



National Award for
Outstanding Entrepreneurship - 2010



National Award for
Quality Products in Instrumentation - 2002

Materials Microstructure Examination with Inverted Microscopes

What is a Metallurgical Microscope ?

A Metallurgical Microscope is like any other Optical Microscope with the exception of lighting orientation. A Metallurgical Microscope uses a different lighting method, that can illuminate solid specimen to identify, inspect & measure them. Some Industries use Inverted Metallurgical Microscope which observe the specimen from below the stage. Electronic part manufacturers, Forensic laboratories & Metal Foundries, all use this type of instrument.

Inverted Metallurgical Microscope

The Inverted Microscope is designed with the light source and the "condenser" lens above the specimen. The condenser lens concentrates the light. The "objective" and turret of the microscope is on the bottom. The objective focuses the light to produce a real image.

Inverted vs Upright Microscope

Basically, in an Upright Microscope, you look down to see the image, and with an inverted model, you look up. This type is commonly used in metallurgy, cell culture and for viewing aquatic specimens. This microscope model is a very good choice if your sample to be viewed is in suspension or is very large and heavy. The Inverted is offered with two models - routine and research. An upright microscope can be purchased as a smaller model for student use which influences price.

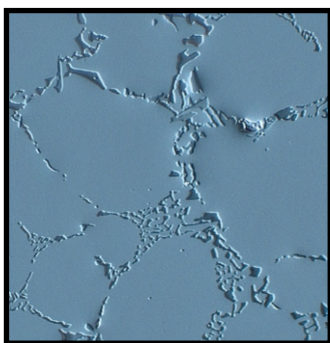
Advantages

Many important macroscopic properties of metallic materials are highly sensitive to the microstructure. Critical mechanical properties, like tensile strength or elongation, as well as other thermal or electrical properties, are directly related to the microstructure. The understanding of the relationship between the microstructure and macroscopic properties plays a key role in the development and manufacture of materials and is the ultimate aim of **inverted metallography**.

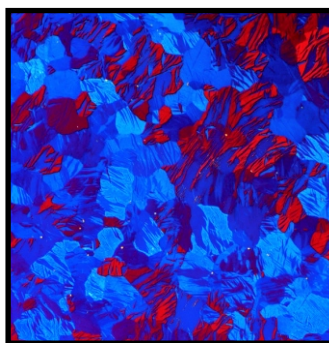
Also the Inverted Microscopes permit use of Kohler Illumination which is a great option as well as DIC and Phase Contrast Optics (creating different shades of brightness) greatly enhancing the image for better viewing.

In the case of large or heavy specimens, such as those in metallurgical sampling, a conventional microscope is useless, but the inverted model, due to its design is perfect for analysis.

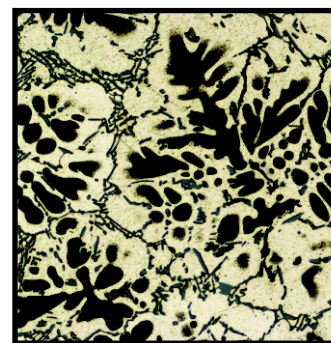
Additionally, the option of recording the interaction of a specimen in its environment allows for validation and review of the real time observations, over a longer period of time.



