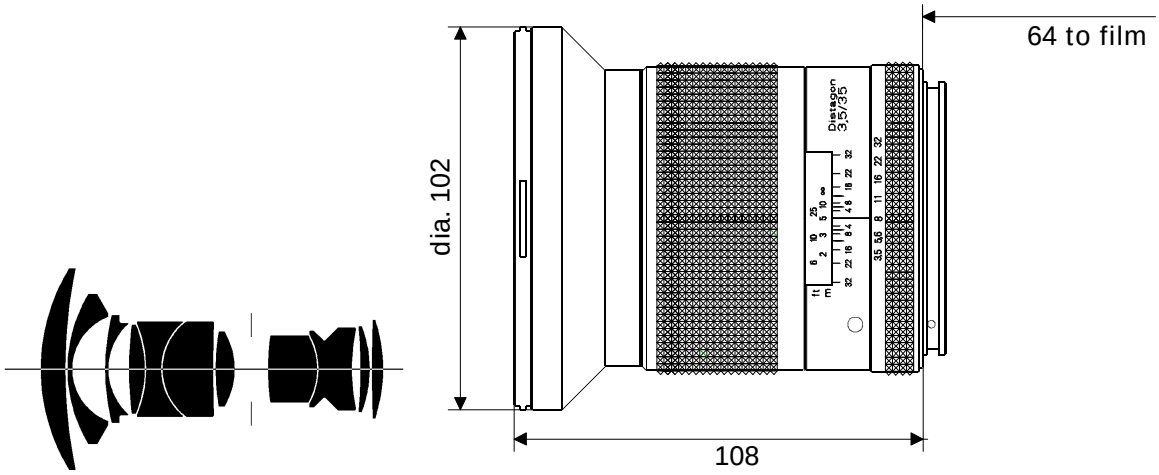
Distagon® T* 3.5/35



CONTAX® 645

The **Distagon**® T* 3.5/35 lens is the super wide angle lens in the Contax® 645 autofocus system. The focal length of 35 mm on the Contax® 645 camera produces images similiar to those from a 21 mm lens on a 35 mm Contax® SLR. It is the lens of choice for dramatic wide angle perspectives, an important tool for professional landscape, advertising and industrial photography. The **Distagon**® T* 3.5/35 lens features a very uniform corner-to-corner illumination, which is appreciated by professionals who need to achieve a pleasing rendition of blue sky areas in their landscape photos.
With its extreme angle of view it is also a very good lens for documentation photography in cramped surroundings. This situation is often encountered in industrial photography, where subjects with many intricate small and important details are to be captured.
Carl Zeiss designed the **Distagon**® T* 3.5/35 lens to provide the high optical performance needed to achieve truly professional photo results with these detailed subjects. The optical system of the **Distagon**® T* 3.5/35 lens was designed using the latest technology, incorporating internal focusing (IF) and the most recent optical glass.
The maximum aperture of f/3.5 on the **Distagon**® T* 3.5/35 lens is second to no other super wide angle lens in medium format. At the other end of the aperture scale the **Distagon**® lens can be stopped down to f/32, thus enabling stunning depth of field effects in outdoor nature photography, advertising and industrial documentation.
Distortion of the **Distagon**® T* 3.5/35 lens is well controlled – a particular strength of retrofocus wide angle lenses from Carl Zeiss, that benefits the professional travel photographer.
Preferred use: dramatic wide vistas, landscapes, cities, interiors, advertising, industrial, documentation

Cat. No. of lens:	**10 49 43**
Number of elements:	11
Number of groups:	8
Max. aperture:	1:3.5
Focal length:	35.5mm
Negative size:	41.5 x 56mm
Angular field 2w:	90°
Mount:	Contax 645 Mount
Filter connection:	screw-in type, thread M95 x 1mm
Focusing range:	∞ to 0.5m
Aperture scale:	3.5 - 4 - 5.6 - 8 - 11 - 16 - 22 - 32
Weight:	approx. 877 g

Entrance pupil*:	
Position:	30.2mm behind the first lens vertex
Diameter:	9.9mm
Exit pupil*:	
Position:	37.6mm in front of the last lens vertex
Diameter:	27.7mm
Position of principal planes*:	
H:	52.8mm behind the first lens vertex
H':	24.6mm behind the last lens vertex
Back focal distance*:	60.1mm
Distance between first and last lens vertex*:	109.2mm

* at ∞

Performance data:
Distagon® T* 3.5/35
Cat. No. 10 49 43

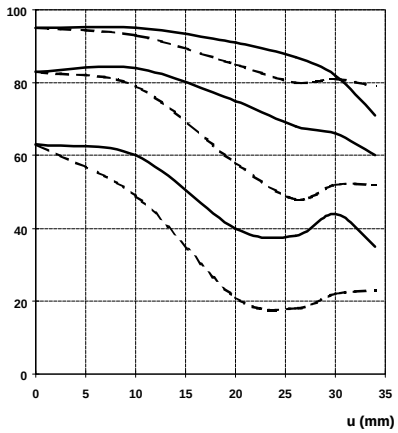
1. MTF Diagrams

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.

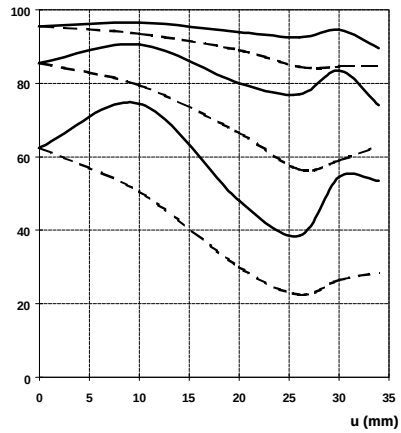
Modulation transfer T as a function of image height u.
White light. Spatial frequencies R = 10, 20 and 40 cycles/mm

Slit orientation: sag, tan

f-number k = 3,5



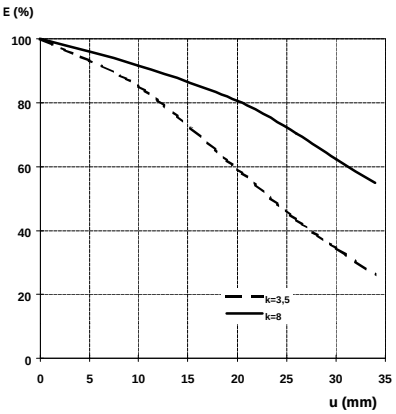
f-number k = 5,6



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.

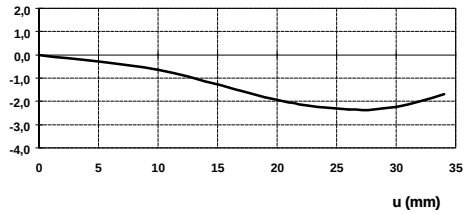
Relative illuminance



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.

