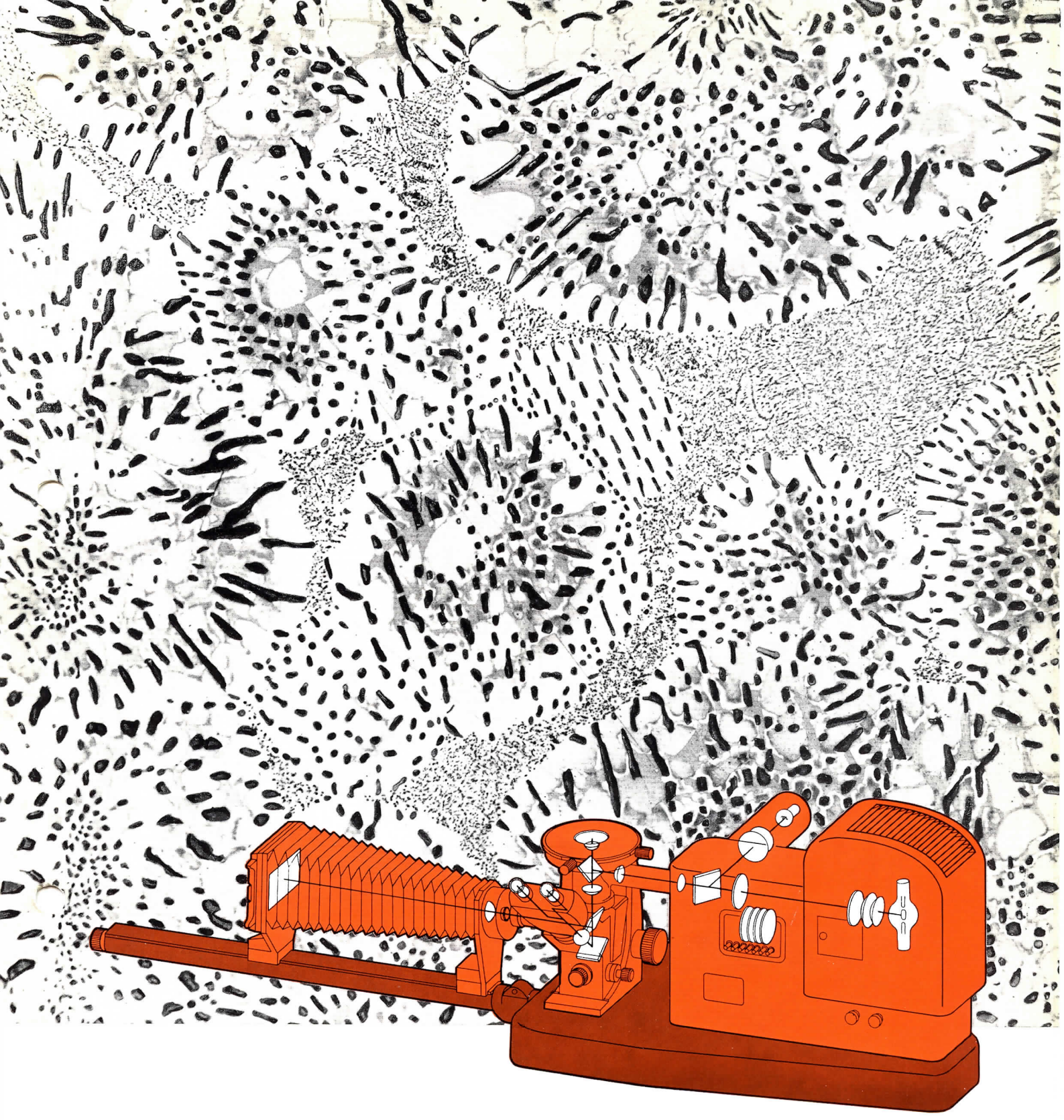


Leitz
WETZLAR

MM 5 A
metallographic microscope

with high-pressure xenon lamp 150 W

56-16/Engl.

