



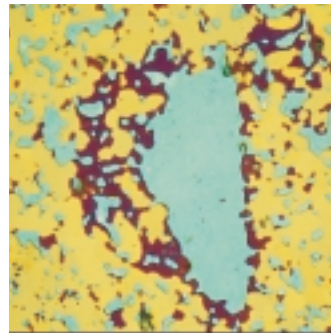
# Leica DM ILM

Inverted Microscope  
for Material Control

*Leica*

# Leica DM ILM

The Leica DM ILM is specially designed for all inspection and measurement tasks in metallography and material testing in general, for inspection of incoming materials, production control, checking sample preparation processes and also for metallographic training.



Molybdenum-silicon material

Do you need a task-oriented and cost-effective microscope?

If so, the Leica DM ILM is just what you're looking for.

Besides being easy to use, it is highly efficient and versatile – although it accommodates samples of all sizes, it has a slender footprint.

High performance optics from the Leica HC family of optics guarantee maximum image resolution and contrast.

The new HC objective series is a further development of Leica's famous Plan and Delta infinity optics.

The continuity of Leica infinity optics is a practical advantage that our customers soon come to appreciate.



Leica DM ILM with MPS30 camera system

Leica Design by Ernest Igl/Christophe Apothéloz

### **The basic stand**

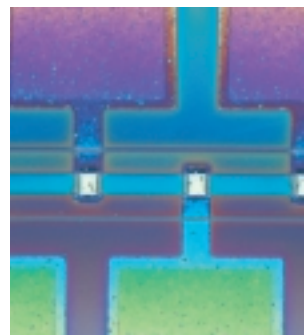
is made of sturdy, corrosion-resistant cast aluminium with a pleasantly light paint finish and clean, smooth surfaces.

The microscope's basic T-shape provides high stability and ample space for hand movement and easy access to the controls. The microscope's base with vibration damping feet prevents the transfer of vibrations and guarantees a steady image even at high magnifications and with heavy samples.

### **Built-in 6 V 35 W power supply**

The built-in power supply is an ergonomic feature which saves a lot of space on the workdesk. There is no clutter of cables and the microscope can easily be moved to another table as a single unit.

Also, the stand has a bayonet mount interchange for externally powered lamphousings with 12 V 100 W halogen or Hg 50/100 W and Xe 75 W gas discharge lamps. On request, two lamphousings can also be fitted simultaneously, e.g. for brightfield and fluorescence work.



IC chip

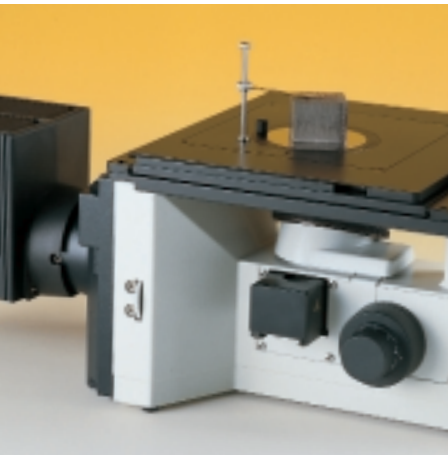


Leica DM ILM illuminator



Leica DM ILM, tube rotated to the side

# New incident light system



Central part of the microscope, view from the left side



Central part of the microscope, view from the right side



Central part of the microscope with quadruple objective nosepiece, reflector slide, focus control

## **Incident light system with new illumination principle**

The new illumination axis accepts different types of light sources (lamp filament or discharge arc), ensuring an optimal light flux of maximum intensity and homogeneity. The field and aperture diaphragms are arranged in accordance with the proven Koehler principle. As the field diaphragm is preadjusted to a fixed optimal setting, there is no risk of a mix-up when centering the aperture diaphragm, which is responsible for resolution, contrast and field depth.

The incident light reflectors are enclosed in the 3-position reflector slide, where they are easily exchanged as necessary.

## **Light filters**

Two permanently integrated positions for filters of 32 mm diameter in the microscope stand, plus an optional intermediate piece for other filters of 50 mm diameter allow specific optimization of the illumination for observation and image documentation.

