

# Plano objectives

for microscopy in transmitted light



Every microscopist is aware that the ordinary types of microscopic objectives do not form a plane image of the specimen, but show a certain curvature which increases with higher magnifications. This image field curvature cannot be eliminated, not even by using compensating eyepieces, such as our PERIPLAN eyepieces which correct anastigmatism and chromatic magnification differences.

Re-adjustment with the micrometer focusing controls is at best a compromise as far as image field curvature is concerned. Admittedly this permits the examination of thicker specimens alternately in the centre or in the marginal area, but it does not alter the fact that a given plane in the specimen or an extremely thin section cannot be seen or photographed at equal sharpness over the entire image field. Our plano objectives are free of this disadvantage.

The plano objectives are suitable for all kinds of microscopic examination, but they are particularly suitable for the observation of smear preparations and very thin sections, for counting and photomicrographic purposes (black and white and colour).

The PI 4/0.10, PI 10/0.25, and PI 25/0.50 plano objectives are achromats. The PI 40/0.65 objective is a fluorite system while the PI Apo OI 100/1.32 objective has apochromatic correction. This means that the range of objectives meets all practical requirements. For microscopic observation and photomicrography at high magnifications the apochromats will usually be employed, while at low magnifications the achromats with their relatively large apertures are entirely satisfactory. The special computation and technical skill needed for these plano objectives is apparent from the fact that the PI Apo OI 100/1.32 plano apochromat requires no less than 14 lenses to achieve apochromatic correction and complete flatness of the image field (see illustration).

As the plano objectives yield a flat image they should be used with eyepieces which do not effect the image field curvature but offer the largest possible field of view. For this purpose we have developed a range of PERIPLAN® wide-field eyepieces bearing the designation GF, whose correction agrees so exactly with our normal PERIPLAN eyepieces that both ranges supplement and substitute each other. The main difference is in the size of their fields of view.

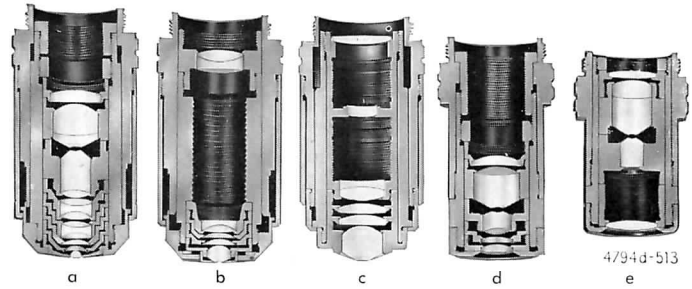
The use of negative eyepieces for photography with plano objectives would be wrong, because in such cases the image field would be curved, this time in the opposite direction.

The universal use of an objective depends very much on its adequate free working distance. With the PI Apo OI 100/1.32 objective it has been possible to increase the free working distance to double the normal figure. **As a result of the exceptionally high working distance of 0.27mm for the oil immersion objective it was possible to make this parfocal with the other plano objectives. The image can therefore be focused with objective PI 40/0.65, the objective swung half-way out, a drop of immersion oil placed on the specimen and the immersion objective swung in. The image is then seen sharply with very little subsequent adjustment.**

Only the immersion oil supplied under our name should be used for our plano objectives, as its composition is based on the computation of the objectives concerned, whilst most of the other oils possess different optical characteristics.

The plano objectives can be used on all LEITZ microscope stands and with all the usual condensers and tubes. It should be noted, however, that they are arranged for an adjustment length of 45mm as opposed to 37mm in our other objectives for microscopy in transmitted light.

"Adjustment length" indicates the distance between the shoulder of the objective and the object. Objectives with matched adjustment lengths have the advantage that the image remains in focus when changing over to another objective and only requires slight re-focusing. Plano and normal objectives should not therefore be used on the same revolving nosepiece because of their different adjustment lengths; in special cases, however, the difference can be overcome by using the PLEZY intermediate adapter for the ordinary objectives.



Plano objectives seen in cross-section

- (a) PI Apo OI 100/1.32
- (b) PI 40/0.65
- (c) PI 25/0.50
- (d) PI 10/0.25
- (e) PI 4/0.10

### Optical data of the plano objectives

Designation <sup>1)</sup>	Focal length mm	Free working distance mm	Cover glass correction <sup>2)</sup>	Eyepiece type to be used
PI 4/0.10	41.5	15	DO	PERIPLAN
PI 10/0.25	17.9	7.5	DO	PERIPLAN
PI 25/0.50	7.6	0.90	D	PERIPLAN
PI 40/0.65	4.63	0.58	D	PERIPLAN
PI Apo OI 100/1.32	2.43	0.27	D(O)	PERIPLAN

The PI 25/0.50, PI 40/0.65, and PI Apo OI 100/1.32 objectives are supplied with front lens spring mount for specimen protection. All objectives are coated.

<sup>1)</sup> The number before the stroke indicates the magnification, the number following the stroke the aperture.

<sup>2)</sup> D indicates suitability for use with cover glass, O without.

### Prices

#### Dry systems

- PI 4/0.10 achromatic plano objective . . . . .PLAVS
- PI 10/0.25 achromatic plano objective . . . . .PLABY
- PI 25/0.50 achromatic plano objective . . . . .PLAWT
- PI 40/0.65 fluorite plano objective . . . . .PLASP

#### Oil immersion

- PI Apo OI 100/1.32 apochromatic plano objective . . . .PLARN
- Intermediate adapter for ordinary objectives to compensate adjustment length . . . . .PLEZY

### Eyepieces

Designation	Field of view	Angle of view	Code word singles	Code word pairs
GF 10×	18	40°	PERIR	PESIS
PERIPLAN 10× M	15	32°	RXIII-	NIITQ-
		52°	OCASY*	OCASY*
GF 16×	15		PEROS	PESOT
GF 25×	10	53°	PESAP	PETAR
GF 25× M	10	53°	PESER-	PELOM-
			OCASY*	OCASY*

\* OCASY: Eyepiece graticule with 10mm scale graduated in intervals of 0.1mm.

We reserve the right to alter construction and design.

® = registered trade mark