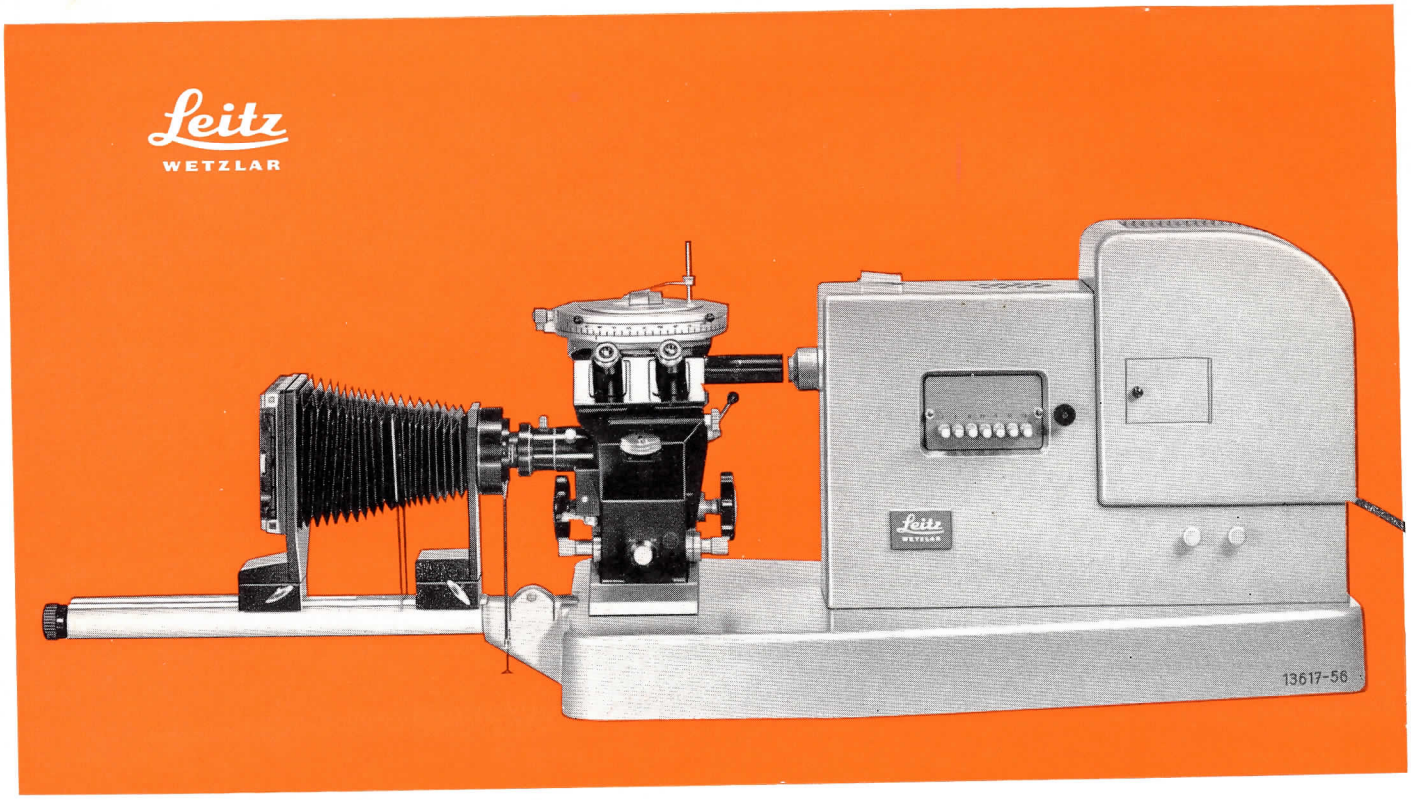


Fig. 1
LEITZ metallographic microscope MM 5 A with bellows camera 9 x 12cm or 4 x 5″ and binocular tube, total view.

The LEITZ MM 5 A metallographic microscope is a moderately priced universal microscope especially for medium-size enterprises of the metal industry in need of a stand of first-class mechanical quality and optical performance.
The large horizontal microscope has all the advantages of a „Le Chatelier" type stand. The object is illuminated from below by means of a vertical illuminator, i. e. the objectives point vertically upwards instead of downwards. As a result, the position of the polished sections is always perfectly vertical to the optical axis; large objects, too, can be examined, since the space above the table is not obstructed by mechanical or optical components.

Structural features

Modern incident-light microscope, Le Chatelier type, on robust baseplate.
Large central stand with interchangeable vertical illuminator for brightfield examinations.
Optical outfit for the standard magnifications in material testing: 50, 100, 200, 500, 1000 x.
Binocular tube with optical tube length compensation.
Rotating stage on ball bearings, 200mm diameter, with graduation in degrees, and built-in mechanical stage.
Alternative illumination with 150 W xenon and 12 v 60 W low-voltage lamp, and built-in push-button filter control.
9 x 12cm or 4 x 5″ bellows camera with international back for photomicrography.

Fig. title page
Alloy 100/casting, enlargement 1050:1, time of exposure 4 sec.

Technical details

The LEITZ MM 5 A metallographic microscope consists of

1. **the baseplate**
2. **the microscope stand with optical outfit**
3. **the interchangeable illuminators**
4. **the photographic equipment.**

Baseplate

The microscope and the interchangeable illuminators are rigidly mounted on a common baseplate, which in turn rests on shock absorbers largely neutralizing ground vibrations and preventing their transmission to the microscope.