## **3-plate mechanical stage**

for samples of differing shapes and sizes. Before material defects can be detected, the interesting parts of the material must be accessible. From small to large, the 3-plate mechanical stage can accept nearly all sample sizes and also allows non-destructive microscopic examination of large components.

The large stage surface of 247 x 230 mm easily accommodates wide and tall components, and for bulky samples, the inner rectangular stage insert of 150 x 150 mm can be completely removed. Small samples are placed on the inner insets which have holes of 80 mm, 40 mm, 30 mm and 20 mm. These are optionally available with knobs for removing or rotating the sample.

## **High load bearing capacity – wide adjustment range**

The two-sided, large stage support on the basic stand bears sample weights of up to 8 kg.

The wide adjustment range of 60 x 40 mm in x-y direction allows swift scanning and fast access to the interesting, important parts of the sample.

## **Nosepiece focusing – reliable and precise**

Samples are focused by vertical adjustment of the 4-position objective nosepiece and the objectives used. Focusing precision is not influenced by the weight of the stage and the sample.

# The optics

The optics are the heart of a microscope and decisive for the quality of the information. Designed for incident light bright-field, polarization contrast and fluorescence, the Leica DM ILM microscope is compatible with all infinity high performance objectives in the Leica range with M25 mm or RMS thread. Even earlier types of Leica (Leitz) objectives with RMS thread can be adapted for use on the Leica DM ILM.

## N PLAN series

		FWD
N PLAN	2.5x/0.07	11.2 mm
N PLAN	5x/0.12	14.0 mm
N PLAN	10x/0.25	5.8 mm
N PLAN	20x/0.40	1.1 mm
N PLAN	50x/0.75	0.37 mm
N PLAN	100x/0.90	0.27 mm

## PL FLUOTAR series

PL FLUOTAR	1.6x/0.05	1.54 mm
PL FLUOTAR	2.5x/0.07	9.2 mm
HC PL FLUOTAR	5x/0.15	12.0 mm
HC PL FLUOTAR	10x/0.30	11.0 mm
HC PL FLUOTAR	20x/0.50	1.27 mm
HC PL FLUOTAR	50x/0.80	0.5 mm
HC PL FLUOTAR	100x/0.90	0.3 mm
HC PL FLUOTAR	100x/1.30 OIL $\infty$ /0	0.13 mm

## PL APO series



PL APO	50x/0.90	0.28 mm
PL APO	100x/0.95	0.16 mm
PL APO	150x/0.95	0.20 mm
PL APO	250x/0.95	0.24 mm
with spacer ring 25/RMS		

## Objectives with long free working distances

PL FLUOTAR	L 50x/0.55	8.0 mm
PL FLUOTAR	L 100x/0.75	4.7 mm
with spacer ring 25/RMS		
PLAN H	20x/0.40	12.6 mm
PLAN H	40x/0.60	7.1 mm



Depending on the tube, the following eyepieces are available for pin-sharp definition at the edge of the images and standard magnification:

With tubes ILB and ILT: eyepieces of 23.2 mm diameter

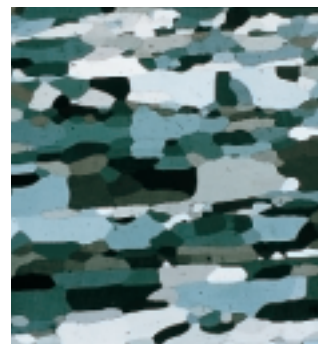
Eyepiece 10x/18  and eyepiece 10x/18  M (for graticules)

Eyepiece 10x/20  and eyepiece 10x/20  M (for graticules)

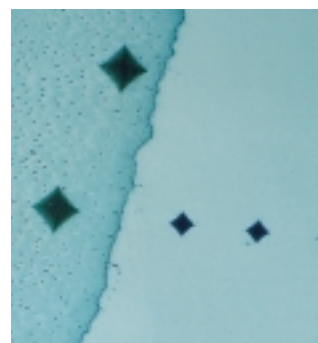
With tubes of the HCL series: eyepieces of 30 mm diameter

Eyepieces HC PLAN 10x/20  and eyepiece 10x/20  M

Outside the standard magnification, other eyepiece magnifications such as 12.5x, 16x and 25x are compatible.



