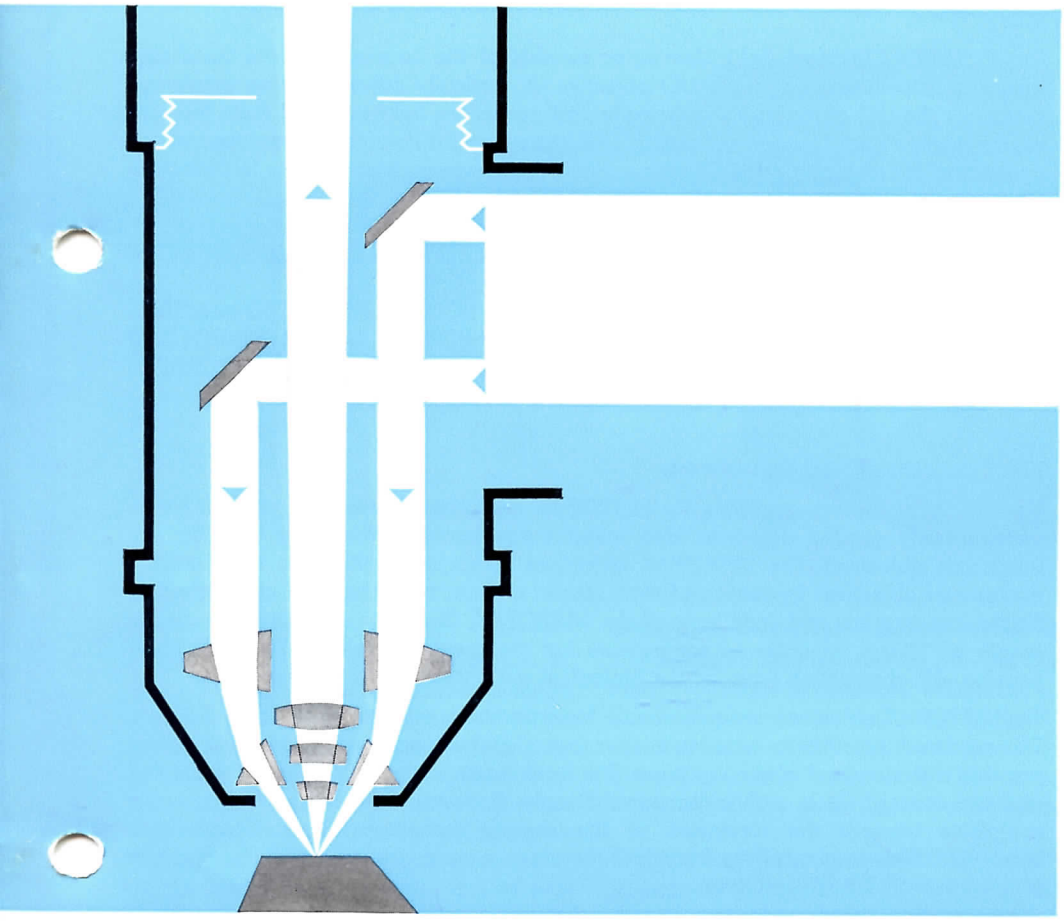
Incident Light Illuminator

ULTROPAK

for Microscopic Observations



Advantages of the Incident Light Illuminator ULTROPAK®

Extraordinarily high clarity and brilliance together with true-to-life depth of the image.
Objectives from 3.8 to 100:1 are applicable.
Exploits the full aperture of the objectives.
Use of polarizer and analyser to eliminate disturbing reflections.
No tedious preparations, even large specimens remain undamaged.
Irregular and unprepared surfaces are fully illuminated.
Extremely sharp image in fluorescence microscopic examinations, as the energizing rays do not pass into the image beam of the microscope.
Particularly suitable for intravital microscopic investigations.
Observations in combined incident and transmitted light.

Versatility of the ULTROPAK

Biology and medicine by the abundance of their problems offer a vast field of application to the ULTROPAK. So, to mention only two examples, it proves itself to be of value not only in the examination of plate cultures in bacteriology, but also in the observation of organs in vivo in zoology and medicine. In **criminology** it is essential (often in conjunction with monochromatic light), for the detection of forgeries and the identification of finger prints. To give a complete survey of the range of application of the ULTROPAK in **industry** is not even remotely possible. The following examples are chosen at random and do not claim to be exhaustive: In the testing and examining of the surface structure of fabrics made of wool, cotton, rayon, silk, chemical fibres, leather, wood, rubber, brown coal and bituminous coal, lacquers and enamels, minerals and refining products, internal surfaces of drawing dies, raw materials, finished and semi-finished products of all descriptions.