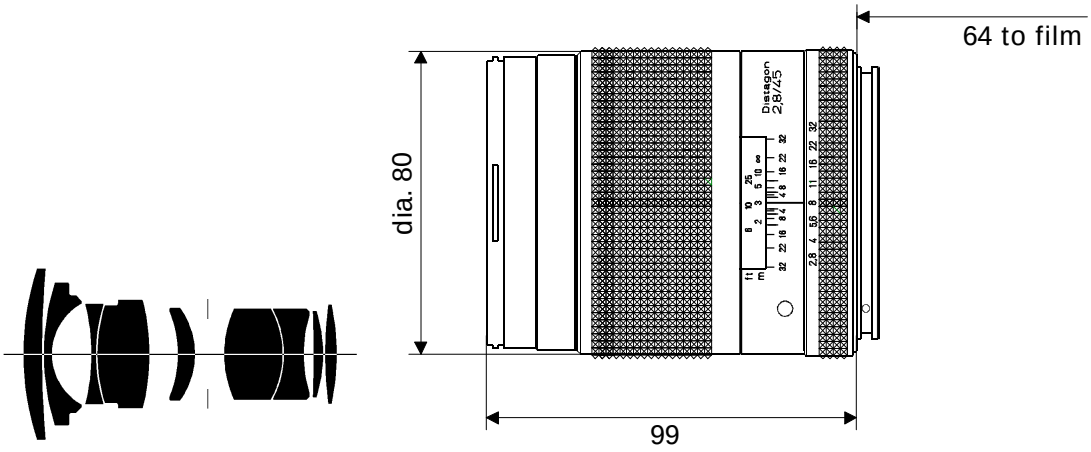
Distortion in % of image height u



Subject to change.
Printed in Germany 09.03.99

Carl Zeiss
Photoobjektive
D-73446 Oberkochen
Telephone (07364) 20-6175
Fax (07364) 20-4045
eMail: photo@zeiss.de
http://www.zeiss.de

Distagon® T* 2.8/45



CONTAX® 645

The **Distagon**® T* 2.8/45 lens is the all-purpose wide angle lens in the Contax® 645 autofocus system. The focal length of 45 mm on a Contax® 645 medium format camera produces images similiar to the 28 mm lens on a Contax® 35 mm SLR. The optical system of the lens was designed using the latest technology, incorporating internal focusing (IF). Thus it is the the right optic for most scenic landscapes and cities. To handle these subjects with perfection the **Distagon**® T* 2.8/45 lens features a very uniform corner-to-corner illumination, which is highly appreciated by professionals who need to achieve a pleasing rendition of blue sky areas in their landscape photos.

With a maximum aperture of f/2.8 the **Distagon**® T* 2.8/45 lens is fast enough for indoor wedding coverage and similar tasks that ask for medium format image quality.

On assignments like a wedding, which are fast paced and cannot be repeated, the combination of medium format and autofocus on Contax® level excels. At the other end of the aperture scale the **Distagon**® lens can be stopped down to f/32, thus enabling stunning depth of field effects in outdoor nature photography.

Distortion of the **Distagon**® T* 2.8/45 lens is kept remarkably low – a particular strength of retrofocus wide angle lenses from Carl Zeiss, that benefits the professional travel photographer.

Preferred use: all-purpose, landscapes, cities, calendars, travel, editorial, weddings

Cat. No. of lens:	**10 49 44**
Number of elements:	9
Number of groups:	7
Max. aperture:	1:2.8
Focal length:	45.5mm
Negative size:	41.5 x 56mm
Angular field 2w:	76°
Mount:	Contax 645 Mount
Filter connection:	screw-in type, thread M72 x 0.75
Focusing range:	∞ to 0.5m
Aperture scale:	2.8 - 4 - 5.6 - 8 - 11 - 16 - 22 - 32
Weight:	approx. 821 g

Entrance pupil*	
Position:	29.4mm behind the first lens vertex
Diameter:	16.0mm
Exit pupil*	
Position:	33.0mm in front of the last lens vertex
Diameter:	33.1mm
Position of principal planes*:	
H:	52.8mm behind the first lens vertex
H':	14,7mm behind the last lens vertex
Back focal distance*:	60.2mm
Distance between first and last lens vertex*:	100.0mm

* at ∞

Performance data:
Distagon® T* 2.8/45
Cat. No. 10 49 44

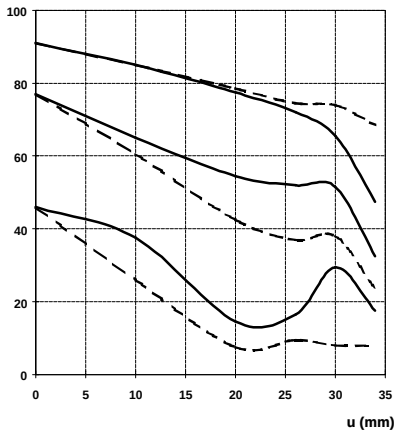
1. MTF Diagrams

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.

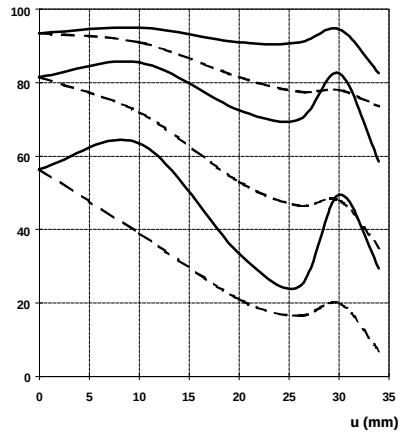
Modulation transfer T as a function of image height u.
White light. Spatial frequencies R = 10, 20 and 40 cycles/mm

Slit orientation: —— sag – – tan

f-number k = 2,8



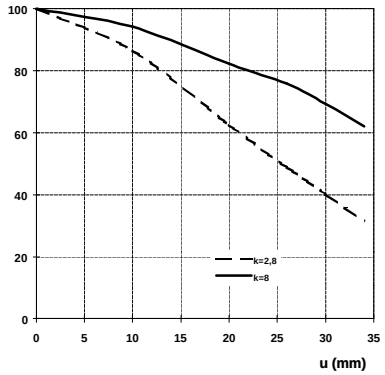
f-number k = 5,6



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.

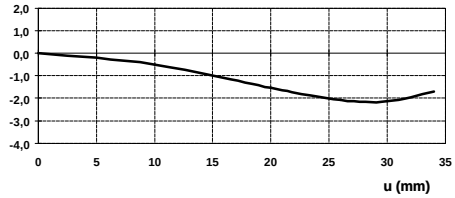
Relative illuminance
E (%)



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.

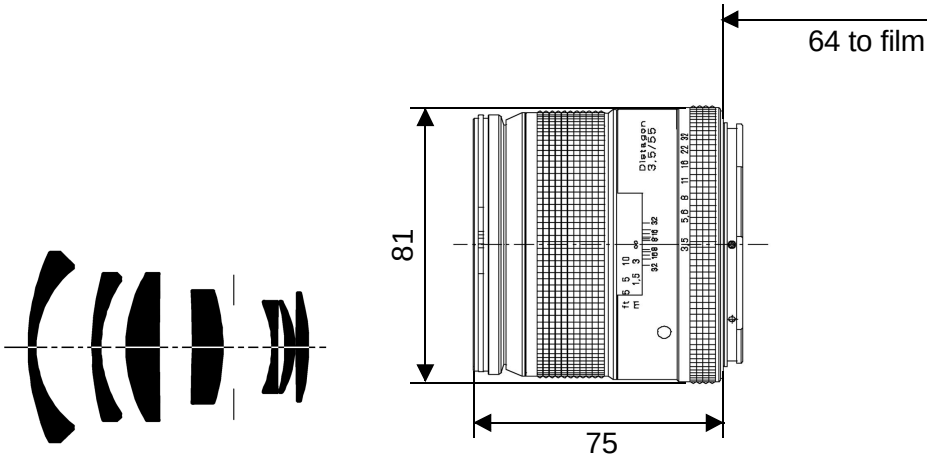
Distortion in % of image height u
V



Subject to change.
Printed in Germany 09.03.99

Carl Zeiss
Photoobjektive
D-73446 Oberkochen
Telephone (07364) 20-6175
Fax (07364) 20-4045
eMail: photo@zeiss.de
http://www.zeiss.de

Distagon® T* 3.5/55



CONTAX® 645

The Distagon® T*3.5/55 lens is the compact and light-weight all-purpose wide-angle lens in the Contax 645 autofocus system. The focal length of 55 mm on a Contax 645 camera produces images similar to those from 35 mm lenses on 35mm SLRs.
The Distagon® T*3.5/55 lens consists of 7 lens elements. It is of rather compact, light-weight design and features smooth corner-to-corner illumination. Image quality is excellent over the entire frame from full opening to small apertures.
The Distagon® T* 3.5/55 lens can be stopped down to f/32, thus enabling stunning depth of field effects. Distortion of the Distagon® T* 3.5/55 lens is kept remarkably low - a particular strength of retrofocus wide angle lenses from Carl Zeiss.