Aluminium, Pol contrast

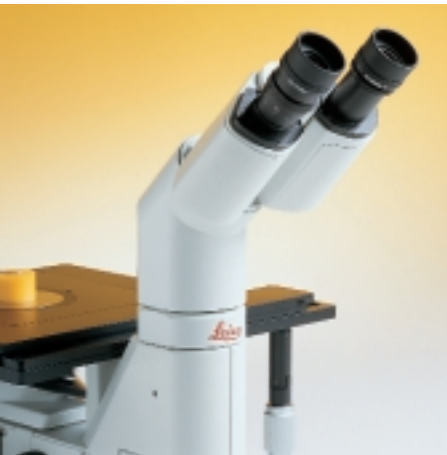


Microhardness indentations



Objective series N PLAN and PL FLUOTAR  
Eyepieces 23.2 mm and 30 mm  $\emptyset$

# Tubes



Binocular tube HC ILB



Trinocular tube HC ILT  
with DC100 digital camera



Trinocular tube HC ILT  
with SLR camera

## Observation and phototubes

The DM ILM has a wide selection of observation and phototubes for image documentation, including a tube with variable viewing angle from 0° to 35°. All the tubes are equipped with an infinity tube lens 1x and are rotatable through 360°, so that the microscope can also be used from the side. The following tubes are available:

### Binocular tube HC ILB

with 45° viewing angle,  
for eyepieces with 23.2 mm outer diameter

### Trinocular tube HC ILT

with 45° viewing angle,  
for eyepieces with 23.2 mm outer diameter with vertical photo/  
TV exit at the side with switchable light path 100 % vis/100 %  
photo/TV. The position of the photo/TV exit 88 mm to the side of  
the tube has the advantage of not obstructing the view of the  
stage and specimen.

Other tubes can be adapted with the intermediate piece IL/L:

### Binocular tube HC LB

### Trinocular tube HC LVB

with variable viewing angle 0° – 35°

### Trinocular tube HC L1 T

light path 50 % vis/50 % photo/TV

### Trinocular tube HC L3 T

light path 100 % vis/100 % photo/TV and 50 %/50 %

### Trinocular tube HC LV1T

with variable viewing angle 0° – 35° and  
light path 50 % vis/50 % photo/TV



Trinocular tube HC ILT  
with MPS30



Trinocular tube HC L V1T  
with TV camera

# Accessory systems

## Accessory systems (for DML tube series)

### Ergomodule

for raising the viewing position by 30 mm.

### Magnification changer

with factors 1x, 1.5x, 2x in turret plate, for stepwise alteration of the total magnification without changing the objective.

### Drawing device

For photomacrography and videography with 1:1 reproduction ratio. Used for tracing structures of the specimen on a drawing surface next to the microscope.

### Microhardness tester Paar MHT 10

Microhardness testing in a load range of 0.5 pond to 400 pond is simple with an inverted microscope. Microscopic hardness testing is particularly useful for measuring thin layers in fine structural constituents.

### CCD adapters

(for all trinocular tubes)

We have a selection of CCD adapters for analog and digital image documentation as a video print or computer print-out with standard magnification and large picture areas.

The reduction or enlargement factors are matched to the chip sizes of the CCD cameras to give the largest possible picture area. Cameras with smaller chip sizes can also be used, but result in smaller picture diagonals. We achieve top imaging quality by optical matching of the CCD adapters to the geometry of the cameras.

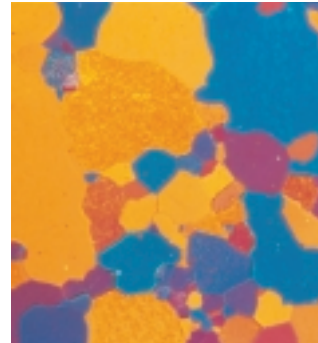
For 1-chip cameras:

c-mount 0.35x HC	1/3"
c-mount 0.5x HC	1/2" (+ 1/3")
c-mount 0.63x HC	2/3" (+ 1/2")
c-mount 1x HC	1" (+ 2/3" + 1/2")