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Historical Development

Users of the first "compound microscopes" employed incident illumination for their observations, but soon changed over to the use of transmitted light. When later on special vertical illuminators were designed for the examination of metals and ores, they where found so efficient that incident light was once again frequently used in biology also. In the first instance the existing apparatuses were taken over, but it was very soon evident that they were no longer equal to the growing demands of research work. It was therefore essential, to develop incident light illuminators based on entirely new principles. In the course of this new development, the ULTROPAK incident light illuminator was designed to afford illumination from the outside. The object is illuminated from all sides by means of ring condensers surrounding the objective. In this way, the objective is not penetrated by the illuminating rays, and is thus only used for image formation with the aid of the light reflected diffusely from the object structures.

Technical Description

Housing

The ULTROPAK incident light illuminator consists of the housing with the fixed ring mirror and the interchangeable UO objective. A vertically adjustable ring condenser surrounds the UO objective concentrically and guides the light reflected from the ring mirror to the object. The optimal setting of the condenser is dependent upon the surface structure of the object. A graduation for general guidance enables the user to determine this setting and to return to it without difficulty.

Illumination

The built-in microscopic illumination of the LEITZ ORTHOLUX®, PANPHOT® or METALLUX® stands provides the light-source. For our LABORLUX, LABORLUX®-POL and DIALUX®-POL stands, which have no built-in incident illumination, the ULTROPAK is equipped with a centering voltage filament bulb (6 volts 15 watts).

ULTROPAK for the ORTHOLUX microscope

ULTROPAK Objectives

The special objectives available for ULTROPAK microscopy have been designed with systematically graded apertures and initial magnifications from 3.8x to 100x (oil immersion objective). The ULTROPAK objectives differ outwardly from the standard microscope objectives by reason of their special mounts, which have been designed to fit the construction and technique of the ULTROPAK. They are corrected for a tube length of 185mm, in order to compensate for the greater height of the ULTROPAK housing. All observation tubes of the biological microscopes may be used.

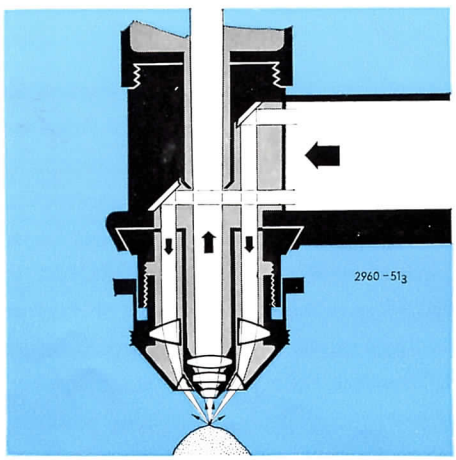
The ULTROPAK objectives are remarkable for a particularly long free working distance. This renders it possible to examine deeper layers of the specimen, which would not be possible with standard micro objectives. The front lenses of the objectives are protected and are covered up in such a manner that only those rays can enter which actually contribute towards the formation of the image; secondary illumination is thus eliminated. The opening of the front lens therefore corresponds exactly to the aperture and the size of the field of view.

