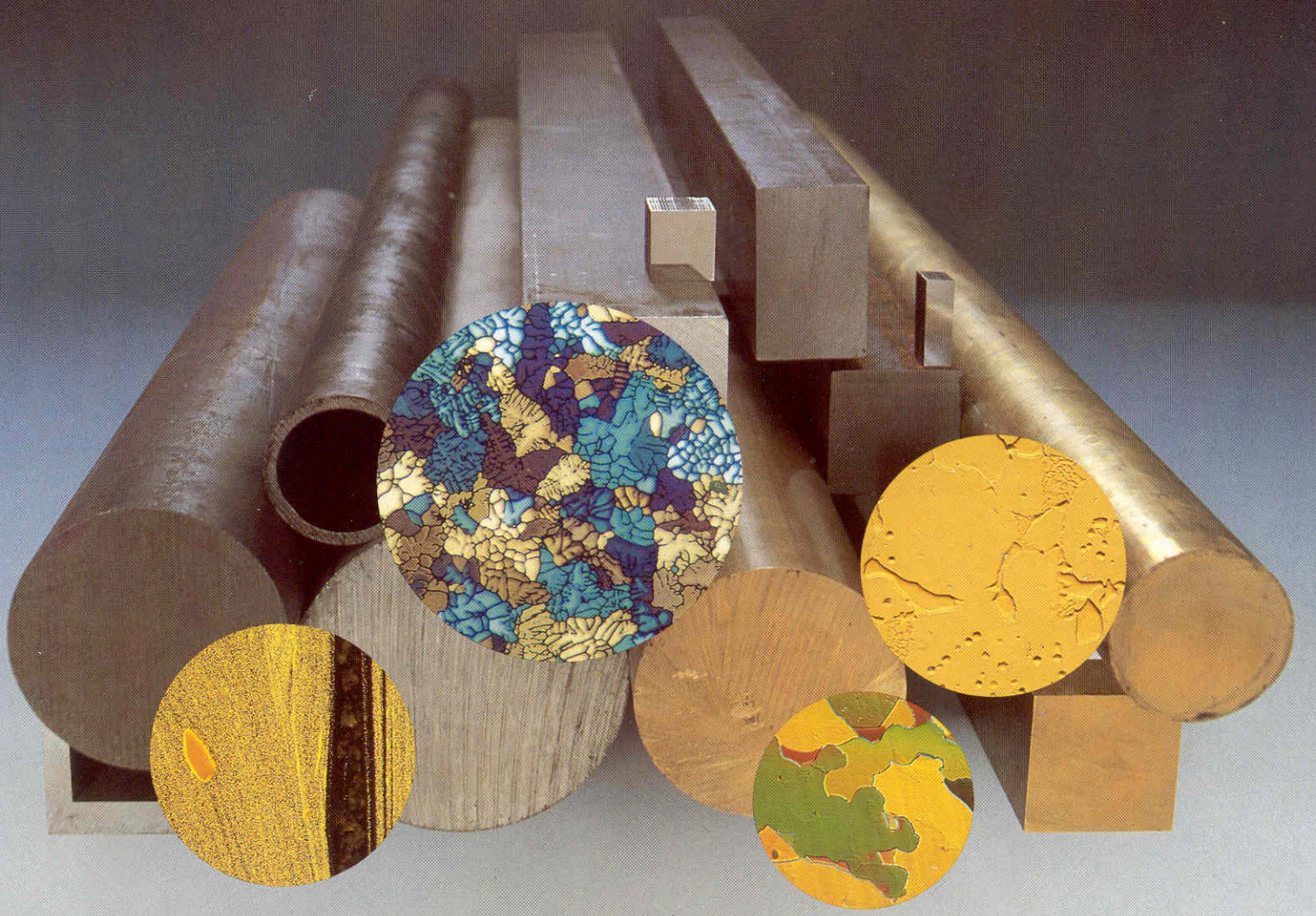
LEITZ ARISTOMET

Modular microscope for metallography, quality control, research and development



Leitz. One of the Wild Leitz Group of companies.