With these features the Distagon® 3.5/55 lens is the ideal lens for photojournalistic ”street photography” with the Contax 645 AF camera. Another standard task in professional medium format photography is taking pictures of large groups of up to 100 people. In this case a moderate wide angle with high image quality in the entire frame and low distortion is required and the Distagon® T* 3.5/55 lens is the lens of choice for the Contax 645 AF.

Preferred use: photojournalistic work, ”street photography”, people, groups, weddings, indoor photography

Cat. No. of lens	**10 49 59**
Number of elements	7
Number of groups	7
Max. aperture	f/3.5
Focal length	55.0 mm
Negative size	41.5 x 56 mm
Angular field 2w*	width 54°; height 41°; diagonal 65°
Min. aperture	32
Camera mount	Contax 645
Filter connection	M 72 x 0.75 mm
Focussing range	infinity to 0.45 m
Working distance (between mechanical front end of lens and subject)	0.31 m
Close limit field size	230 mm x 330 mm
Max. scale	1 : 5.5
Entrance pupil*	
Position	28.7 mm behind the first lens vertex
Diameter	15.5 mm
Exit pupil*	
Position	20.3 mm in front of the last lens vertex
Diameter	24.3 mm
Position of principal planes*	
H	48.3 mm behind the first lens vertex
H'	10.0 mm behind the last lens vertex
Back focal distance	65.0 mm
Distance between first and last lens vertex*	66.4 mm
Weight	500 g

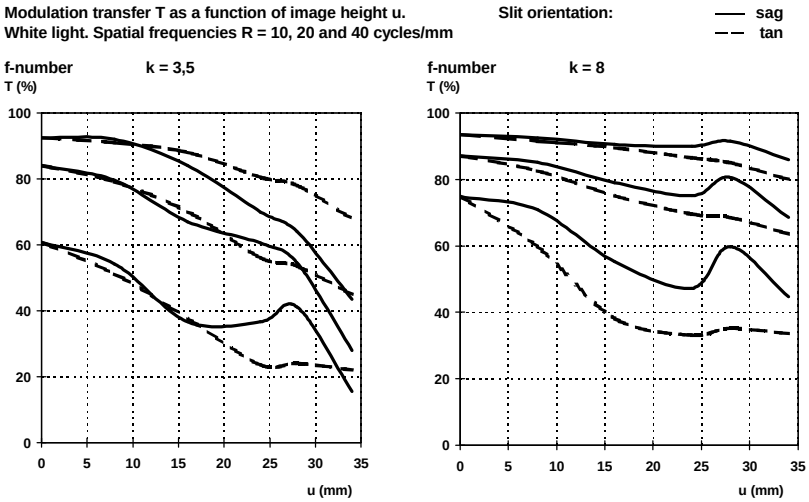
*at infinity

ZEISS

Performance data:
Distagon® T* 3.5/55
Cat. No. 10 49 59

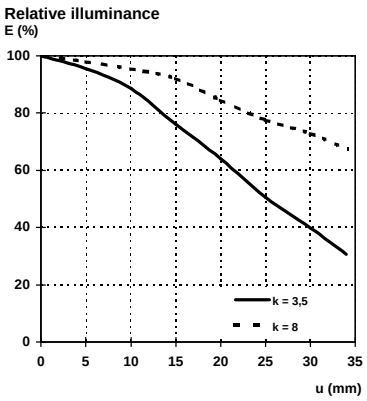
1. MTF Diagrams

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.



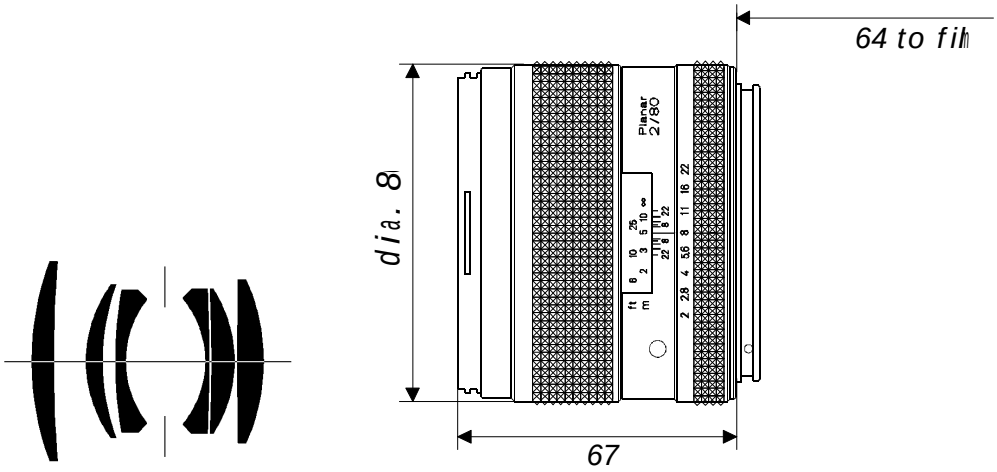
3. Distortion

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.

Subject to change.
Printed in Germany 29.05.2002

Carl Zeiss
Camera Lens Division
73446 Oberkochen
Germany
Telephone ++49-7364-20-6175
Fax ++49-7364-20-4045
eMail: photo@zeiss.de
http://www.zeiss.de/photo

Planar® T***** 2/80



CONTAX® 645

The Carl Zeiss **Planar**® lens is the most successful camera lens design ever created. This nearly symmetrical layout provides the lens designer with numerous means to correct aberrations extraordinarily well, even for wide open apertures. The ideal basis for high-performance lenses with great color correction, high speed, flat image plane (this is where the name comes from) and low distortion. The **Planar**® design is the basis for nearly all professional 'workhorse' lenses on earth and in space today.
At f/2 the **Planar**® T* 2/80 lens is the fastest optic in the Contax® 645 system. There is no faster **Planar**® lens in medium format photography anywhere. Even at full aperture the performance of the **Planar**® T* 2/80 lens is so high that professional quality images are reached. Especially so since the Contax® 645 autofocus provides for quick and accurate focusing, where manual focusing would have been too slow or not accurate enough for f/2. So the **Planar**® T* 2/80 lens is the ideal tool for handheld photography with decent shutter speeds at low light levels, like in people photography indoors, celebrity portraits, wedding coverage and similar demanding tasks.
With its focal length of 80 mm the **Planar**® T* 2/80 lens records an image with a perspective (size relationship between foreground and background) that is pretty much the way we see the scene with our eyes, like a fast 50 mm lens on a 35 mm SLR. So it is suited for almost any task in general photography, which makes it a powerful and versatile standard lens in the Contax® 645 system.
Preferred use: all-purpose, travel, editorial, people, celebrities, candid weddings

Cat. No. of lens:	**10 22 19**
Number of elements:	6
Number of groups:	5
Max. aperture:	1:2
Focal length:	80.0mm
Negative size:	41.5 x 56mm
Angular field 2w:	47°
Mount:	Contax 645 Mount
Filter connection:	screw-in type, thread M72x0.75
Focusing range:	infinity to 0.7m
Aperture scale:	2 - 2.8 - 4 - 5.6 - 8 - 11 - 16 - 22
Weight:	approx. 524 g

Entrance pupil*****:	
Position:	40.1mm behind the first lens vertex
Diameter:	39.9mm
Exit pupil*****:	
Position:	27.8mm in front of the last lens vertex
Diameter:	45.2mm
Position of principal planes:	
H:	47.1mm behind the first lens vertex
H':	20.0mm in front of the last lens vertex
Back focal distance*****:	60.0mm
Distance between first and last lens vertex:	55.0mm

***** at infinity

ZEISS

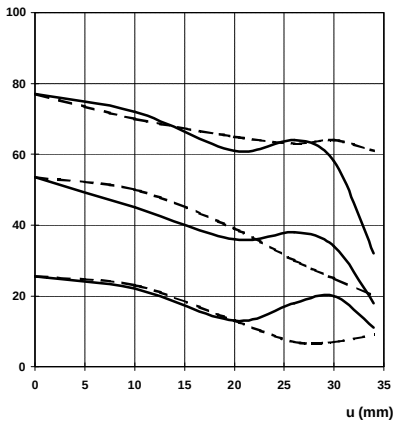
Performance data:
Planar® T* 2/80
Cat. No. 10 22 19