UO 6.5

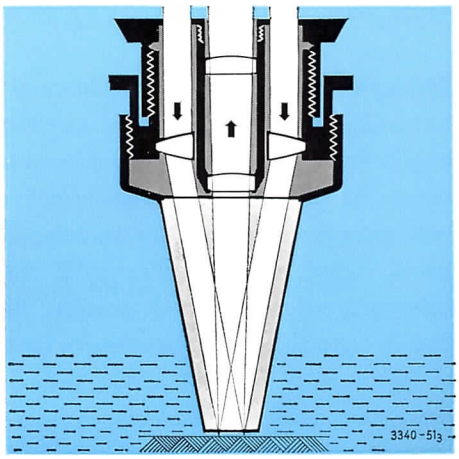
UO 11

UO OI 75

Typical ULTROPAK objectives

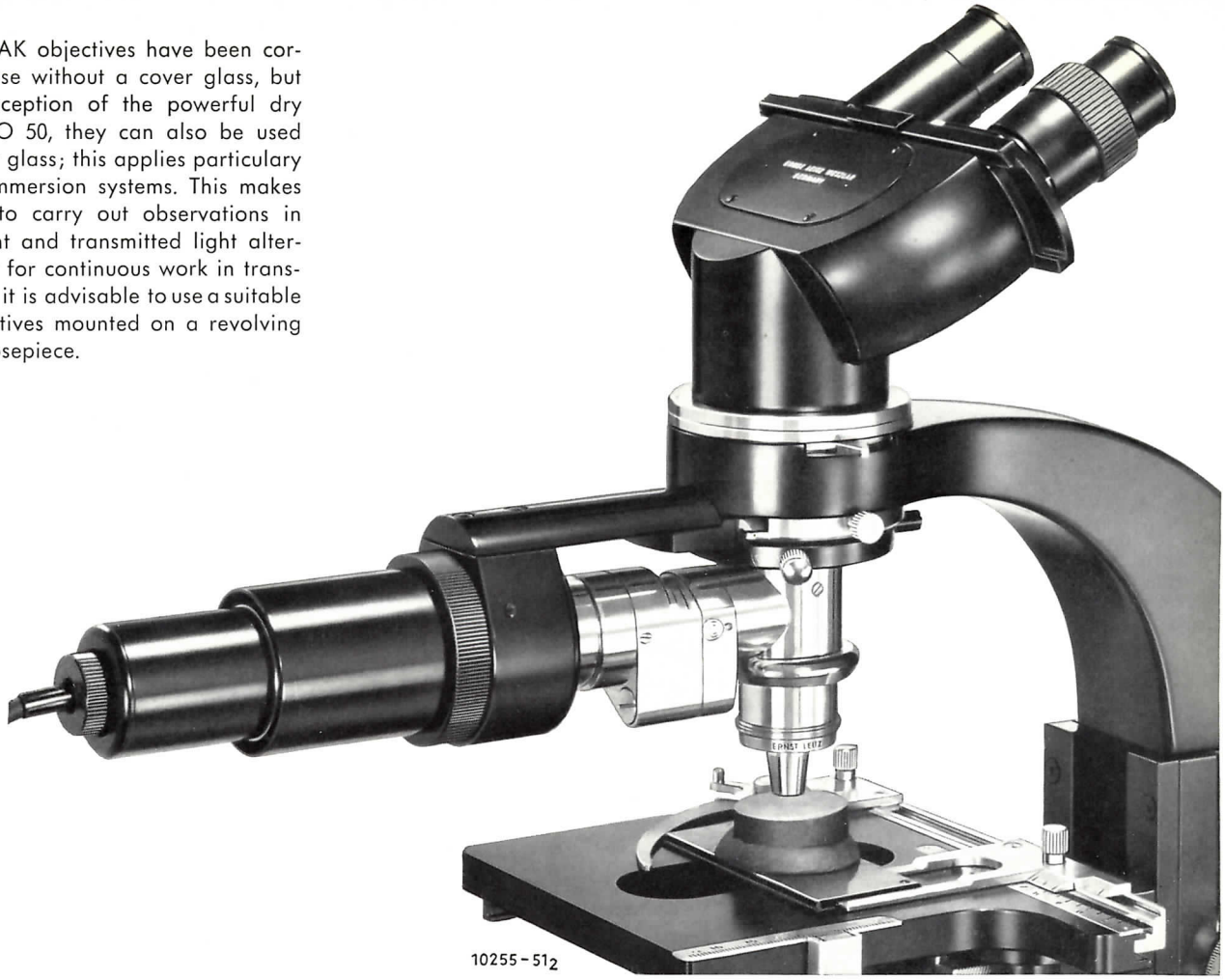


Path of rays in the ULTROPAK



Dipping cone

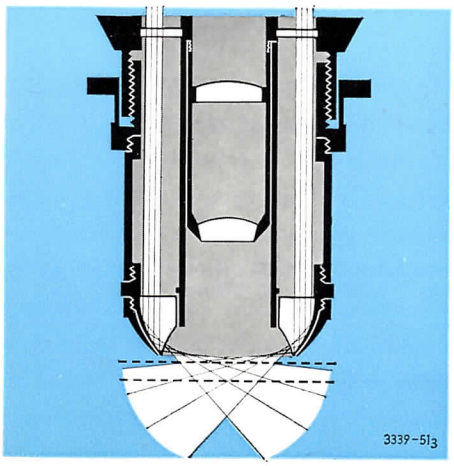
All ULTROPAK objectives have been corrected for use without a cover glass, but with the exception of the powerful dry objective UO 50, they can also be used with a cover glass; this applies particulary to the oil immersion systems. This makes it possible to carry out observations in incident light and transmitted light alternatively. But for continuous work in transmitted light, it is advisable to use a suitable set of objectives mounted on a revolving objective nosepiece.



ULTROPAK on the Leitz LABORLUX microscope

Condensers

The less powerful ULTROPAK objectives, are supplied with a condenser matched to their focal length. In the case of the more powerful objectives an interchangeable ring condenser is provided which may be used with all objectives 22x and above. In practice, however, it is advisable to obtain each objective with its own ring condenser in order to avoid loss of time in changing over and to achieve a speedy transition from one magnification to another.



Relief condenser on the ULTROPAK

Sector Diaphragms and Colour Filters

The following may be inserted into the filter slot of the ULTROPAK as required:
Polarizing filters to eliminate reflections, colour filters for photomicrography, or sector diaphragms for achieving special illumination effects.
Greater depth of field may be achieved through the use of insertion diaphragms which are available in different sizes. It should be mentioned, however, that excessive stopping-down affects the resolving power adversely.

Dipping Cones and Immersion Caps

In order to eliminate surface reflection in observations of moist material or in liquids, dipping cones are used for the dry objectives, and immersion caps for the immersion systems. The dipping cones are vertically adjustable, independent of the illumination, so that the free working distance can be varied, or the surface of the specimen may be flattened. The ULTROPAK objectives UO 3.8 to UO II may be used in combination with their corresponding cone as a dry, immersion, or dipping system. The immersion caps for the immersion systems perform the same function as the dipping cones for dry systems.

Relief Condensers for Contrast Illumination