Cast Aluminium
500x, DIC



Pure Magnesium
100x, Polarization



Aluminium Alloy
100x, Brightfield



Inverted Metallurgical Microscope : IMS 7001A

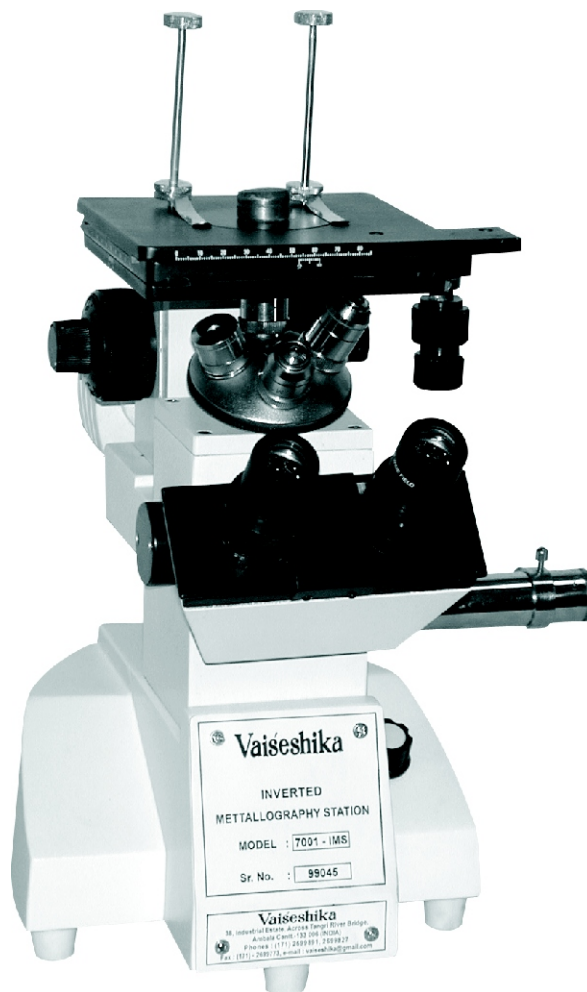
DESCRIPTION

"Vaiseshika" has introduced Metallurgical Microscope with inverted design so often favoured by metallurgists, and industrial users. It saves time and is so convenient for large size metallographic specimen examinations. Prepared specimens and even large objects placed on the inverted stage are levelled automatically to the optical axis, ready to examine.

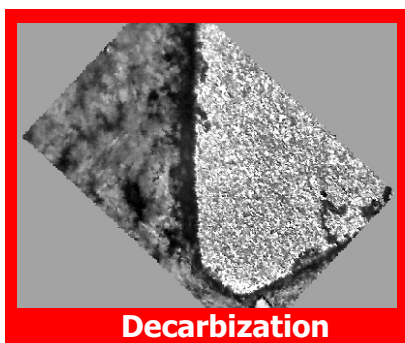
Microscope is having motion assembled on ball bearing guides, having compact design, clear glare free image, low drive stage.

FEATURES

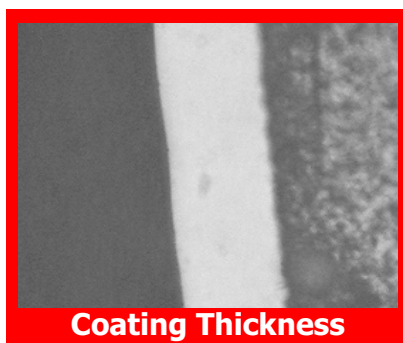
- Special design for large & thin size specimen
- Incident light microscopy for metallography
- Optional Polarizer and Analyzer attachment
- 12V/50 Watts halogen lamp for better illumination & adjustable brightness
- Magnification range 25x to 2000x
- Spring loaded objectives at higher magnification to avoid damage to optics or specimen
- Coaxial coarse and fine focusing
- Perfect transmission system having localized illumination and flatness of field
- PC interface facility with camera and image analysis measurement software for micro-photography



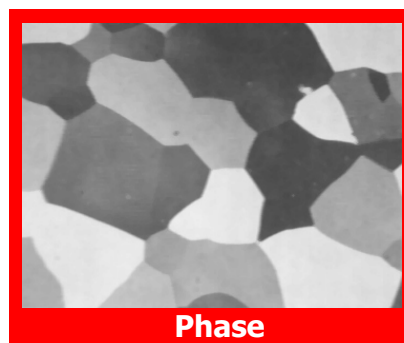
IMS 7001A



Decarbization



Coating Thickness



Phase

Images Taken On Metallurgical Microscopes Through Image Capturing Device



SPECIFICATION

Magnification	100X to 400X with standard eyepieces & objectives 25X to 2000X with optional eyepieces & objectives
Standard Eyepieces	WF 10X / Ø18mm
Optional Eyepieces	5X, 15X & 20X Micrometer 10X with least count = 0.1mm Filar Micrometer 10X Grain size measurement WF 10X (08 grains engraved) Objective Micrometer Disc with least count = 0.01 mm
Standard Objectives	Achromatic 05X, 10X, 20X & 40X (Parafoval high quality optics)
Optional Objectives	Achromatic 60X & 100X (Oil)
Viewing Head (45° Angle)	Trinocular (three parts, two for visual observation & one for camera attachment) interpupillary distance : 55mm to 75mm
Light Distribution	50 : 50% between camera port & binocular eyepieces
Color Filters	Yellow, Blue, Green & Frosted Glass
Focusing System	Coaxial coarse & fine focus system
Nosepiece	Quadruple (Backward ball bearing inner locating)
Polarizer & Analyzer	Set of polarizer & Analyzer attachment (Available, Optional)
Mechanical Stage	Two layer & three-axis moveable with coaxial X-Y movement. Size : 170 X 135mm & Travel : 30mm X 30mm, Stage plate hole : Ø10mm, Ø20mm
Illuminator	12V / 50W, 220V AC/50Hz, Halogen lamp, adjustable brightness

