ZEISS

S-Planar f/5.6 — 135 mm
Cat. No. 107711

HASSELBLAD

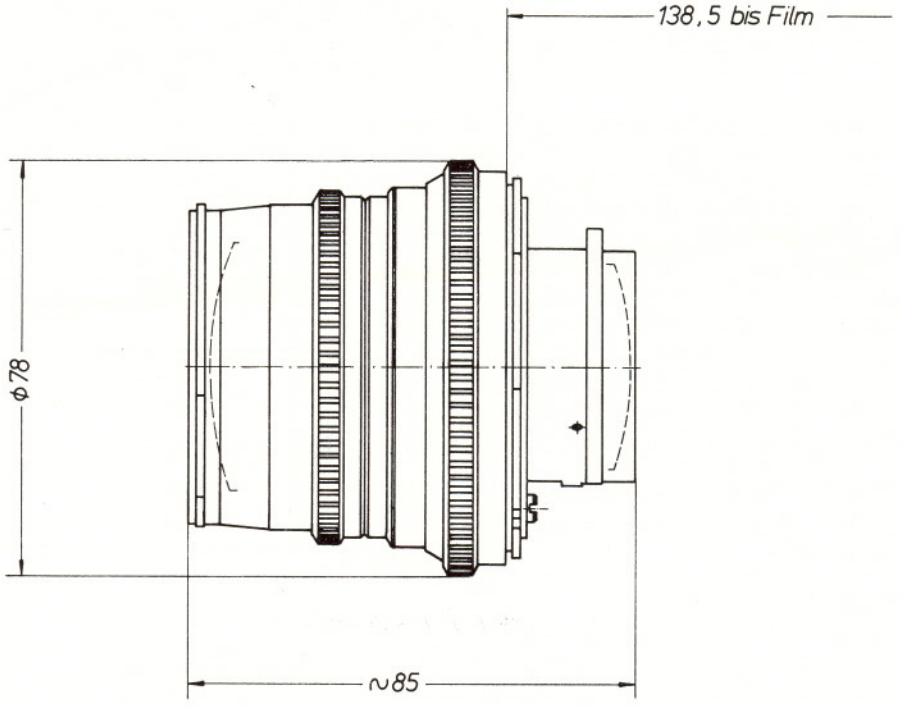
CARL ZEISS
Abteilung für Photographie

7082 Oberkochen
West Germany

The S-PLANAR f/5.6 - 135 mm is designed for use with a bellows extension, so it has no worm-wheel drive for focusing. With the bellows extension the focusing range of the lens is continous from infinity to scale 1 : 1.

Like the S-PLANAR f/5.6 - 120 mm, the S-PLANAR f/5.6 - 135 mm is optimally corrected for close-range work and is therefore ideally suited for all subjects at close range where maximum image quality and freedom from distortion are required.

Owing to its relatively constant correction over a broad scale range, the lens can also be used successfully for distance if it is stopped down slightly more than a normal lens.



Number of lens elements:	7
Number of components:	5
f-number:	5.6 at ∞
Focal length:	137.1 mm
Negative size:	56.5 x 56.5 mm
Angular field 2 w:	diagonal 32°, side 23° at ∞
Spectral range:	visible spectrum
f-stop scale:	5.6 - 8 - 11 - 16 - 22 - 32 - 45
Mount:	Compur interchangeable reflex shutter size 0 with automatic iris diaphragm
Filter mounting:	bayonet for Hasselblad series 50
Weight:	560 g

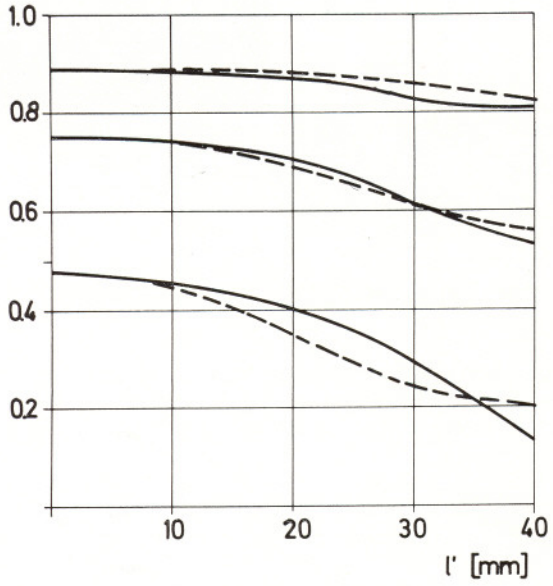
Distance range:	∞ to 0.54 m (image scale 1 : 1) to be used with bellows only
Position of entrance pupil *):	47.4 mm behind the first lens vertex
Diameter of entrance pupil:	24.2 mm
Position of exit pupil *):	47.3 mm in front of the last lens vertex
Diameter of exit pupil:	28.5 mm
Position of principal plane H:	67.7 mm behind the first lens vertex
Position of principal plane H′:	23.5 mm in front of the last lens vertex
Distance between first and last lens vertex:	80.2 mm