WILD LEITZ

Leitz ARISTOMET
The incident-light microscope for metallography, quality control, research and development

The new Leitz ARISTOMET incident-light microscope is a versatile and task-oriented microscopy system with the following outstanding features:

New incident-light axis built into the base of the stand with switchable beam-splitter, diaphragm and filter modules for any observation or contrast method

New high-performance Leitz PLAN-FLUOTAR® incident-light objectives with excellent imaging characteristics

New optical design: the same objective can be used for any observation or contrast method

Newly designed tube with continuously variable magnification changer, intermediate image plane access for graticules, adjustable viewing height and TV port

New approach to photomicrography, using a firmly supported large-format camera and a vertical film plane

Economic modular system: the microscope can be matched to the requirements and budget of the customer.

The Leitz PLAN FLUOTAR objectives consist of new high-refraction optics with semi-apochromatic correction and multiple anti-reflection coating, featuring perfect image flatness over the entire 26mm field. The result of this new optical design: brilliant contrast, superb resolution of detail and pin-sharp images right to the edge of the field of view for 26mm large-field microscopy. The same set of objectives can be used for all observation and contrast techniques, such as brightfield, darkfield, interference contrast, fluorescence, polarisation and oblique illumination for the same large field of view and the same image and object window.

For the scanning of polished surfaces, surface inspections, particle measurements and determination of grain sizes, the large field of view index (26) of the Leitz GW 10x/26 eyepieces provides an exceptional information gain: the field of view is twice as large as that offered by microscopes with the conventional 18 field of view index.

The ARISTOMET's first-rate optics, operational convenience, impressive versatility and stability and high standard of workmanship combine to make it the ideal microscope for any task in industry and research.

Requirements in the metallographic laboratory, in production and incoming-material control and in the research of raw and finished materials are high. In meeting them, the ARISTOMET provides evidence you can rely on when assessing your samples.

Not only that: the ARISTOMET's modular design gives you the opportunity to choose only the equipment you need, i. e. match the size of your investment to practical and financial considerations.


VARIOPHOT
ARISTOMET

Leitz ARISTOMET
A wide range of microscopic techniques for reliable assessment of new materials

Problem solution: Brightfield

For high-contrast structures with their own reflection and colour contrasts.

Problem solution: Darkfield

For the depiction of surface deformation, such as grain boundaries, edges, scratches, holes and cracks and for details of rough surfaces and unprepared objects.

Problem solution: Polarised light

For the identification of anisotropic inclusions in metal surfaces and coatings, and for general contrast enhancement.

Problem solution: Interference contrast

For low-contrast polished and material surfaces that cannot be adequately contrasted by other means. This method shows up minute changes in level and refractive index and presents these as a contrasty three-dimensional image.

Problem solution: Investigations in transmitted light

The ARISTOMET can easily be adapted for the examination of transparent objects, e.g. thin and polished sections, powders and liquids.

Problem solution: Oblique illumination

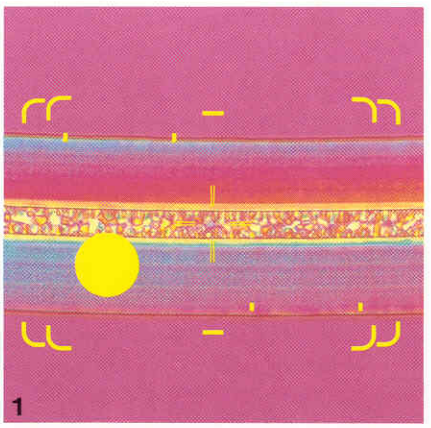
Oblique incident light shows up the structural relief of the surface topography of specimens. This method is used for the investigation of damage and the identification of surface defects. The oblique lighting can be switched reproducibly.