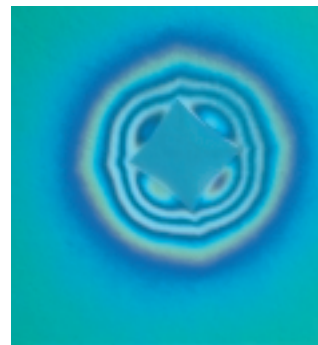
For 1–3 chip cameras:

Vario c-mount 0.33x – 1.6x	1/3" (+ 1/2" + 2/3" + 1")
Vario B-mount 0.5x – 2.4x	1/2" (Sony ENGmount)
c-mount 1x*	
B-mount 1x*	
B-mount 1.25x*	
F-mount 1x*	
F-mount 1.25x*	

\* required for each: CCD adapter 0.5x HC



Zircon, pol contrast



Microhardness indentation with interferogram



Leica DM ILM  
with asymmetric discussion tube

# Digital image documentation



Dentrite structure

## Leica DC 100/DC 200

Digitized microscope images can be displayed directly on the PC screen and processed. They can be printed out and used in multimedia or Internet applications.

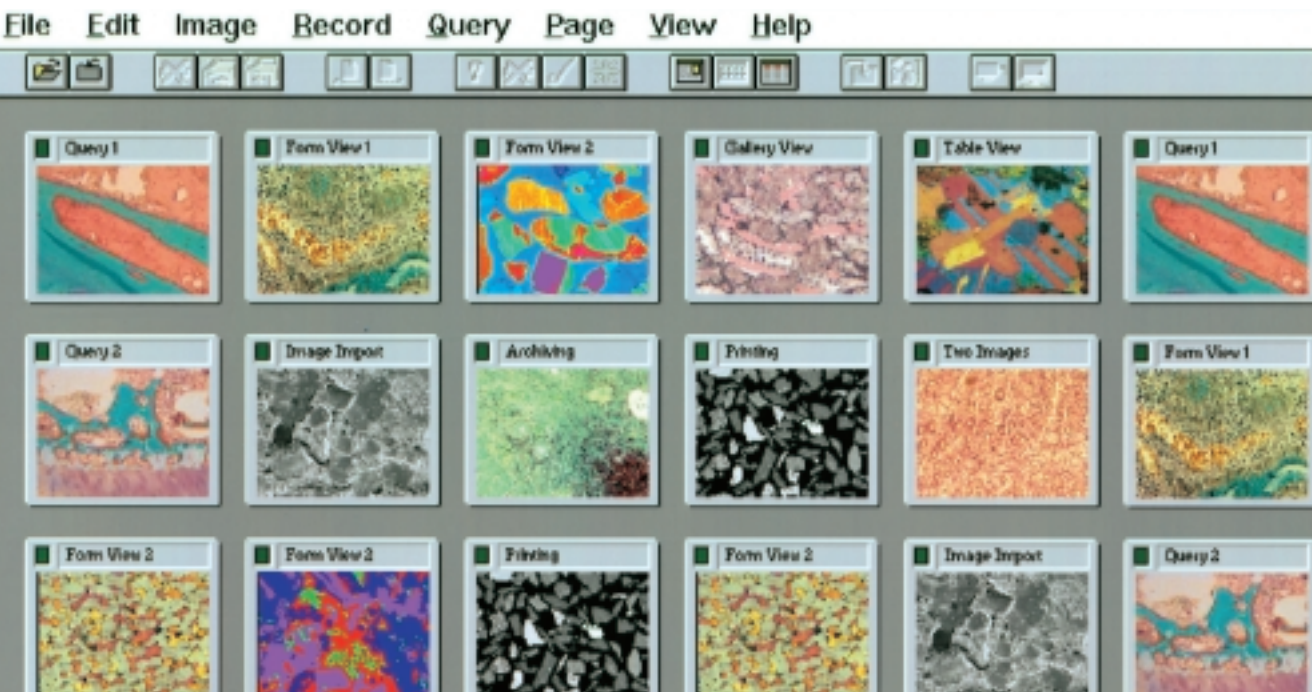
The quality of the new HC optics with redesigned HC camera adapters is particularly noticeable in digital image documentation.

Specially designed for microscopy, the new DC 100 digital camera with optics and software is compatible with PC, TWAIN drivers and Leica Qwin image analysis software and styled to harmonize with the functional elegance of Leica microscopes.