*) for image scale 1 : ∞

Performance data at image scale 1:5

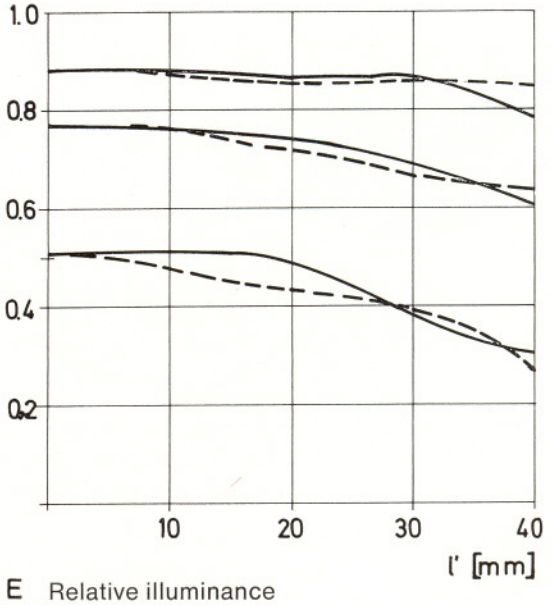
Modulation transfer T as a function of image height l′
Slit orientation tangential ————
sagittal — — — —

T f-number k=5.6

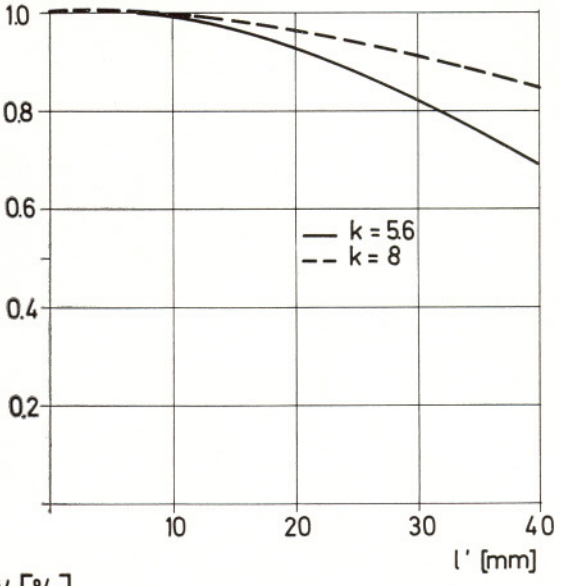


White light
Spatial frequencies R = 10 periods/mm 20 periods/mm 40 periods/mm

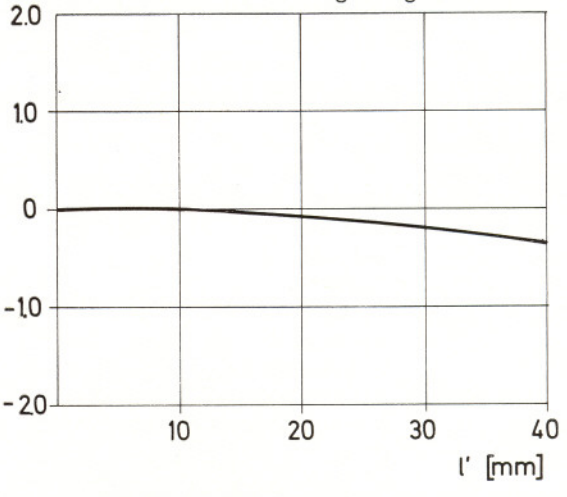
T f-number k=8



E Relative illuminance



V [%] Distortion in % of image height l′



1. MTF Diagrams
The image height l′ — reckoned from the image center — is entered in mm on the horizontal axis of the graph. The modulation transfer T (MTF = **M**odulation **T**ransfer **F**actor) is entered on the vertical axis. Parameters of the graph are the spatial frequencies R in periods (line pairs) per mm given at the top right hand above the diagrams. The lowest spatial frequency corresponds to the upper pair of curves, the highest spatial frequency to the lower pair. Above each graph the f-number k is given for which the measurement was made. "White" light means that the measurement was made with a subject illumination having the approximate spectral distribution of daylight.