1. MTF Diagrams

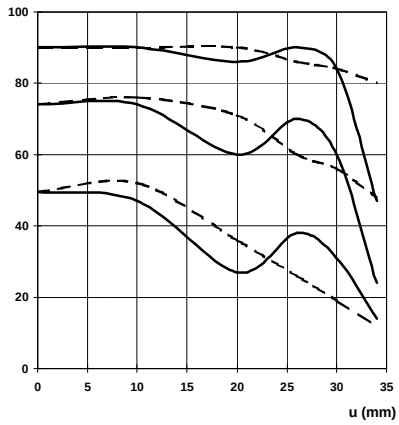
The image height u - calculated from the image center - is entered in mm on the horizontal axis of the graph. The modulation transfer T (MTF = Modulation Transfer Factor) is entered on the vertical axis. Parameters of the graph are the spatial frequencies R in cycles (line pairs) per mm given at the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

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

f-number k = 2
T (%)



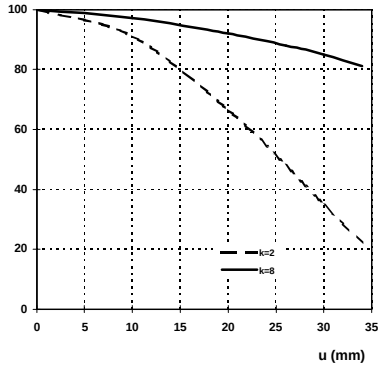
f-number k = 4
T (%)



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.

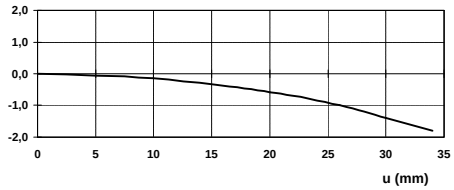
Relative illuminance
E (%)



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.

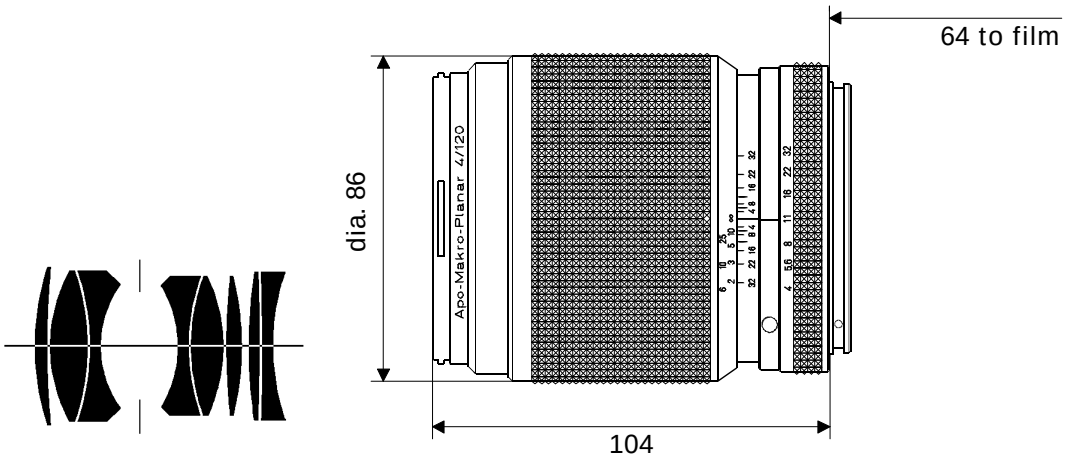
Distortion in % of image height u
V



Subject to change.
Printed in Germany 12.07.2001

Carl Zeiss
Camera Lenses
D-73446 Oberkochen
Telephone ++49-7364-20-6175
Fax ++49-7364-20-4045
eMail: photo@zeiss.de
http://www.zeiss.de/photo

Apo-Makro-Planar® T* 4/120



CONTAX® 645

The Apo-**Makro-Planar**® T* 4/120 lens has been designed with the goal to create a medium format lens of outstanding performance and versatility. It covers subjects from infinity to life size (1:1) without additional accessories. And it uses the latest in optical glass with floating elements (FLE) to keep the performance on top level in the entire focusing range.

The Apo-**Makro-Planar**® T* 4/120 lens even reaches the extreme image quality level of dedicated Carl Zeiss S-**Planar**® high resolution copy lenses at life-size copying tasks, a unique benefit only available with Contax® cameras.

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 infinity to life-size (1:1). It is based on the **Planar**® lens design type, which offers very good close-up potential in the first place and has therefore also been chosen as the basis for the ultra high resolution Carl Zeiss S-**Planar**® lenses for the production of microchips, which are the most sophisticated lenses of our day.

The Apo-**Makro-Planar**® T* 4/120 lens is targeted at the meticulous close-up photographer who is in full control of the technical aspects of his picture taking situation, and who expects uncompromising image quality as reward for his efforts. He is used to do very careful and well thought placement of the focus himself, and he would not use the autofocus on his imaging projects. Considering this need from professional photographers and keen amateurs alike, the Apo-**Makro-Planar**® T* 4/120 lens is equipped with a high quality precision mechanism for smooth manual focusing and no autofocus.

The aperture ranges from f/4 to f/45 for both a bright viewfinder image and adequate control of depth of field in close-up photography. All aperture settings can be used with truly professional photo results, even wide open. This is due to both the inherent qualities of the Carl Zeiss **Planar**® lens design and apochromatic color correction. Considering the outstanding imaging potential of this lens it has been kept remarkably lightweight and compact.

Preferred use: Close-ups of all kind, beauty, flowers and blossoms, nature, products, industrial, subjects with demanding details, documentation

Cat. No. of lens:	**10 78 86**
Number of elements:	8
Number of groups:	5
Max. aperture:	1:4
Focal length:	120.1mm
Negative size:	41.5 x 56mm
Angular field 2w:	32°
Mount:	Contax 645 Mount
Filter connection:	screw-in type, thread M72 x 0.75
Focusing range:	∞ bis M 1:1
Aperture scale:	4 - 5.6 - 8 - 11 - 16 - 22 - 32 - 45
Weight:	approx. 796 g

Entrance pupil*	
Position:	23.2mm behind the first lens vertex
Diameter:	29.9mm
Exit pupil*	
Position:	25.5mm in front of the last lens vertex
Diameter:	29.8mm
Position of principal planes*:	
H:	22.0mm behind the first lens vertex
H':	26.6mm in front of the last lens vertex
Back focal distance*:	93.5mm
Distance between first and last lens vertex*:	51.1mm

* at ∞

Performance data:

Apo-Makro-Planar® T* 4/120

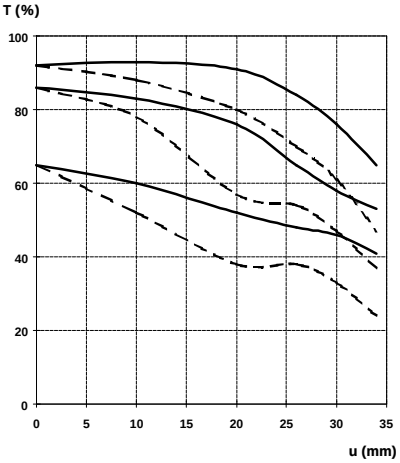
Cat. No. 10 78 86

1. MTF Diagrams

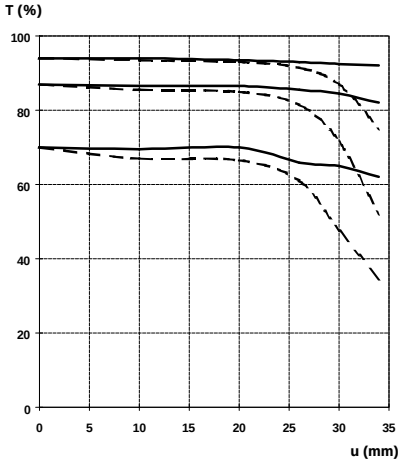
The image height u - calculated from the image center - is entered in mm on the horizontal axis of the graph. The modulation transfer T (MTF = Modulation Transfer Factor) is entered on the vertical axis. Parameters of the graph are the spatial frequencies R in cycles (line pairs) per mm given at the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

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

f-number **k = 4**



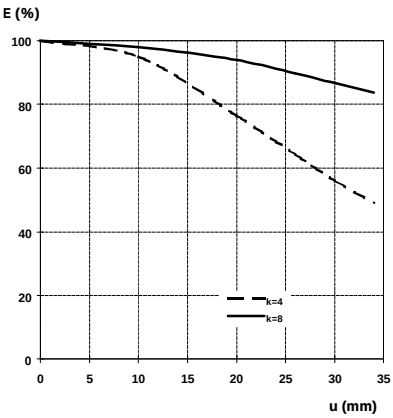
f-number **k = 8**



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.