## Leica Q550 W image analysis system and Leica Qwin image analysis software.

### Leica image data base and archiving systems.

Microscope, digital image processing, image archiving, image analysis – an entire system by Leica for material analysis.





# Measurement and comparison

Eyepiece gratitudes with their fine, highly precise line patterns belong to the standard equipment of an inspection microscope for length and distance measurement, grain and particle size determination. Both types of eyepieces (23.2 and 30 mm diameter) with adjustable eyelens (M type) can be fitted with suitable eyepiece gratitudes on request or retrofitted later. E. g.:

Graticules with scale 10 mm = 100 divisions

Graticules with standard circle and reference length for grain and particle sizes

Graticules with ASTM-E112 grain size pattern

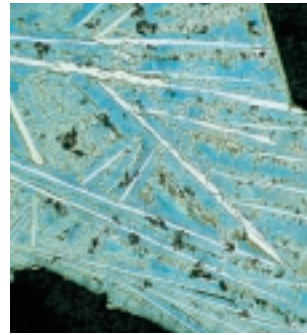
Graticules with 10 x 10 mm in 100 grid divisions

Format outline gratitudes for photomicrography

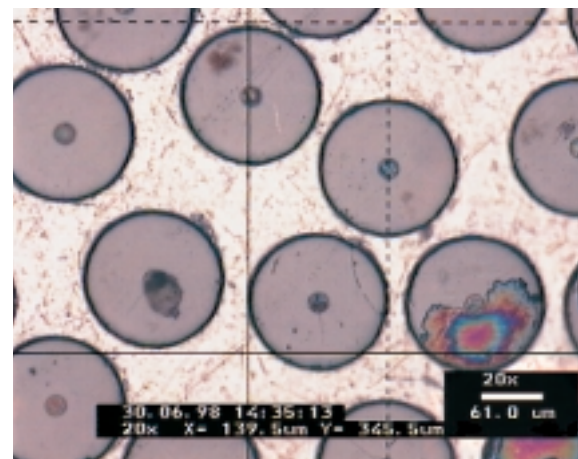
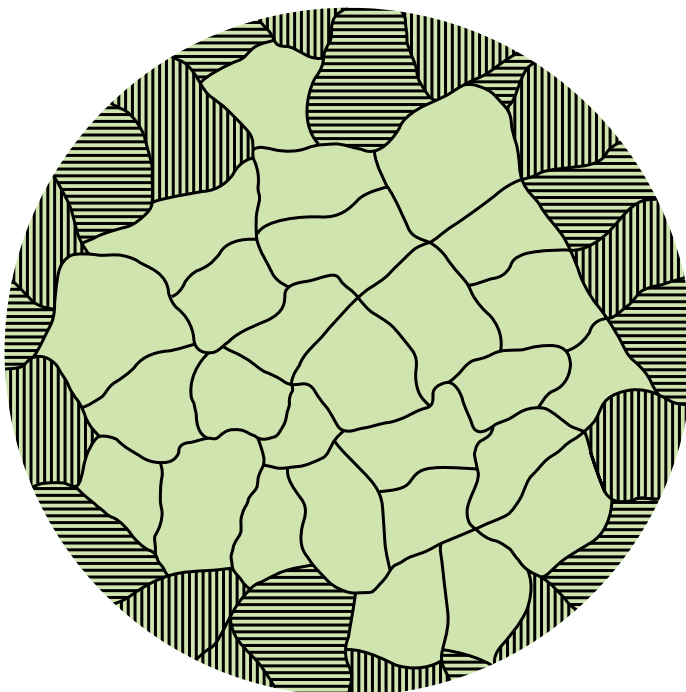
Stage micrometer for calibration

## Leica DM MFK2

Video measurement crosslines for length, angle and circle measurements by optical overlay of reference marks on the video screen in connection with CCTV systems.