In the case of certain objects, fine structural details are clearly visible only in an extremely oblique illumination, or in the case of translucent objects, by means of depth illumination. This may be achieved to an extremely good effect by employing the mirror condenser AQFEE in conjunction with objectives higher than 22x or, when using less powerful objectives, by means of a relief condenser.
The relief condenser may be used in combination with every ULTROPAK dry system and its design resembles that of normal ring condensers. It is likewise vertically adjustable for achieving optimal illumination or image effect. The equipment of the relief condenser includes an intermediate collar for vertical focusing and a screening funnel to exclude side lights, which is specially designed to correspond to the particular objective employed. When ordering, therefore, it is necessary to specify the objective with which the relief condenser is to be used. For serial observations, we recommend that a separate relief condenser be provided for each objective in regular use in order to ensure rapid transition from one magnification to another. (see P. 4.)

ULTROPAK-Objectives

	Objective UO	Free working distance in mm	Codeword	Magnification with eyepiece 6 x	8 x	10 x	Dipping cones optional with:
Dry systems	3.8/0.12	33	AHPEE	23	30	38	3.8 AREEK
	6.5/0.18	16.2	AIREE	39	52	65	6.5 ASEEI
	11/0.25	5.8	AKEER	66	88	110	11 ASKEE
	22/0.45	2.2	ALVEE	132	176	220	
	32/0.55	1.0	PAKAW	192	256	320	
	50/0.65	0.7	AMEEP	300	400	500	
Immersions	W 55/0.84	0.57	ANEEO	330	440	550	Immersion cap EZ 23–100 AWSEE with 6 cover glass carriers, 50 cover glasses and tube of cover glass cement.
	W 75/0.90	0.45	ANZEE	450	600	750	
	Fl Öl 60/0.85	0.57	APDEE	360	480	600	
	Fl Öl 75/1.0	0.51	APEEM	450	600	750	

Fl = Fluorite system, W = Water immersion, Öl = Oil immersion

Mirror condenser 22–100 is suitable for every UO objective 22–100 for oblique, sharply limited incident light. Particulary suitable for observation of depths in objects in which particles beyond the site to be observed should not be illuminated AQFEE

Special objectives for the ULTROPAK

(subject to availability)

	Objective UO	Free working distance in mm	Codeword	Magnification 6 x	8 x	10 x	Dipping cones optional with:
Immersions	Fl Öl 100/1.0	0.48	AQEEL	600	800	1000	Immersion cap EZ 23–100 AWSEE with 6 cover glass carriers, 50 cover glasses and tube of cover glass cement.