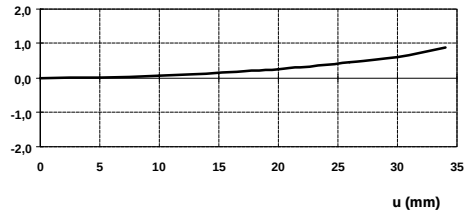
Relative illuminance



3. Distortion

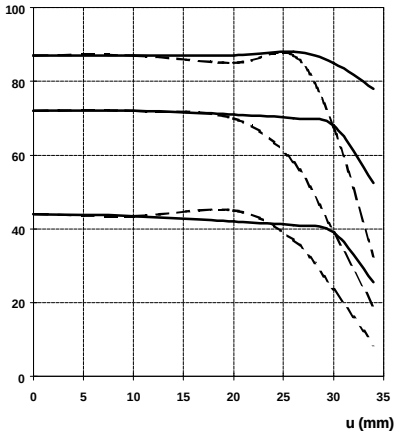
Here again the image height u is entered on the horizontal axis in mm. The vertical axis gives the distortion V in % of the relevant image height. A positive value for V means that the actual image point is further from the image center than with perfectly distortion-free imaging (pincushion distortion);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

Distortion in % of image height u



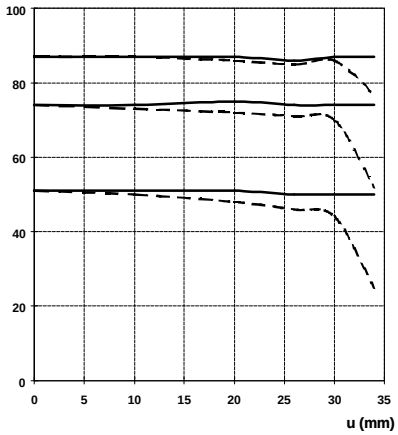
f-number k = 4 M 1:1

T (%)



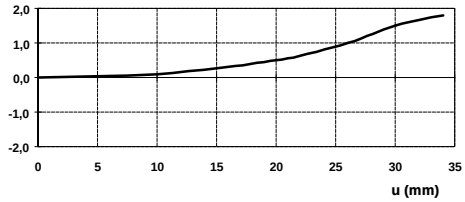
f-number k = 8 M 1:1

T (%)



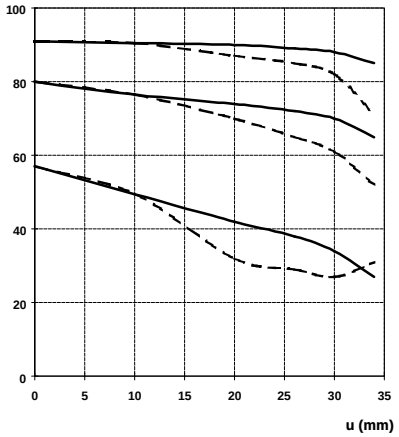
Distortion in % of image height u; M 1:1

V



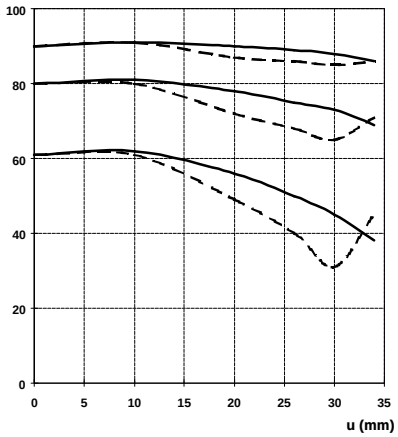
f-number k = 4 M 1:2

T (%)



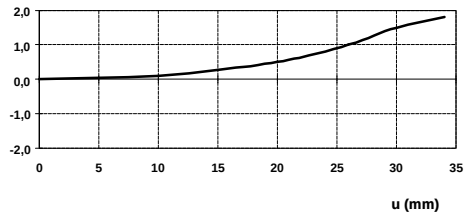
f-number k = 8 M 1:2

T (%)



Distortion in % of image height u; M 1:2

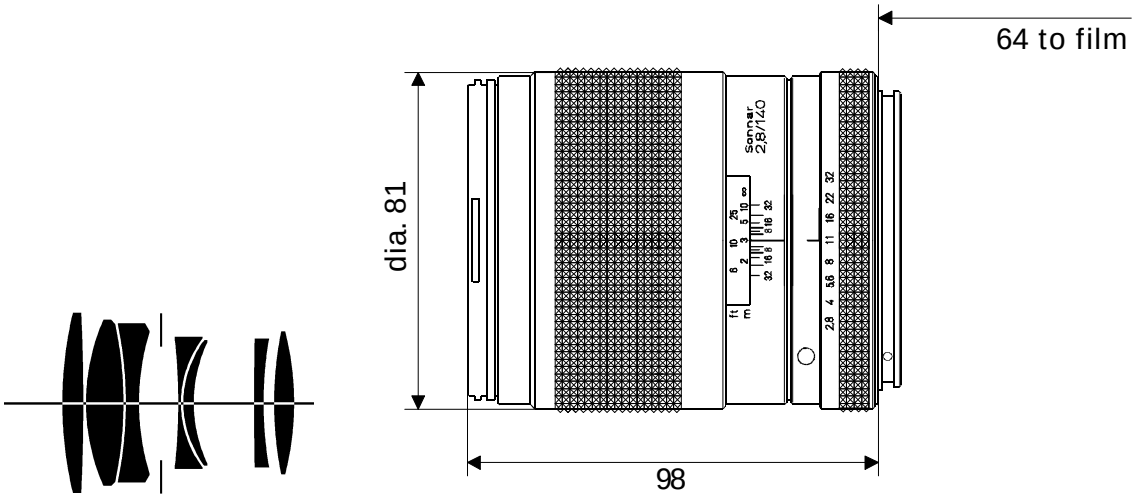
V



Subject to change.
Printed in Germany 09.03.99

Carl Zeiss
Photoobjektive
D-73446 Oberkochen
Telephone (07364) 20-6175
Fax (07364) 20-4045
eMail: photo@zeiss.de
http://www.zeiss.de

Sonnar® T* 2.8/140



CONTAX® 645

At a focal length of twice the format diagonal the **Sonnar**® T***** 2.8/140 lens is the first choice for pleasing head and shoulders portraits of people. Also the **Sonnar**® T***** 2.8/140 lens is a general purpose telephoto lens for handheld shots in travel, sports, fashion, editorial and theatrical photography, to mention just a few. The Contax® 645 autofocus further adds tremendously to the versatility of this lens. Size and weight have been kept low to make it an ideal travel companion on scenic landscape photo assignments and calendar productions. The optical system of the **Sonnar**® T***** 2.8/140 lens was designed using the latest technology, incorporating internal focusing (IF) and the most recent optical glass types.