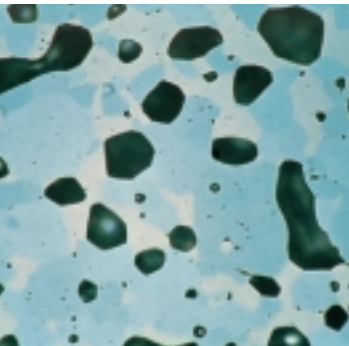


Pig iron



MFK2 measurement crosslines with display of magnification and x-y length values

# Photomicrography



Moselite, brightfield

## Choice of 3 microscope camera systems:

### Leica MPS 30 and MPS 60

Automatic camera system with photodiode (extremely wide linear working range). Even critical specimens are optimally exposed with integral or spot (1%) measurement. A whole array of automatic functions and memories make operation easier and saving time.

### Leica DM LD

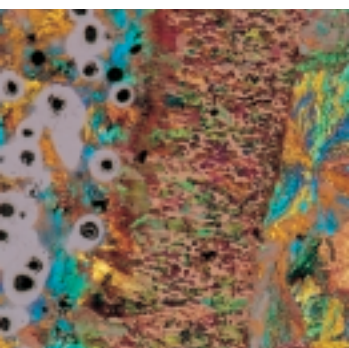
The state-of-the-art chip technology integrated in the new Leica DM LD camera system automatically ensures that even the lowest light intensities and the finest specimen structures are correctly exposed. You have a choice of 3 programs, which can be used in both integral and spot mode, for all illumination/contrasting techniques. An illuminated eyepiece graticule is especially useful for focusing dark specimens (Pol, DF, Fluo). A number of automatic functions (e. g. bracketing) and 10 memories (for individual settings) make the Leica DM LD easy to use. A PC can easily be connected for operation, data acquisition, etc., a corresponding Windows® program is available.

### CCD adapters

There is a choice of C-mount and B-mount (ENG) adapters with fixed and zoom magnification.



Weld structure, brightfield



Weld structure, pol contrast

# Dimensions

**Viewing height:**

with ILB/ILT tubes	390 mm
with HC L tubes	410 mm
with HC L V tubes (ergo)	350 – 450 mm

**Size of microscope:**

Front-to-back with lamphousing	650 mm
Width (max.)	320 mm

**Objective thread:**

M25 x 0.75

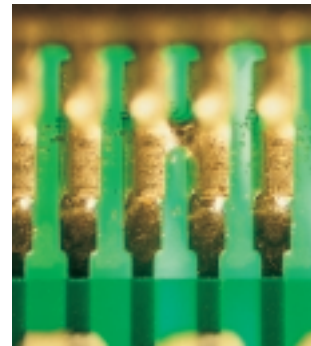
**Eyepiece diameter:**

23.2 mm (ILB/ILT tubes)

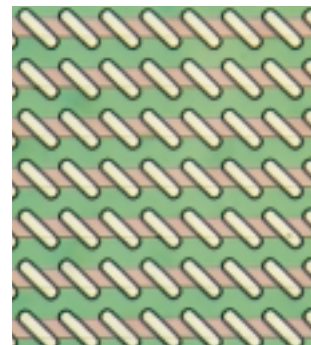
30 mm (HC L tubes)

**Filter diameter:**

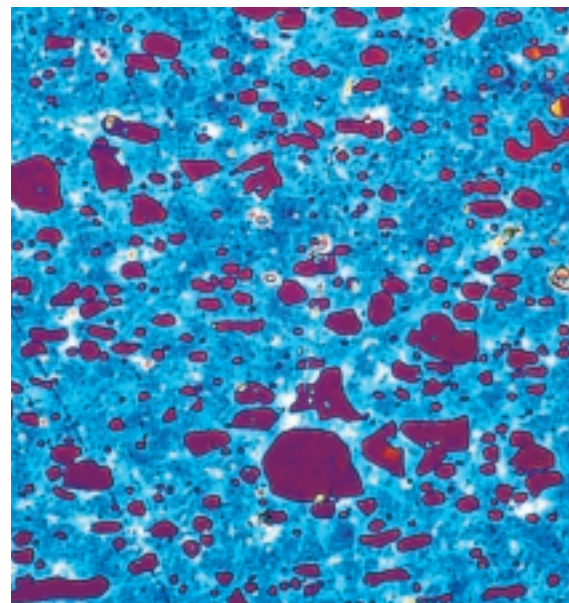
32 mm (50 mm optional)



Defective strip conductor



Sensor structure



Iron material, interference colour layer