Problem solution: Measurement of length and grain size

Graticules with micrometer scales can be either inserted into the eyepieces or, mounted on slides, into the light path in the VARIOPHOT. For the determination of grain and particle size to DIN, ASTM and Euronorm standards there are graticules for standard series, Snyder-Graff lines and ASTM E112. They are matched to the standard magnification series so that, for example, at a standard 100x magnification a division line corresponds to 10µm in the object plane. Screw micrometer eyepieces and digital linear micrometer eyepieces with computer and printer are also available.

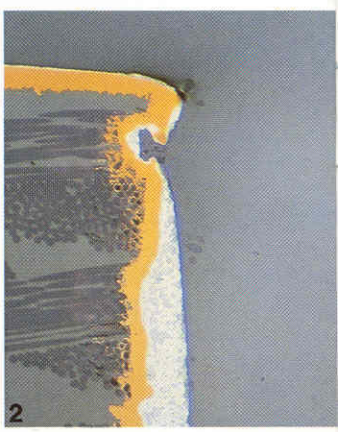
Problem solution: Interference coating

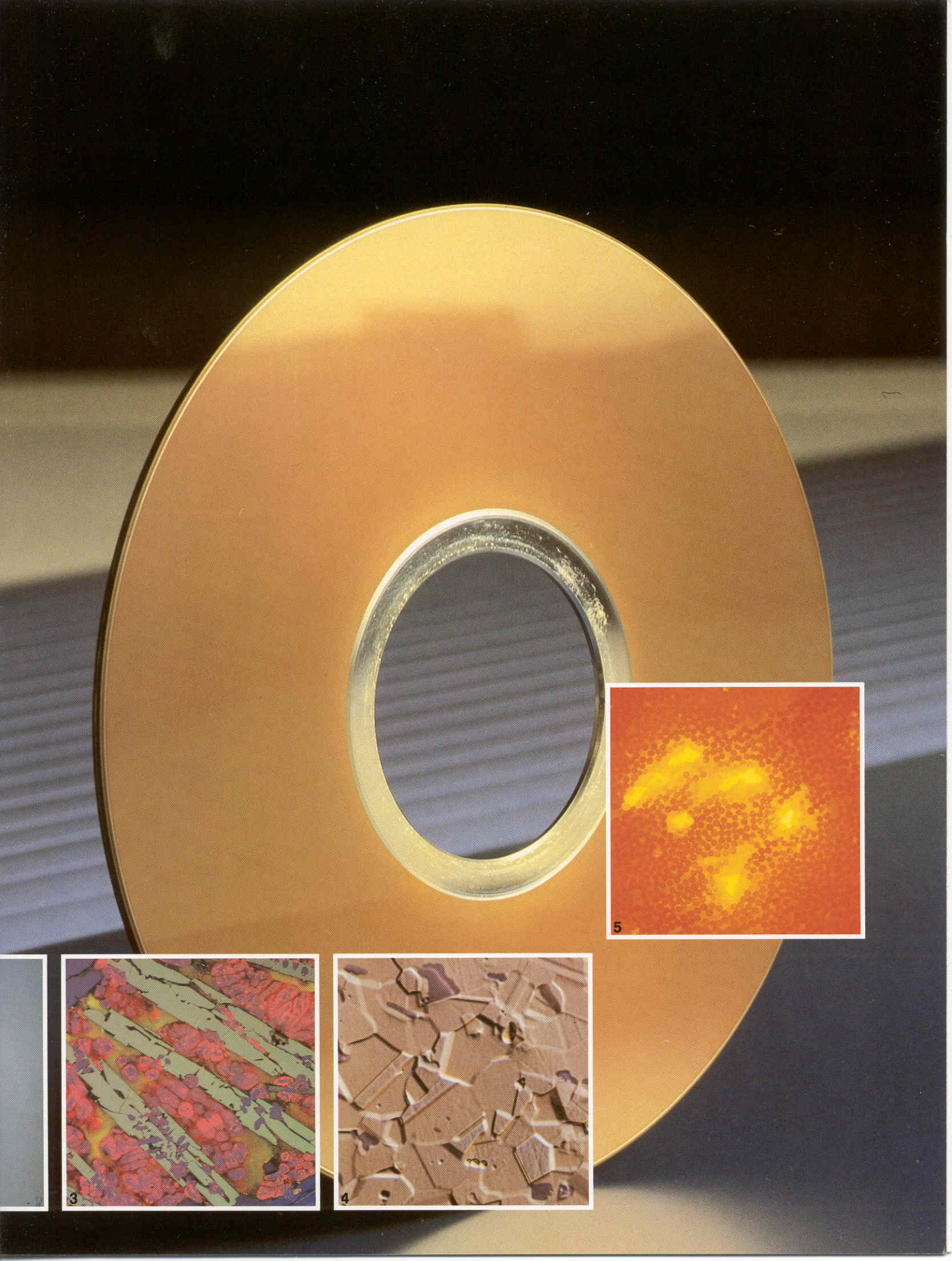
By applying interference layers, phase-specific colour contrasts can be produced in the structure of multi-phase materials resistant to chemical corrosion and on the surface of poorly reflecting materials. The ARISTOMET's generous working space is large enough to accommodate the contrast chamber, so that the coating process can be controlled under the microscope.