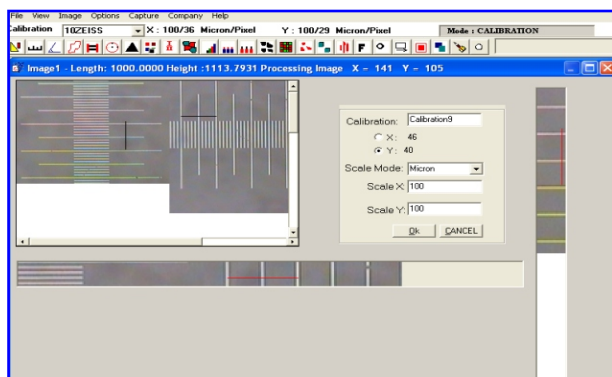
What is Optical Calibration ?

Calibration is an exercise to determine the accuracy of an optical component for any number of optical applications. Calibration Standards are very precise measuring devices that allow optical components to be accurately evaluated after multiple uses to ensure continued effectiveness or determine when recalibration is required.

Glass Disc Micrometer Stage is one such calibration standard which is used to check the correctness and validation of optical magnification of eyepieces and objectives. Vaiseshika supplies its microscopes duly checked and calibrated on all magnification sections.

Calibration Certificate

Vaiseshika can supply its microscopes along with calibration certificate traceable to **National Physical Laboratory (NPL), New Delhi / International Standards.**



Adjacent photograph shows calibration of a microscope with Measurement Software under process with the help of Glass Disc Micrometer Stage.



INVERTED METALLURGICAL MICROSCOPE : IMS 7001B

FEATURES

- Special design for large & thin size specimen
- Plan, Achromatic objectives and wide-field eyepieces, give clear pictures and wide field view
- Comfortable and enjoyable operation with low and pre position control knob
- Universal anti reflected coated optics ensuring full contrast, flat field image with natural color reproduction
- Fully synchronized with PC, Image Capturing Device & Measurement software
- Kohler illumination system
- Illumination system is having facility to adjust bulb filament and its centering to get evenly illuminated entire field of view.
- Facility of color filters in a single strip ensure quick color contrast to observe different type of samples



IMS 7001B

SPECIFICATION

Magnification	100X to 1000X with standard Eyepiece & Objectives 12.5X to 2000X with optional Eyepieces & Objectives
Standard Eyepieces	WF 10X/Ø18mm
Optional Eyepieces	. 5X, 12.5X, 16X, & 20X . Micrometer 10X(10mm X 100 parts) With least count =0.1mm . Filar Micrometer 10X . Grain size measurement WF 10X (08 grain engraved) . Objective Micrometer Disc with least count =0.01mm
Standard Objectives	Plan Achromatic PL 10X/0.25, PL 20X/0.40(S), PL 40X/0.60(S), PL 100X/1.25(S)(Oil)
Optional Objectives	2.5X/0.7, 4X/0.10, 50, 60, 80, 100X Dry
Viewing Head(Inclined at 30°)	Sidentop Trinocular (three parts, two for visual observation & one for camera attachment) Interpupillary distance: 55mm to 75mm, adjustable angle for two Eyepieces
Light Distribution	100:0%, between camera port and binocular eyepieces
Color Filter	Yellow, Blue, Green & Ground
Focusing	Coaxial coarse & fine focusing with tension adjustable and up-stop. Fine resolution : 2µm
Nose Piece	Quadruple(Backward ball bearing inner locating)
Polarizer Attachment(Optional)	Available
Mechanical Stage	Double/ three layer & three – axis moveable with coaxial X-Y movement Size: 180mm X 150mm & Travel : 15mmX15mm. Stage plate hole: Ø12mm, Ø20mm
Illuminator	6V/20W, 220 Volts AC/50Hz, Halogen lamp, adjustable brightness



Image Capturing Devices



Nosepiece



Eyepieces

VAISESHIKA ELECTRON DEVICES

38-Industrial Estate, Across Tangri River Bridge,
Ambala Cantt.-133 001. Haryana (INDIA)
Phones : (171)-2699827, 2699891 Fax : (171)-2699773
Email : info@vaiseshika.com, vaiseshika@gmail.com

