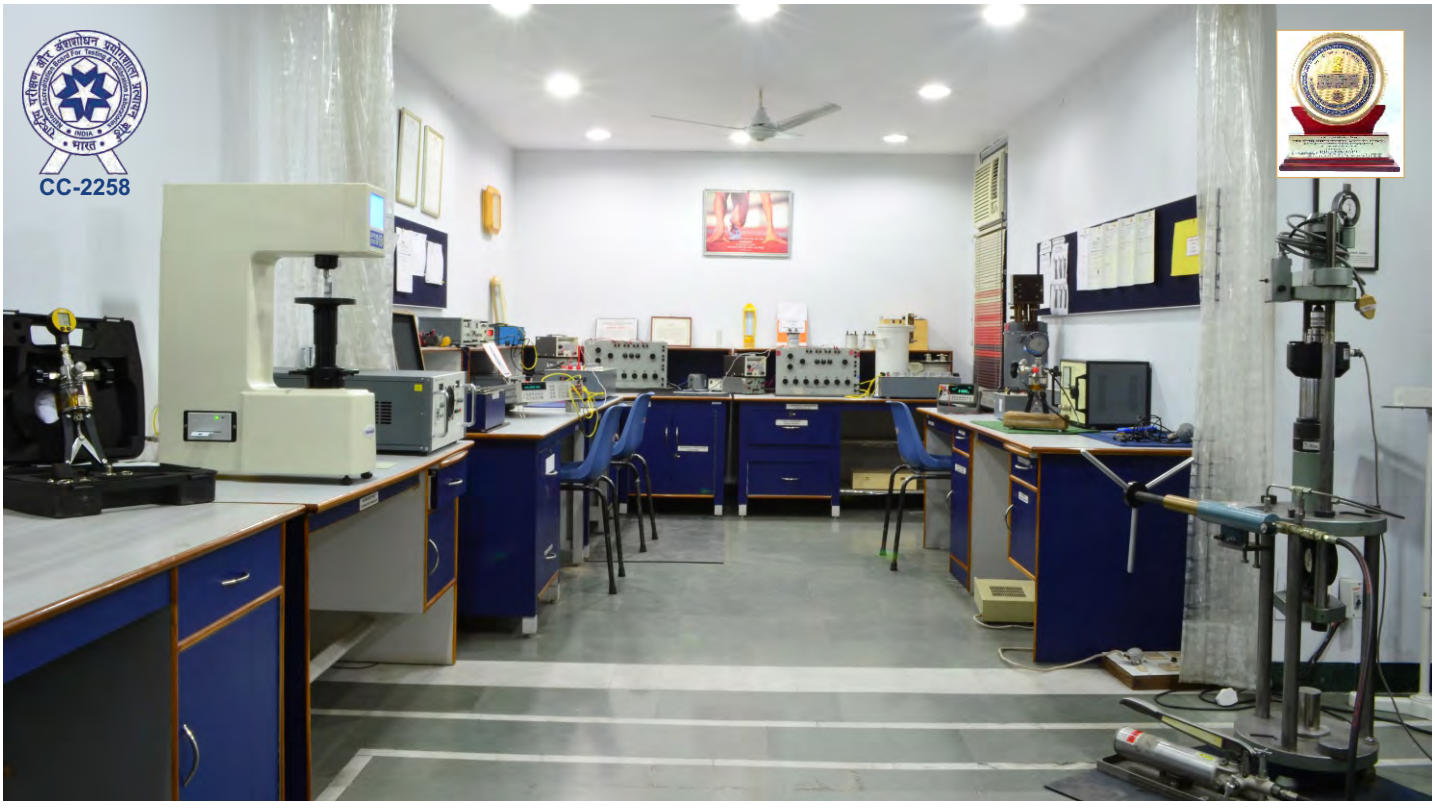
(A Bhaskaranarayana)

Dr. Anil Jain
President
Vaiseshika Electron Devices
Across Tangri River Bridge
38-Industrial Estate
Ambala Cantt – 133 001 (INDIA)

भारतीय अन्तरिक्ष अनुसंधान संगठन Indian Space Research Organisation

ISRO Chairman Appreciation Letter for Vaiseshika Engineering Capabilities

Vaiseshika Standards are being used in Aero Space Applications



Panoramic View of Vaiseshika ISO 17025:2017 Accredited Calibration Laboratory

Vaiśeshika®
WORLD CLASS CALIBRATION STANDARDS

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