1 Thin, 5-layer section of plastic, transmitted light brightfield/polarisation. Prep. and photo Kristen Kjeldsen, Techn. serv. dept. Statoil, Bamble. With reflected format outlines, movable metering spot and central focusing cross lines of the Leitz ORTHOMAT E camera system
2 Circuit board contact, Fe-sputtered*.
3 Copper converter slag with copper oxydul, Fe-sputtered, polarised light*.
4 Steel X4 CrNiMoB 18.11, Fe-sputtered, interference contrast. Prep. and photo H. Stienstra, KEMA, Arnheim.
5 Pores in glass-fibre reinforced component, incident light fluorescence*.

* **2, 3 and 5:** Prep. and photo H. Rappe, G. Müller, Struers GmbH, Erkrath.

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Problem solution: Incident light fluorescence

For investigations on contaminated or coated surfaces, for contrasting of embedding media and synthetic resins (circuit boards) and investigation of damage (cracks and holes). The wide choice of interchangeable filter sets permits selective fluorescence excitation. For specific methods of investigation, two filter sets can be switched in fast alternation to make assessment easier.

Problem solution: Interference fringe method

Changes in level are shown by the course and deflection of interference fringes and can be measured directly by means of the wavelength of the light used. With Michelson's twin-beam and Tolansky's multiple-beam interference methods peak-to-valley height, height and film thickness can be measured within a range of 10nm to 30,000nm (0.01µm to 30µm).

Problem solution: Microhardness testing

The microhardness tester whith indentor diamond according to the Vickers and Knoop method was designed for testing the strength and hardness of the microstructure and surface of materials. The indentation loads are selectable, ranging from 0.02N (2p) to 4N (400p). Hardness values are digitally displayed and automatically analysed and recorded.

Problem solution: Projection, TV microscopy

The observation and film plane of the large-format camera and a projection attachment are available for discussion work. The connection of a TV camera enables a larger number of people to view the microscope image and also permits the use of TV techniques.

Problem solution: Heating-stage microscopy

Using the Leitz 350, 1350 or 1750 heating stages, it is possible to carry out applied basic research and investigations of plastics and high-temperature resistant metals, ceramics and powders. Heating stage microscopy provides an insight into the melting processes of test substances, their structural transformation, sintering, surface diffusion, grain growth, precipitation, dissolution and shrinkage of constituents at temperatures up to +1750°C.