This results in a telephoto lens with excellent performance. A good tripod is recommended to bring the high image quality of the **Sonnar**® T***** 2.,8/140 lens onto film. The lens can be used with professional results even at full aperture. Image definition is so evenly distributed over the entire frame and the distortion is so well controlled that the **Sonnar**® T***** 2.8/140 lens can deliver professional medium format product shots – and this at a rapid pace and a in cost effective way.
Preferred use: portraits of all kinds, travel, scenic landscapes, beauty, sports, theatrical and stage photography

Cat. No. of lens:	**10 11 38**
Number of elements:	7
Number of groups:	5
Max. aperture:	1:2.8
Focal length:	140.1mm
Negative size:	41.5 x 56mm
Angular field 2w:	28°
Mount:	Contax 645 Mount
Filter connection:	screw-in type, thread M72x0.75
Focusing range:	∞ to 1.3m
Aperture scale:	2.8 - 4 - 5.6 - 8 - 11 - 16 - 22 - 32
Weight:	approx. 688 g

Entrance pupil*:	
Position:	27.3mm behind the first lens vertex
Diameter:	49.3mm
Exit pupil*:	
Position:	44.2mm in front of the last lens vertex
Diameter:	48.6mm
Position of principal planes*:	
H:	23.2mm behind the first lens vertex
H':	48.2mm in front of the last lens vertex
Back focal distance:	91.9mm
Distance between first and last lens vertex:	66.2mm

* at ∞

ZEISS

Performance data:
Sonnar® T* 2.8/140
Cat. No. 10 11 38

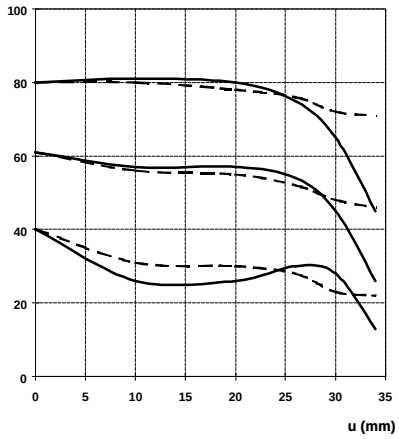
1. MTF Diagrams

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.

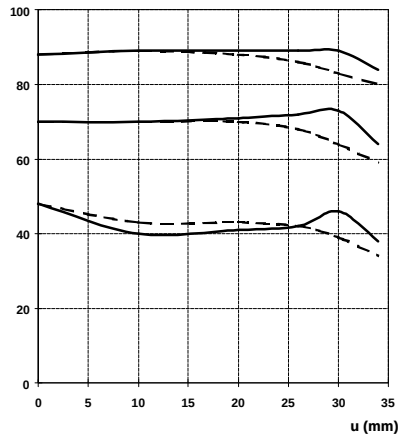
Modulation transfer T as a function of image height u.
White light. Spatial frequencies R = 10, 20 and 40 cycles/mm

Slit orientation: —— sag – – – tan

f-number k = 2,8



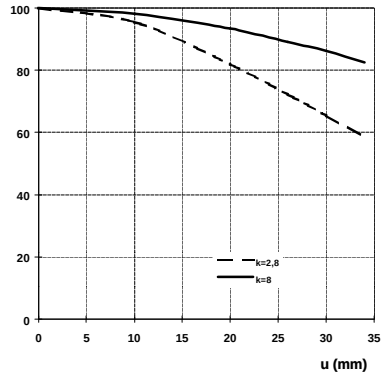
f-number k = 5,6



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.

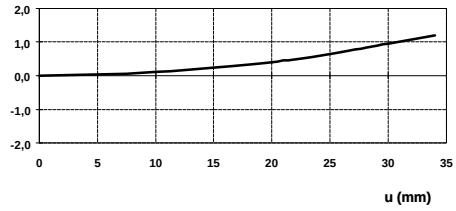
Relative illuminance
E (%)



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.

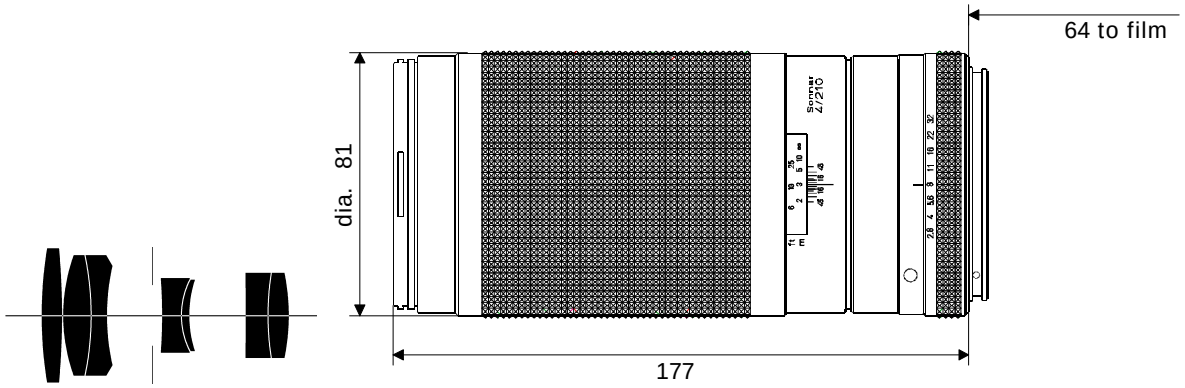
Distortion in % of image height u
V



Subject to change.
Printed in Germany 09.03.99

Carl Zeiss
Photoobjektive
D-73446 Oberkochen
Telephone (07364) 20-6175
Fax (07364) 20-4045
eMail: photo@zeiss.de
http://www.zeiss.de

Sonnar® T* 4/210



CONTAX® 645

The **Sonnar**® T* 4/210 lens is an autofocus telephoto lens similar to a 135 mm lens on a 35 mm Contax® SLR. The optical system was designed using the latest technology, incorporating internal focusing (IF) and the most recent optical glass types. It shows outstanding performance.

The **Sonnar**® T* 4/210 lens can deliver telephoto shots of high quality and perfect corner-to-corner uniformity even at wide open aperture.

This is what fashion photographers need to blur out unwanted background with a shallow depth of field, making their subjects stand out impressively.

Combined with the autofocus of the Contax® 645 the **Sonnar**® T* 4/210 lens brings new possibilities to such fields as fashion and beauty photography, sports celebrities in action, performing artists on stage, musicians in concert, playing kids, pets and the like. The resulting images can be blown up to poster size with significantly better results than a 35 mm photo could deliver.

Preferred use: portraits, kids, pets, animals, fashion, beauty, sports and action

Cat. No. of lens:	**10 11 39**
Number of elements:	7
Number of groups:	4
Max. aperture:	1:4
Focal length:	209.6mm
Negative size:	41.5 x 56mm
Angular field 2w:	19°
Mount:	Contax 645 Mount
Filter connection:	screw-in type, thread M72x0.75
Focusing range:	∞ to 1.4m
Aperture scale:	4 - 5.6 - 8 - 11 - 16 - 22 - 32 - 45
Weight:	approx. 1178 g

Entrance pupil*:	
Position:	61.6mm behind the first lens vertex
Diameter:	51.1mm
Exit pupil*:	
Position:	74.2mm in front of the last lens vertex
Diameter:	47.2mm
Position of principal planes*:	
H:	40.5mm behind the first lens vertex
H':	93.3mm in front of the last lens vertex
Back focal distance:	116.3mm
Distance between first and last lens vertex:	116.3mm

* at ∞

Performance data:

Sonnar® T* 4/210

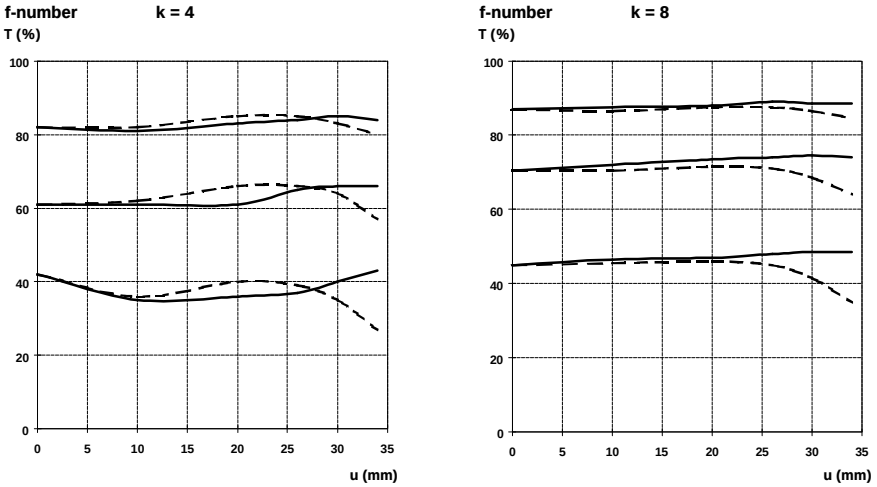
Cat. No. 10 11 39

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.