Outfits

Incident light illuminator with lamp attachment 6 volts 15 watts for LABORLUX with filter slot:

ULTROPAK illuminator, centering; centering lamp attachment 6 volts 15 watts; interchange bayonet mount for UO objectives, built-in heat filter, 2 slots for polarizer and lambda-plates, slot to accept filters and sector diaphragm; filter set C, adjustable sector diaphragms, spare filament bulb (7 · 21 · – · 35) PEURY

ULTROPAK illuminator as PEURY, but with polarizing arrangement, consisting of slip-in polarizer and analyser in slider (7 · 26 · – · 35) MUDUH

For LABORLUX-POL and DIALUX-POL

ULTROPAK illuminator as PEURY, but with slip-in polarizer (7 · 22 · – · 35) PEULT

ULTROPAK illuminator without lamp attachment For ORTHOLUX and ULTROPAK

with interchange bracket, built-in heat filter, 2 slots for polarizer, filter and lambda plates, slot to accept sector diaphragm, adjustable sector diaphragms (13 · 16 · – · – ·) ORULT

ULTROPAK illuminator as ORULT, but with polarizing arrangement (13 · 17 · – · – ·) ORUPO

For ORTHOLUX-POL

ULTROPAK illuminator as ORULT, but with slip-in polarizer, (13 · 24 · – · – ·) PABAM

For PANPHOT (gray model)

ULTROPAK illuminator as ORULT, but with light-guidance tube (13 · 18 · – · – ·) MUPAN

ULTROPAK illuminator as MUPAN, but with polarizing arrangement (13 · 19 · – · – ·) MUPEP

For PANPHOT-POL

ULTROPAK illuminator as MUPAN, but with slip-in polarizer (13 · 25 · – · – ·) PABEN

For the Inverted (Chemist's) Microscope

ULTROPAK illuminator with dovetail mount, with lamp attachment 8 volts, 0,6 amps, sector diaphragms, filter set, spare bulb KELOX

Accessories for the ULTROPAK

Polarizer in metal mount for LABORLUX, ORTHOLUX, PANPHOT and Inverted (Chemist's) microscope POLAK

Analyser in slip-on metal mount KANON

λ plate (red, Ist. order) in mount, for insertion into the slot of the ULTROPAK KARAM

set of insertion diaphragms (6) AXUEE

Object slide 76 x 26mm made of black glass, with bevelled edges, plane polished on one side AYEEC

Collector for a separate light source, suitable for PEURY, MUDUH and PEULT PEHEG

Adjustable sector diaphragm, 90° to 180° BKEET

Adjustable sector diaphragm from 180° onwards BKSEE

RING condenser for relief observation

Relief condenser without objective UBEEN

When using one of the following intermediate collars with funnel stop, the relief condenser can be used together with the corresponding objective:

Intermediate collar with funnel stop for objective UO 3.8 UAGEE

Intermediate collar with funnel stop for objective UO 6.5 UCEEM

Intermediate collar with funnel stop for objective UO 11–50 UCLEE

Transformers *) for lamp attachments (low voltage lamp 8 volts 0.8 amps)

Regulating transformer with ammeter, for 110–240 volts / 50–60 cycle AC BEEVY

For the low voltage lamp 6 volts 15 watts

Transformer with fixed voltage settings, four tappings for 110–240 volts / 50–60 cycle AC REROW

Regulating transformer without ammeter for 110–240 volts / 50–60 cycle AC RESEV

Regulating transformer with ammeter for 110–240 volts / 50–60 cycle AC RETAV

Spare filament bulbs

6 volts 15 watts LINOP

8 volts 0,6 amps LISEY

*) The transformers 110–240 v / 50–60 cycle are provided for 110, 120, 130, 220, 230 and 240 volts.

Design subject to alteration without notice.

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