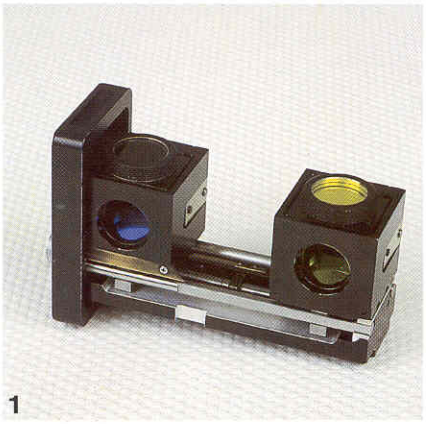
Problem solution: Accessories

The advantages of the ARISTOMET's modular design are demonstrated by its many accessories. Besides the equipment already mentioned, the range also includes:

– **Discussion device** for simultaneous viewing of the microscope image by two or three people. An externally movable arrow can be pointed to any object detail in the field of view.

– **Drawing device** for easy tracing of the microscope image with a post-magnification up to factor 2 and for photomacrographic documentation from 0.5:1 to approx. 2.5:1.

– **Magnification changer** 1.25x, 1.6x and 2x for step-by-step change of the overall magnification when using FSA tubes.



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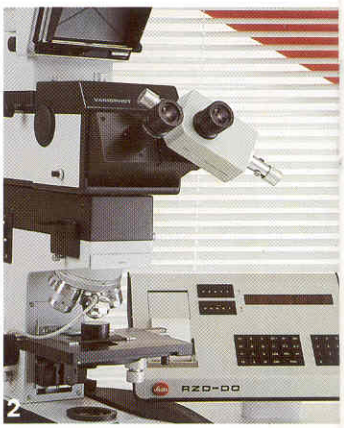
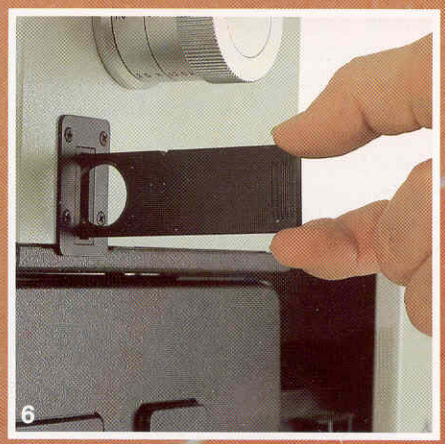


2

Preparation: Material 1.4301 Fe-sputtered, prep. and photo H. Stienstra, KEMA, Arnheim.