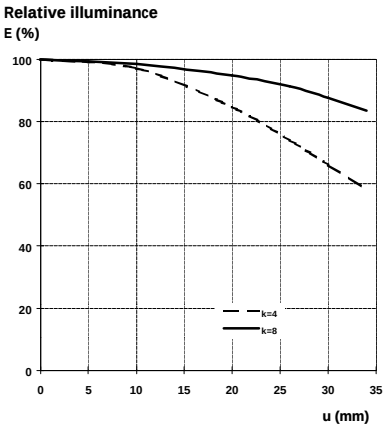
Modulation transfer T as a function of image height u.
White light. Spatial frequencies R = 10, 20 and 40 cycles/mm

Slit orientation: —— sag – – tan



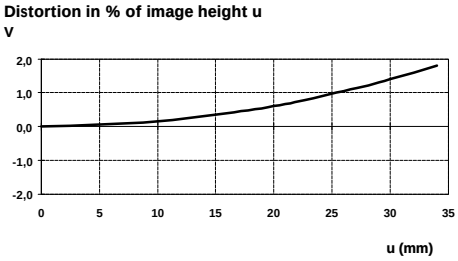
2. Relative illuminance

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

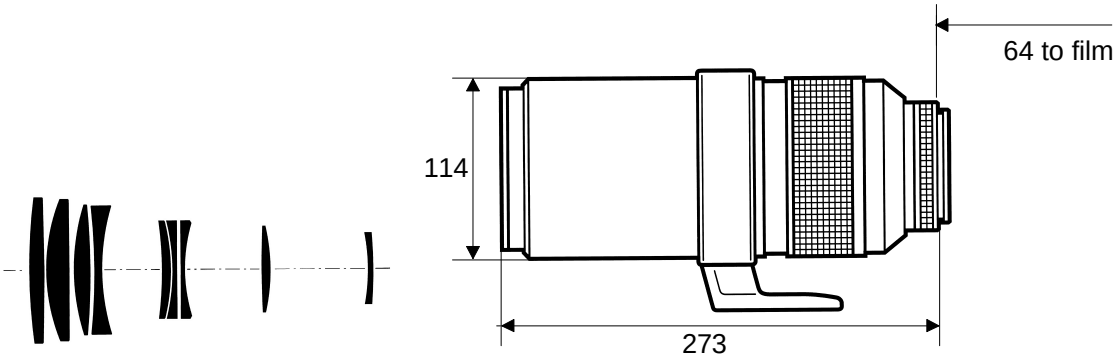
Here again the image height u is entered on the horizontal axis in mm. The vertical axis gives the distortion V in % of the relevant image height. A positive value for V means that the actual image point is further from the image center than with perfectly distortion-free imaging (pincushion distortion);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



Subject to change.
Printed in Germany 09.03.99

Carl Zeiss
Photoobjektive
D-73446 Oberkochen
Telephone (07364) 20-6175
Fax (07364) 20-4045
eMail: photo@zeiss.de
http://www.zeiss.de

Tele-Apotessar® T* 4/350



CONTAX® 645

The Carl Zeiss **Tele-Apotessar®** T* 4/350 lens is specially designed for the Contax 645 medium format autofocus camera system.
Being a highly corrected optical tool for the demanding medium format photographer it incorporates 9 lens elements in 8 groups, several elements being made of fluor crown glass to correct chromatic aberrations exceptionally well. Due to elaborate stray light baffling techniques and specially developed absorptive surface treatments, internal suppression of flare is on an extremely advanced level. Stunningly brilliant photos with true-to-life color rendition and vivid saturation are the result.
The **Tele-Apotessar®** T* 4/350 lens comes with a rotatable tripod collar, and Carl Zeiss recommends to use a good tripod in order to bring the full optical potential of this lens to film. Filter thread is M 95, non-rotating.

Utilizing internal focusing optics and autofocus drive motors in the lens, not in the camera body, the new lens focuses as close as impressive 1.9 meters in front of the film plane, 1.5 meters from the front lens element. This enables the photographer to tightly fill the fame with a child's face at a magnification of 1:4. The level of correction is so high that the lens can be successfully used wide open. So the photographer can use selective focus in a very pronounced way. The **Tele-Apotessar®** T* 4/350 lens comes with the **Mutar®** 1,4x T* converter, building a powerful 5,6/490 mm lens. This optic expands the capabilities of the Contax 645 system considerably.

Preferred use: Action, Fashion, Nature, Wildlife, Editorial

Cat. No. of lens	**10 45 56**
Number of elements	9
Number of groups	8
Max. aperture	f/4
Focal length	349.4 mm
Negative size	41.5 x 56 mm
Angular field*	width 9.1°; height 6.8°; diagonal 2w 11°
Min. aperture	45
Camera mount	Contax 645
Filter connection	M 95 x 1 mm
Focusing range	infinity to 1.9 m
Working distance (between mechanical front end of lens and subject)	1.56 m
Close limit field size	164 mm x 221 mm
Max. scale	1 : 4.0
Entrance pupil*	
Position	293.2 mm behind the first lens vertex
Diameter	86.0 mm
Exit pupil*	
Position	49.1 mm in front of the last lens vertex
Diameter	41.5 mm
Position of principal planes*	
H	86.1 mm in front of the first lens vertex
H'	231.0 mm in front of the last lens vertex
Back focal distance	118.4 mm
Distance between first and last lens vertex	210.9 mm
Weight	3610 g

---

* at infinity

ZEISS

Performance data:

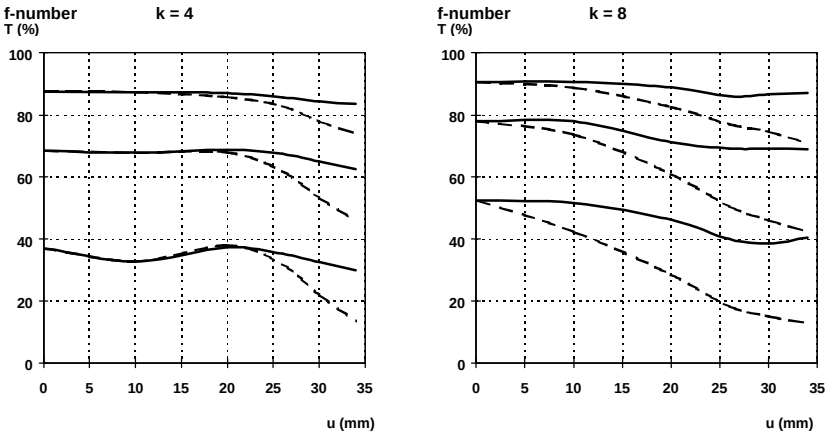
Tele-Apotessar® T* 4/350

Cat. No. 10 45 56

1. MTF Diagrams

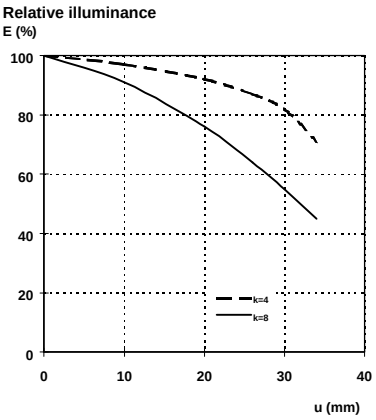
The image height u - calculated from the image center - is entered in mm on the horizontal axis of the graph. The modulation transfer T (MTF = M odulation Transfer Factor) is entered on the vertical axis. Parameters of the graph are the spatial frequencies R in cycles (line pairs) per mm given at the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