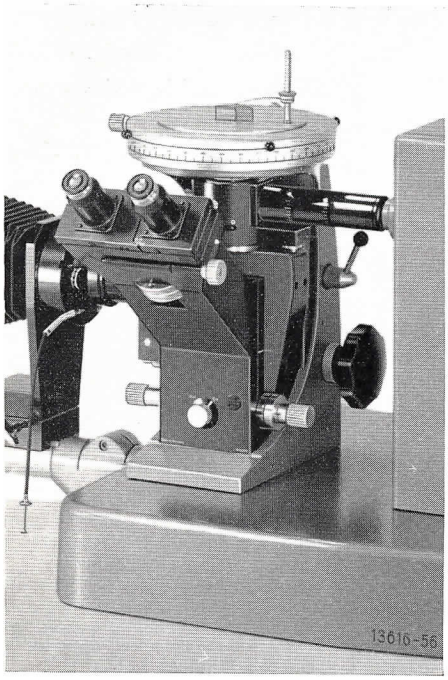


Fig. 2
Microscope stand with binocular tube and rotating stage.

Microscope stand

The robust stand represents an inverted incident-light microscope. The bottom part houses the fine adjustment (on ball bearings) which acts on the holder of the vertical illuminator. The large object stage, of particularly sturdy construction, is mounted above the vertical illuminator; it has a diameter of 200mm, runs on ball bearings, can be rotated through 360° and clamped in any position. A mechanical stage which runs also on ball bearings, is built into the stage plate; its adjustment range is 20mm in both directions. The displacement can be read off mm scales. Four plane-parallel glass plates with apertures of different sizes can be inserted in the object stage for the examination of objects of various dimensions. The stage can be vertically adjusted by means of 2 large, conveniently sited knobs, and fixed at any level by means of a toggle. However, this coarse adjustment is used only when the object stage has to be raised or lowered through a considerable distance in order to change the objective.

A beam splitter and a mirror each are built into the stand, to be used alternatively for deflecting the beam for

a) simultaneous visual observation and photomicrography
b) photomicrography at full light intensity,
c) visual observation at full light intensity

Thus, photomicrographs can be taken at the same time as the image is seen in the microscope.

Tube

A binocular tube with optical tube length compensation is supplied with the stand. The optical tube length compensation allows for the change in the mechanical tube length caused when the binocular tube is adjusted for the user's interpupillary distance; the microscopical image is always simultaneously sharp in the eyepiece and on the groundglass screen of the bellows camera, provided the camera is set at the "standard magnifications". See also tables p. 4. At other bellows extensions the image on the groundglass screen can be focused with the remote focusing knob.

The tube accepts standard eyepieces of 23.2mm diameter.

Optical equipment

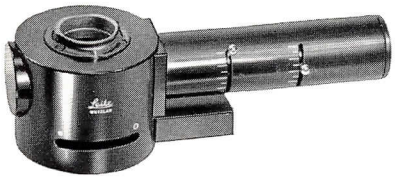


Fig. 3
Vertical illuminator for brightfield

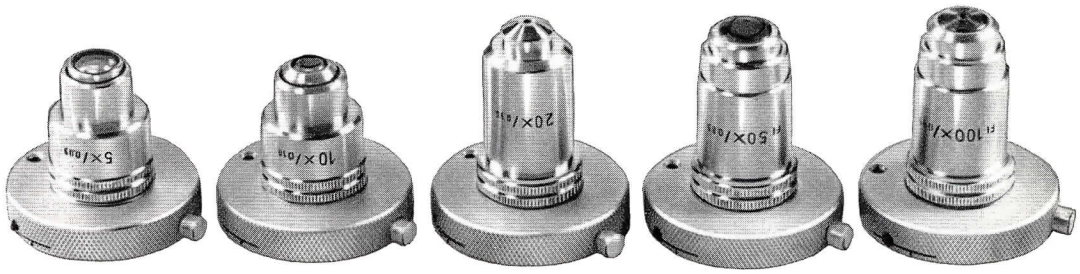
The optical equipment includes a vertical illuminator for brightfield examinations, incident-light objectives from 5 x to 100 x magnification, and eyepieces for visual observation and photomicrography.

The vertical illuminator has an aperture- and a field diaphragm, and is used in combination with the incident-light objectives 5 x, 10 x, 20 x, 50 x, 100 x, and Öl 100 x, already welltried on our METALLUX metallographic microscope. Together with the PERIPLAN® 12.5 x MM special eyepiece the objectives produce large fields of view which are sufficiently plane for visual observation.

Negative eyepieces are provided for photomicrography; they are inserted in the photo-tube, and produce clear pictures which are sharp from corner to corner. The field of view diameters are listed in the table below.

All objectives have centring rings with changing mounts for rapid interchange on the vertical illuminator.