Unless otherwise indicated, the performance data refer to large object distances, for which normal photographic lenses are primarily used.

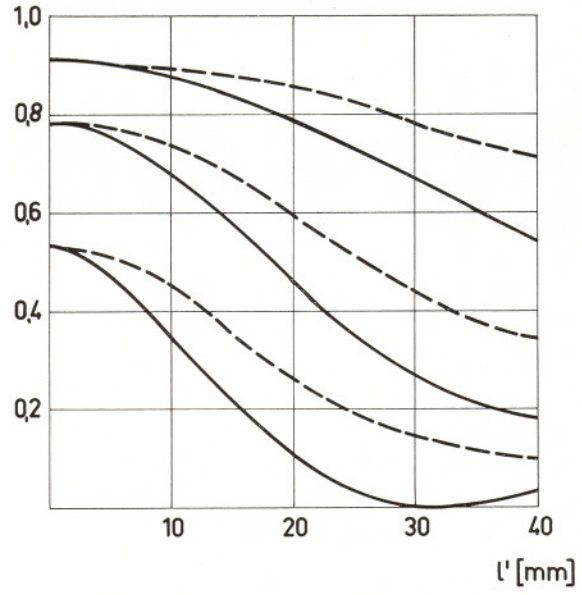
2. Relative illuminance
In this diagram the horizontal axis gives the image height l′ in mm and the vertical axis the relative illuminance E, both for full aperture and a moderately stopped-down lens. The values for E are determined taking into account vignetting and natural light decrease. The natural light decrease increases with the factor "$\cos^4$ of half the angular field". It is independent of the design and degree of correction of the lens.

3. Distortion
Here again the image height l′ is entered on the horizontal axis in mm. The vertical axis gives the distortion V in % of the relevant image height. A positive value for V means that the actual image point is further from the image center than with perfectly distortion-free imaging (pin-cushion distortion); a negative V indicates barrel distortion.

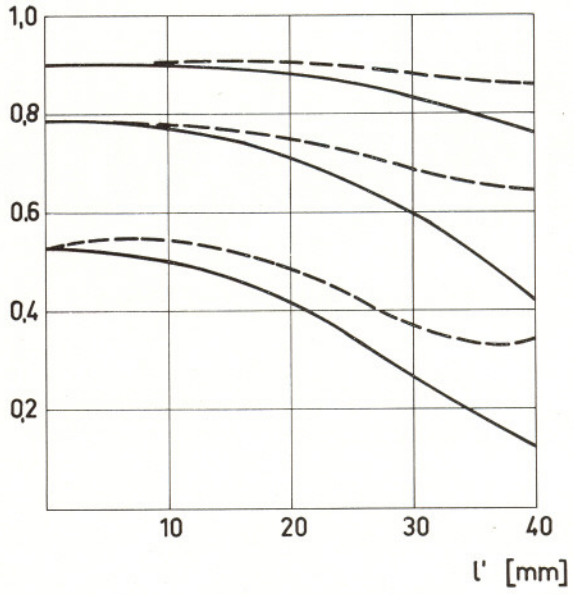
Subject to technical amendment

Performance data at taking distance ∞

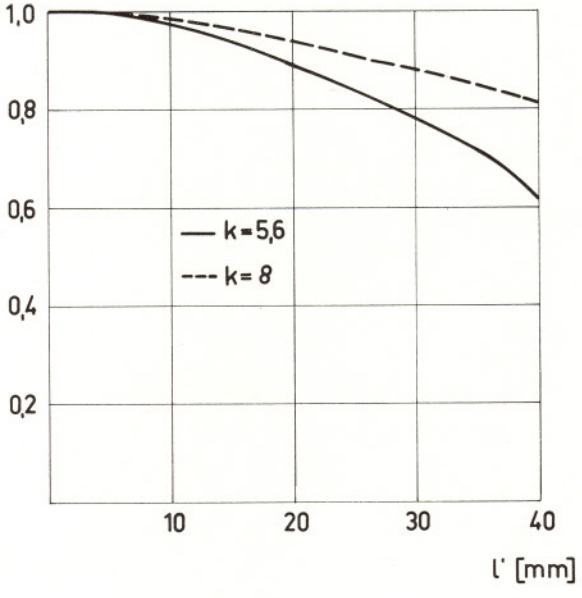
T f-number k=5.6



T f-number k=11



E Relative illuminance



V [%] Distortion in % of image height l'