

S-PLANAR f/1.6 — 25 mm

Cat. No. 10 77 37 ($\lambda = 546 \text{ nm}$) e 101125 10X e
 10 77 38 ($\lambda = 436 \text{ nm}$) g 101126 10X g
 10 77 39 ($\lambda = 405 \text{ nm}$) h 101126 10X h

DISPLAY OPTICS
 1675 Comstock Ave.,
 Los Angeles, Calif. 90024



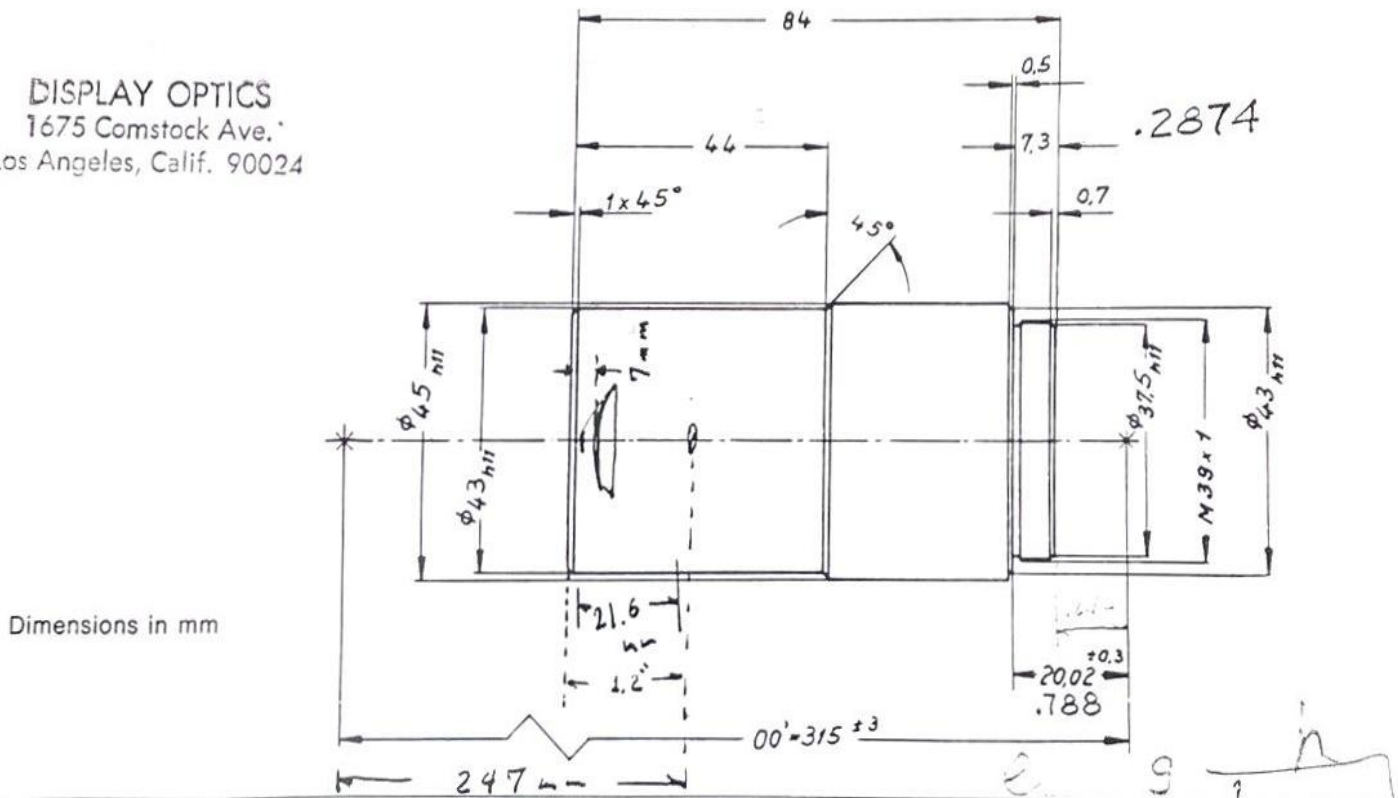
CARL ZEISS
 Dept. of Photographic Optics

7082 Oberkochen
 West Germany

The S-PLANAR f/1.6 — 25 mm is a high-quality reduction lens for 10 times reduction. Three different versions of this lens are optimally corrected for the wavelengths 546 nm (e-line), 436 nm (g-line), 405 nm (h-line), and for the image field diameter of 8 mm.

The performance of this lens is dependent on its aperture alone. There is no need to stop down the lens to increase the performance quality, and it is therefore produced without iris diaphragm. The object-to-image distance is 315 mm. The lens can thus be used in most of the repeaters now on the market.

