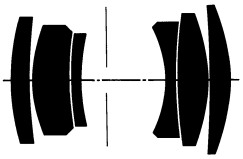
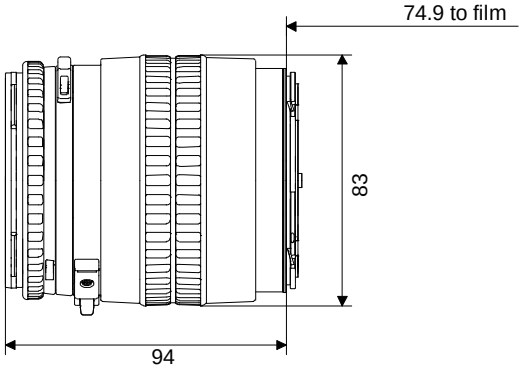
Makro-Planar® T***** 4/120 CFE





HASSELBLAD

This is the must-have lens for every photographer doing serious close-up work. We believe that no studio photographer specialised in advertising, product, food, technical or industrial photography can really do without it. Combined with a motorized Hasselblad SLR or the Hasselblad FlexBody for creative selective tilting of the sharpness zone, the Makro-Planar® T* 4/120 CFE lens is the compact workhorse lens for day-to-day studio work - be it analog or digital.
Optically well-designed makro-lenses like the Makro-Planar® T* 4/120 CFE lens differ from other lenses in two ways.
First: Their performance is optimized for subjects like the one you're just looking at: A flat page slightly larger than a human head with intricate detail plus color. Which means that the image quality and light distribution is extremely good, even in the corners and even at full aperture. This is exactly what is needed for serious professional copy work of subjects that are smaller than the ones ideally photographed with the Carl Zeiss Planar® T* 3,5/100 CFi lens, e. g. delicate drawings (so the two lenses complement each other very well in the hands of a demanding photographer).
Second: A basic type of lens design is chosen that maintains its performance characteristics very constantly on a high level over a wide range of reduction ratios or distances.
Like from half life-size (1:2) to infinity, in the case of the Makro-Planar® T* 4/120 CFE lens.

It is based on the Carl Zeiss Planar® lens design type, which offers very good close-up potential and is therefore also chosen as the basis for the ultra high resolution Carl Zeiss S-Planar® lenses for the micro-lithography, which are - in their new version - called Starlith, the most sophisticated lenses of our day.
Although the Makro-Planar® T* 4/120 CFE lens can and should be used for subjects as small as postcards, the built in focussing helicoil allowes only to focus down to a single page. This has been done for safety reasons: Since most of the Hasselblad SLR cameras in use with professional photographers today do not incorporate TTL exposure metering, we believe that the lens should not easily focus down to such reduction ratios without warning, where exposure compensation is absolutely unavoidable for professional results. Adding an extension ring for closer focussing should remind the photographer to apply the necessary compensation.
The CFE version of the Makro-Planar® T* 4/120 lens allows for fully automatic compensation of exposure in extreme close-up photography provided a Hasselblad camera with built-in TTL exposure meter is used.

Preferred use: Close-ups of all kind, products, industrial, documentation, copy work, digital photography

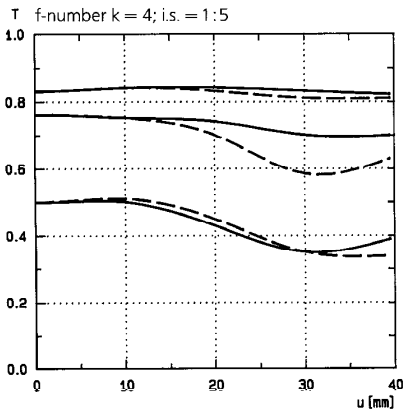
Cat. No. of lens	**10 78 82**
Number of elements	6
Number of groups	4
Max. aperture	f/4
Focal length	120,9 mm
Negative size	55 x 55 mm
Angular field 2w*	width 25°, height 25°, diagonal 25°
Min. aperture	32
Camera mount	CFE
Shutter	Prontor CFE 1s-1/500s, b, f
Filter connection	bayonett series 60
Focussing range	infinity to 0.8 m
Working distance (between mechanical front end of lens and subject)	0.6 m
Close limit field size	246 mm x 246 mm
Max. scale	1 : 4.5
Entrance pupil*	
Position	30.2 mm behind the first lens vertex
Diameter	29.7 mm
Exit pupil*	
Position	41.0 mm in front of the last lens vertex
Diameter	33.3 mm
Position of principal planes	
H	42.6 mm behind the first lens vertex
H'	27.2 mm in front of the last lens vertex
Back focal distance	93.5 mm
Distance between first and last lens vertex	60.8 mm
Weight	780 g