1 Fluorescence module
2 Microhardness tester
3 TV attachment
4 Heating stage 1750
5 Michelson's interference attachment
6 Graticule module on the VARIOPHOT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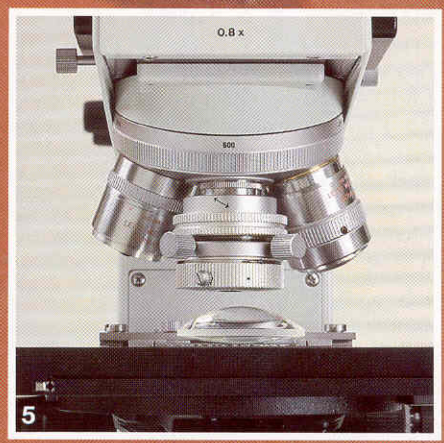
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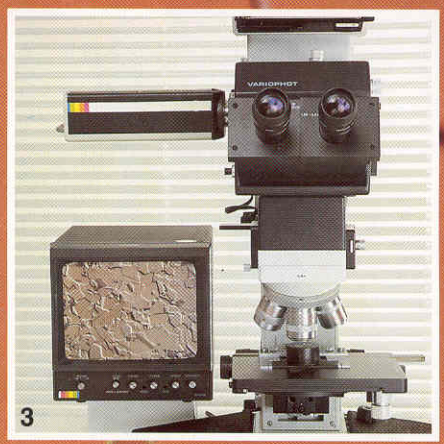
VARIOPHOT
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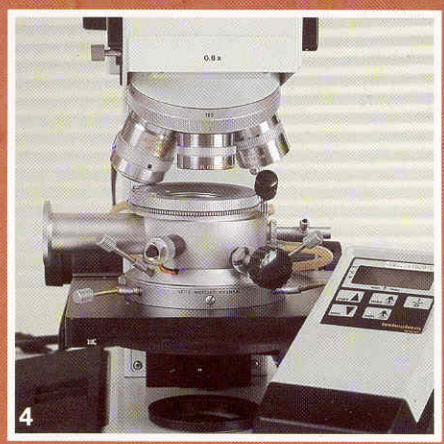
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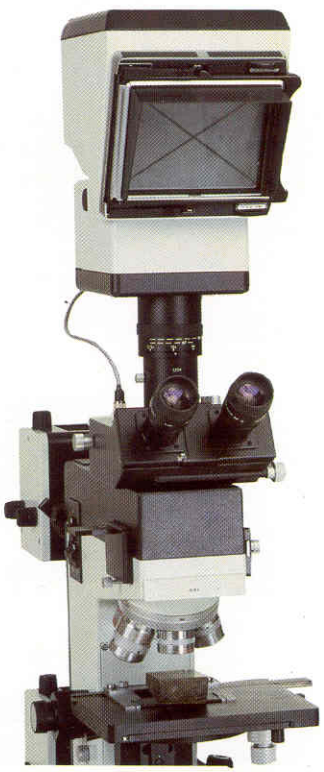
Leitz VARIOPHOT and Leitz ORTHOMAT E
Two new modules utilizing the peak performance of the optics

With the integrated zoom system of the Leitz VARIOPHOT tube, the overall microscope magnification can be continuously varied from 1x to 2.5x at all three image exits. This allows the user to lift out details of interest and photograph them at a magnification that makes the fullest use of the picture format. The imaging performance of the Leitz objectives makes this useful post-magnification readily possible, considerably increasing the application range of the top-quality optics. To prevent fatigue and posture problems, particularly after lengthy spells at the microscope, the viewing angle of the eyepiece tubes can be adjusted from 0° to 40° as required. The VARIOPHOT has intermediate image access for graticules which are superimposed onto the microscope image for measurement and comparison. After use they are simply pulled out of the light path, leaving them ready for the next investigation.
A TV port on the side of the tube is available for the connection of television equipment for discussion and demonstration purposes. This lateral port does not interfere with normal use of the microscope or of photographic equipment.

The Leitz ORTHOMAT® E camera system is another example of the modular versatility of modern Leitz microscopes.
The ORTHOMAT E is unique in its number of user-friendly features, such as the automatic exposure control for all picture formats from 35mm to 102x127mm (4″ x 5″) the spot/integral metering and the storage facilities. The inherent stability achieved by supporting the camera horizontally on the VARIOPHOT large-field tube makes the instrument easy to use and ensures vibration-free photography. Equally ergonomic is the control panel, which has a digital display for constant supervision of film and exposure data. A bright-line format frame projected into the binocular eyepieces shows the area of the specimen being photographed. For normal viewing this bright-line frame can simply be switched off.
An eight-digit data input permits automatic numbering of the exposures, regardless of film format. Other data, such as the specimen number and the date, can also be printed onto the exposure. Particularly in large-format photography, where the identification of negatives or prints and their attribution to the correct specimen is often difficult, this is an invaluable aid.
With the ORTHOMAT E, the user can switch from integral to spot metering and vice versa. Spot metering enables the exact exposure time to be determined from any specimen detail – the spot is moved directly to the detail involved so that time-consuming to-and-fro specimen movements are avoided. Exposure time is determined automatically and can be stored, for example as a fixed setting for serial photographs and mosaics. If required, a fixed exposure time may be input and exposure controlled manually.

Dynamic processes in heating-stage microscopy, such as structural transformation and grain growth, may be recorded automatically as a series of photographs by presetting the number of exposures and intervals between.