Fig. 4
Incident-light objective
for MM 5 A



Magnification table for the LEITZ MM 5 A metallographic microscope

Objectives	5 x / 0.09	10 x / 0.18	20 x / 0.35	50 x / 0.85	100 x / 0.95 Öl 100 x / 1.36
Standard magnifications **(visual)** with PERIPLAN 12.5 x MM eyepiece	**50 x**	**100 x**	**200 x**	**500 x**	**1000 x**
Object field diameter with the PERIPLAN 12.5 x MM eyepiece	3.0mm	1.5mm	0.75mm	0.30mm	0.15mm
Reproduction ratios **(photographic)** with bellows camera 4 x 5″ (9 x 12 cm) and N 6.3 x negative eyepieces	40:1 to 80:1	80:1 to 160:1	160:1 to 320:1	400:1 to 800:1	800:1 to 1600:1
Standard magnifications at 33.6cm bellows extension*	50:1	100:1	200:1	500:1	1000:1

* Bellows extension to be measured from the white ring on the light screening collar to the groundglass screen.

Alternative illumination

The alternative light sources in the large, double-walled lamp housing consist of

1. the 12 v 60 W low-voltage lamp

This special lamp with flat-coil filament emits extremely bright light of a favourable spectral composition for microscopical and photomicrographic purposes. The brightness can be adjusted by means of a regulating transformer.

2. The high-pressure xenon lamp 150 W

The high-pressure xenon lamp has a practically continuous spectrum throughout the entire visual range and the medium and long-wave u. v. Depending on the choice of optical combination, the effective luminous density varies between 10 000 and 25 000 sb. The lamp is supplied by a mains rectifier with built-in starting unit. It burns at full intensity, correct colour temperature etc. immediately after switching on. No maintenance is required except for adjustment before it is used for the first time.

By rotating a mirror the microscopist can select either the low voltage or the xenon lamp as light source. The low-voltage lamp will generally be bright enough for visual observation, while the xenon lamp will be used for photomicrography.

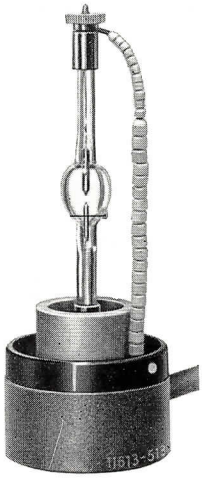


Fig. 5
Xenon high pressure lamp 150 W with lamp holder

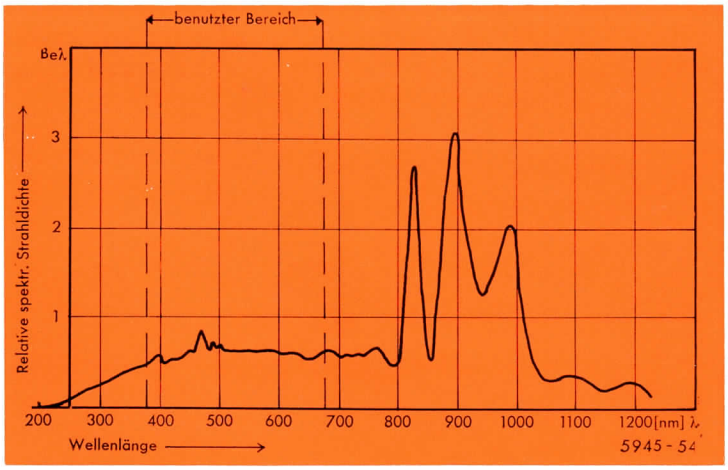


Fig. 6
Spectral intensity distribution of high pressure xenon lamp 150 W

Filter

The lamp housing includes a push-button control with which the following filters can be introduced into the beam of the high pressure xenon lamp singly or in groups:

N-diffusion disc,
R-diffusion disc,
grey filter, 5 % transmission
grey filter, 0,2 % transmission
green filter for photography
2 filter holders for special filters.

Filters and diffusion discs for the low-voltage lamp are inserted in a slit of the lamp mount.

Bellows camera

Photographic equipment

The 4 x 5″ bellows camera with rotatable darkslide frame and international back forms part of the standard outfit. The rotatable darkslide frame makes it possible to choose the most suitable picture area, e. g. in alignment with a line structure; the international back permits the use of most international standard darkslides and of the Polaroid Land Method.

The bellows camera runs on a sturdy tubular rail fixed to the side of the baseplate. A remote control for the fine focusing of the groundglass screen image of the camera is built into the tubular rail. However, this adjustment will usually be necessary only when the camera is not set at "standard magnifications".

A self-winding central shutter in anti-vibration mount has speeds from 1 to $^1/_{125}$ sec. and allows time exposures of any duration.

Fig. 7
Bellows camera 4 x 5″ and mirror for more convenient focusing of the micro image

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