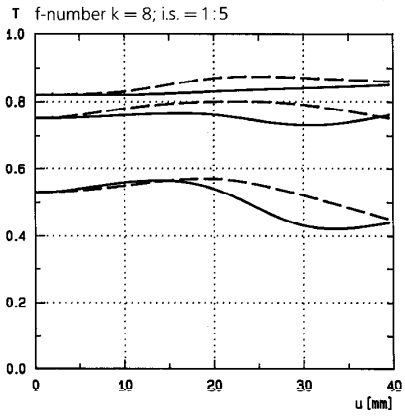
* at infinity

ZEISS

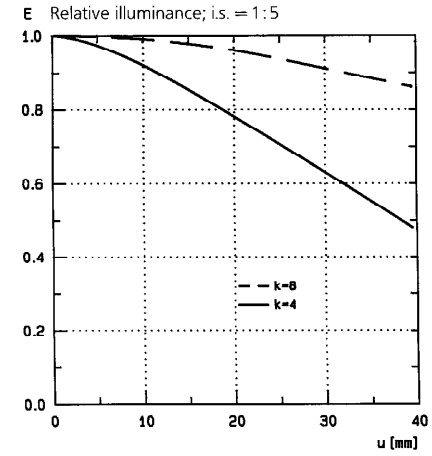
Performance data:
Makro-Planar® **T*** 4/120 CFE
Cat. No. 10 78 82

1. MTF Diagrams
The image height u - calculated from the image center - is entered in mm on the horizontal axis of the graph. The modulation transfer T (MTF = Modulation Transfer Factor) is entered on the vertical axis. Parameters of the graph are the spatial frequencies R in cycles (line pairs) per mm given at the top of this page.
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.

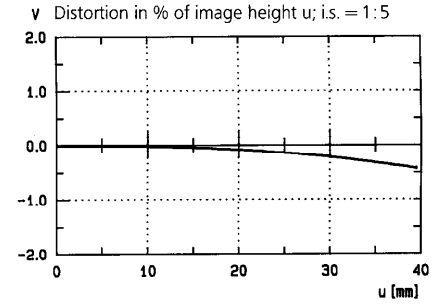




2. Relative illuminance
In this diagram the horizontal axis gives the image height u in mm and the vertical axis the relative illuminance E, both for full aperture and a moderately stopped-down lens. The values for E are determined taking into account vignetting and natural light decrease.



3. Distortion
Here again the image height u 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 (pincushion distortion); a negative V indicates barrel distortion.



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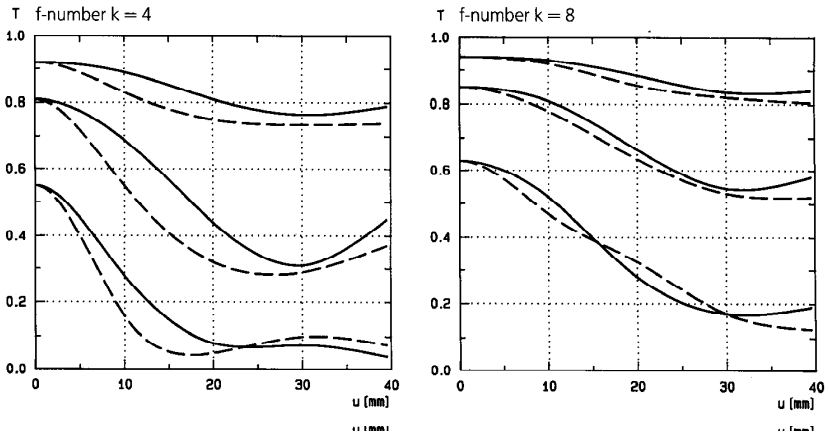
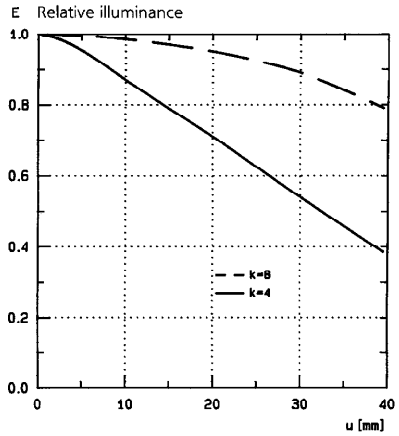
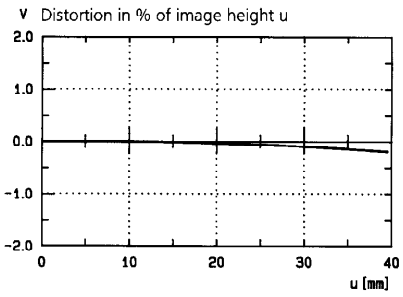
Modulation transfer T as a function of image height u. Slit orientation: tangential — — — sagittal ———
White light. Spatial frequencies R = 10, 20 and 40 cycles/mm







Subject to change.
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