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	Cat. No.	10 77 37	10 77 38	10 77 39
Number of lens elements	9	546 ± 10	436 ± 10	405 ± 10 nm
Number of components	7	25.1	25.2	25.2 mm
f-number	1.6 (at ∞)	Location of entrance pupil*		
Image field diameter	8 mm	behind the first lens vertex	23.3	21.8
Image scale	1 : 10	Diameter of entrance pupil	14.0	13.9
Object-to-image distance	315 mm	Location of exit pupil*		
f/stop scale	none	behind the last lens vertex	264	125
Screw thread	M 39 x 1	Diameter of exit pupil	145	64
Weight	280 g	Location of the principal planes:		
		H behind the first lens vertex	50.7	52.4
		H' in front of the last lens vertex	13.8	13.6
		* for image scale 1 : 10		

S-Planar 1.6/25

Cat. No.	10 77 37
Reduction ratio	1 : 10
Wavelength range	546 ± 15 nm
Object to-image distance	315 ± 3 mm
Image field diameter	8 mm *
Square image format	5,7 x 5,7 mm *
Flange focal distance	20 ± 0,3 mm
Free working distance	min. 12 mm
Length of barrel	84 mm
Max. diameter	45 mm
Screw thread	M 39 x 1
Entrance pupil	
Location behind the object	250 mm
Diameter	14,0 mm
Exit pupil	
Location in front of image	295 mm
Diameter	166 mm
Effective focal length	25,2 mm
Distance of principal points	+ 10 mm
Numerical aperture	0,28
Diffraction limit of resolution	1025 Per/mm
Rayleigh depth in image space	± 3,4 μ

Data on image performance

1. Full field

Distortion max. ± 0.3 μ

Optical transfer factor for incoherent/partially coherent illumination ($\sigma = 0,5$)

Spatial frequency	Lines and spaces	
250 Per/mm	2 μ	52/90 %
500 Per/mm	1 μ	29/38 %
700 Per/mm	0,7 μ	15/5 %

2. Restricted field diameter 6 mm

Distortion max. ± 0.15 μ

Optical transfer factor for incoherent/partially coherent illumination ($\sigma = 0,5$)

Spatial frequency	Lines and spaces	
250 Per/mm	2 μ	62/95 %
500 Per/mm	1 μ	36/43 %
700 Per/mm	0,7 μ	18/6 %

* A 9 mm field can be used; square image format 6,3 x 6,3 mm.

All data subject to revision.

S-Planar 1.6/50 mm (10 77 82)
 S-Planar 1.7/40 mm (10 77 90)

104848

104849

10X

5X

Bestell-Nummer (Cat. Number)	10 77 82	10 77 90
AbbildungsmaBstab (Reduction ratio)	1:10	1:5
Wellenlange (wavelength)	436 \pm 5 nm	436 \pm 5 nm
Objekt-Bild-Abstand (Object to image distance)	60 mm ³⁴²	315mm
Bildkreisdurchmesser (Image field diameter)	14.5mm	14.5mm
quadrates Bildfeld (Square image format)	10.2 x 10.2mm	10.2 x 10.2mm
Anschraubgewinde (Screw Thread)	M 76 x 1	M 56 x 1
AnalogemaB (Flange focal distance)	24.5mm	49mm
<u>Eintrittspupille: (Entrance pupil)</u>		
Lage hinter dem Objekt (Location behind the object)	486mm	200mm
Durchmesser (diameter)	27.2mm	112mm
<u>Austrittspupille: (Exit pupil)</u>		
Lage vor dem Bild (Location in front of the image)	464mm	790mm
Durchmesser	256mm	442mm
<u>Lage der Hauptebenen: (Location of principal points)</u>		
H hinter dem 1. Linsenscheitel (Behind lens)	100.1	81.1
H' vor dem letzten Linsenscheitel (Before lens)	35.9	35.6
effektives Offnungsverhaltnis (effective number)	1.78	2.1
numerische Apertur (numerical aperture)	0.28	0.24
beugungstheoretische Auflosungsgrenze (diffraction limit resolution)	1290 Per/mm	1100 Per/mm
Rayleightiefe im Bildram (Rayleigh depth in image plane)	\pm 3.4 μ	\pm 4.6 μ
Rayleightiefe im Objektraum (Rayleigh depth in object plane)	\pm 340 μ	\pm 230 μ

Angaben zur Abbildungsleistung (spec for picture size)

1. Bildkreisdurchmesser 14.5mm (image field diameter)

Verzeichnung (distortion)		max \pm 0.2 μ	max. \pm 0.15 μ
Optischer Übertragungsfaktor für (optical transfer factor)			
Ortsfrequenz (frequency) Linien und Zwischenräume je (lines & spaces)			
250 per/mm	2 μ	55%	50%
500 Per/mm	1 μ	35%	30%
700 Per/mm	0.7 μ	25%	20%

2. eingeschränkter Bildkreisdurchmesser 12mm (Restricted image field diameter)

Verzeichnung (distortion)		max \pm 0.1 μ	max \pm 0.1 μ
Optischer Übertragungsfaktor für (optical transfer factor)			
Ortsfrequenz (frequency) Linien und Zwischenräume je (lines & spaces)			
250 Per/mm	2 μ	70%	65%
500 Per/mm	1 μ	45%	40%
700 Per/mm	0.7 μ	30%	25%

10.7.97
10.2