The Leitz ARISTOMET can also be modified subsequently – according to the requirements and budget of the user – for the traditional coupling of phototube and camera, e. g. ORTHOMAT E and Wild MPS microcamera system 11A to 45/51. For this purpose a range of binocular phototubes are available; the FSA 20, FSA-R 20, FSA-VR 20, FSA-GW-R and FSA-GW-R with second exit.




VARIOPHOT
ARISTOMET

The Leitz ARISTOMET – more than an ordinary microscope

The ergonomical benefits of the ARISTOMET will impress even the perfectionist: the outstanding stability of the stand, for example, guaranteeing vibration-free microscopy and photography, or the convenient location of the dual-knob coarse and fine focus controls directly above the armrests. Another practical feature is the adjustable height stop, with which a chosen point of focus can be immediately relocated without risk to the objective or the specimen.

Thanks to the modular design, the user can switch between viewing and contrasting techniques without having to convert the microscope or change the objective, i. e. without altering the object window. Whatever the technique used, the viewing height remains unchanged due to the permanently integrated incident light axis. The diaphragm slide for brightfield/darkfield with reproducible oblique lighting, aperture and field diaphragm, the polarisers and the Wollaston prisms for interference contrast are all within easy reach and simple to adjust.
When not in use, the modules for various techniques remain available on the microscope and do not clutter the workstation.

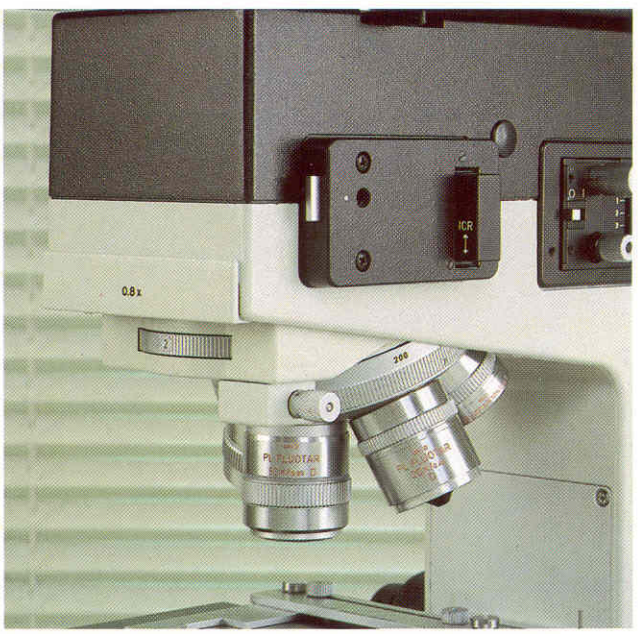
The Wollaston prisms for interference contrast investigations are not fixed to the objectives and can be swung in and out of the light path independently.

Depending on the outfit, the interchangeable objective nosepiece is either quintuple or sextuple. Pointing to the rear of the microscope, the objectives not in use permit an unobstructed view of the specimen and free access for manipulation. The objectives are matched for height to maintain the same focal plane when an objective is changed. The nosepiece is marked with the standard magnifications from 50x to 1000x.

The interchangeable mechanical stage accommodates specimens up to 4kg in weight and 58mm in height (78mm using the special stage holder). The stage has an adjustment range of 76 x 46mm and is rotatable through 90° so that important details in polarised light and interference contrast or in photomicrography can be moved into a favourable position.

The electronically controlled brightness adjustment for the 12V 100W halogen lamp is built into the base of the stand. This saves space on the workbench and gives the stand added stability.

In line with the modular concept, light sources are, of course, interchangeable and simultaneous use of different lamps is also possible. Besides the standard 12V 100W halogen lamp, 50W, 100W and 200W high-pressure mercury lamps, 75W and 150W high-pressure xenon lamps, a 250W halogen arc lamp and spectral lamps can be used for special methods of investigation.



Technical Data

Stand

Weight: Stand with tube	approx. 26kg
Stand with VARIOPHOT and ORTHOMAT E	approx. 37kg

Electrical data

Mains connection	115/230V, 50–60Hz
Secondary voltage	2 to 12V, adjustable

Illumination techniques

in incident light:	brightfield
	darkfield
	oblique lighting
	polarised light
	interference contrast
	interference fringe
	fluorescence
in transmitted light:	brightfield
	darkfield
	polarised light
	fluorescence

Specimen stage

Dimensions	200mm x 159mm
Movement range	76mm x 46mm
Rotation range	90°
Load-bearing capacity	4kg

Light sources

Lamphousing 103Z with
- 12V 100W halogen lamp
- 50W high-pressure mercury lamp
- 100W high-pressure mercury lamp
- 75W high-pressure xenon lamp
- sodium spectral lamp

Lamphousing 250 with
- 200W high-pressure mercury lamp
- 150W high-pressure xenon lamp
- 250W halogen arc lamp

Revolving nosepiece

with objectives pointing well to the rear:
quintuple – also for incident-light darkfield objectives
sextuple – for all objectives except incident-light darkfield

Eyepiece

For 20 to 1000x standard magnifications:
GW 10x/26 ⊙
GF 12.5x/20 M

Graticules

for the eyepieces and the slides for the Leitz VARIOPHOT:
Standard series
Snyder-Graff,
ASTM E112
Length measurements, with 10mm = 100 divisions
µm markers
grid division – various scales,
pointer

Tubes

Interchangeable, optionally for viewing and with beam-splitter for photomicrography, TV microscopy or image analysis with simultaneous viewing.

Objectives for brightfield, polarised light, fluorescence, oblique lighting

PL	1.6x/0.04 FWD*	18.4 mm
PL FLUOTAR	2.5x/0.07	9.2 mm
PL FLUOTAR	5x/0.12	13.1 mm
PL FLUOTAR	10x/0.25	19.8 mm
PL FLUOTAR	20x/0.45	2.4 mm
PL FLUOTAR	50x/0.85	0.38mm
PL FLUOTAR	100x/0.90	0.28mm
PL APO	100x/0.95	0.16mm

With extra-long free working distance:

PLAN L	20x/0.40	11.0 mm
PLAN L	40x/0.60	6.8 mm
PLAN L	100x/0.80	1.96mm

For heating-stage microscopy:

PLAN H	20x/0.40	12.6 mm
PLAN H	40x/0.60	7.1 mm

Objectives for brightfield, darkfield, interference contrast, fluorescence, polarised light, oblique lighting

PL FLUOTAR	5x/0.12 D (P) FWD*	13.0 mm
PL FLUOTAR	10x/0.25 D (P)	19.8 mm
PL FLUOTAR	20x/0.45 D (P)	2.4 mm
PL FLUOTAR	50x/0.85 D (P)	0.42mm
PL FLUOTAR	100x/0.90 D (P)	0.30mm
PL APO	100x/0.90 D (P)	0.26mm

Whith extra-long free working distance:

PLAN L	20x/0.40 D (P) FWD*	11.0 mm
PLAN L	40x/0.60 D (P)	6.8 mm
PLAN L	100x/0.80 D (P)	1.96mm

* FWD = free working distance

The Leitz ARISTOMET – another result of Leitz' continuing strategy of innovation

As a consistent further development of Leitz precision instruments, the new ARISTOMET incorporates state-of-the-art modular technology and the modern principles of human engineering. This is a true system microscope for metallography, quality control and research, expandable in stages according to requirements, and suitable for any task in industry and research.

As an innovator in modern technologies, Leitz offers practical solutions to a variety of problems. In MICROSCOPY, IMAGE ANALYSIS, SEMICONDUCTOR TECHNOLOGY and INDUSTRIAL METROLOGY.

For further details, contact your nearest Leitz agency.

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