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



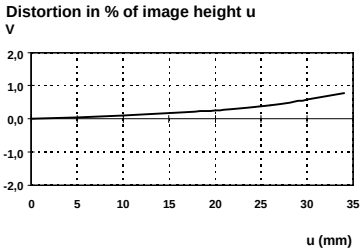
2. Relative illuminance

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

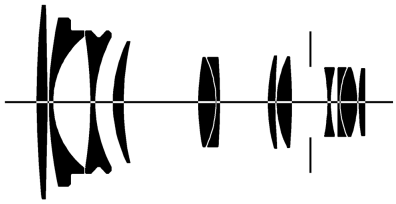
Here again the image height u is entered on the horizontal axis in mm. The vertical axis gives the distortion V in % of the relevant image height. A positive value for V means that the actual image point is further from the image center than with perfectly distortion-free imaging (pincushion distortion);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

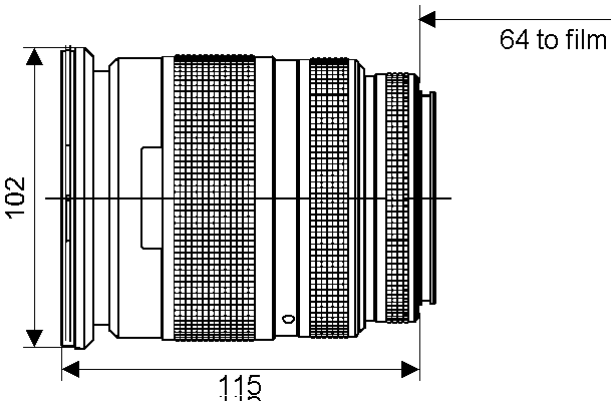


Subject to change.
Printed in Germany 22.08.2000

Carl Zeiss
Photoobjektive
D-73446 Oberkochen
Telephone (07364) 20-6175
Fax (07364) 20-4045
eMail: photo@zeiss.de
http://www.zeiss.de

Vario-Sonnar® T* 4.5/45-90





CONTAX® 645

The Vario-Sonnar® T* 4,5/45-90 lens is an allround autofocus lens for the Contax 645. It is particularly well-suited for demanding photojournalistic work, where prints may be enlarged to poster size with fine details which cannot be reliably captured with 35 mm cameras. Weddings, travel, and industrial photos for annual reports and business presentations are typical tasks of this kind, where medium format has proven to be indispensable. Imaging performance of the Vario-Sonnar® T* 4,5/45-90 lens is on the level of fixed focal length lenses. Both sharpness and brilliance satisfy even high demands, while distortion is very well corrected.

The combination of these characteristics produces an outstanding lens for forensic documentation. Straylight absorbing measures are integrated with great care to enable this multi-element Vario-Sonnar® T* 4,5/45-90 lens to deliver professional quality results even under unfavourable lighting conditions.

Preferred use: demanding photojournalistic work, weddings, travel, street photography, people, industrial and forensic documentation

---

Cat. No. of lens	**10 47 71**
Number of elements	12
Number of groups	10
Max. aperture	f/4.5
Focal length	W = 45.9 mm, T = 87.5 mm
Negative size	41.5 x 56 mm
Angular field 2w*	W = width 63°, height 49°, diagonal 74°
	T = width 36°, height 27°, diagonal 43°
Min. aperture	32
Camera mount	Contax 645
Filter connection	M 95 x 1
Focusing range	infinity to 0.5 m
Working distance (between mechanical front end of lens and subject)	0.32 m
Close limit field size	W = 345 mm x 469 mm
	T = 175 mm x 236 mm
Max. scale	W = 1 : 8.1
	T = 1 : 4.2

Entrance pupil*	
Position	W = 39.1 mm behind the first lens vertex
	T = 31.1 mm behind the first lens vertex
Diameter	W = 10.2 mm
	T = 18.6 mm
Exit pupil*	
Position	W = 16.4 mm in front of the last lens vertex
	T = 16.4 mm in front of the last lens vertex
Diameter	W = 17.2 mm
	T = 24.7 mm
Position of principal planes*	
H	W = 57.6 mm behind the first lens vertex
	T = 52.5 mm behind the first lens vertex
H'	W = 14.7 mm behind the last lens vertex
	T = 11.5 mm behind the last lens vertex
Back focal distance	W = 60.7 mm
	T = 99.0 mm
Distance between first and last lens vertex*	W = 111.3 mm
	T = 76.1 mm
Weight	1140 g

---

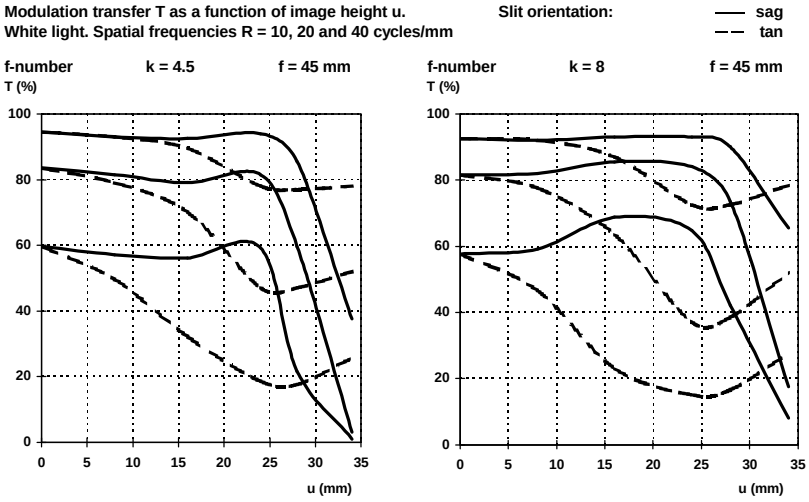
* at infinity

ZEISS

Performance data:
Vario-Sonnar® T* 4.5/45-90
Cat. No. 10 47 71

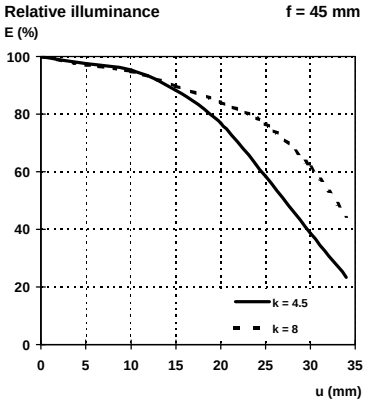
1. MTF Diagrams

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.



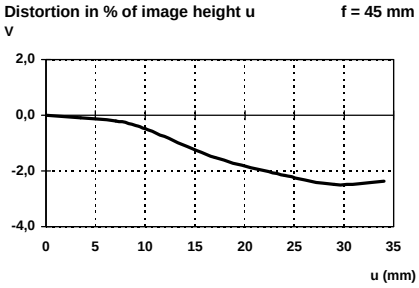
2. Relative illuminance

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.



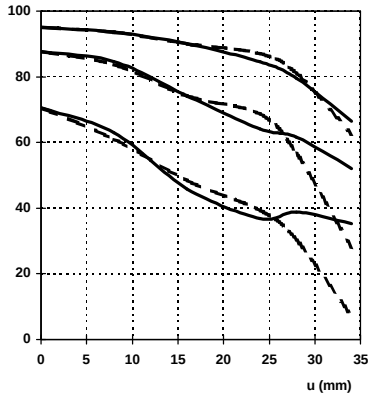
Performance data:

Vario-Sonnar® T* 4.5/45-90

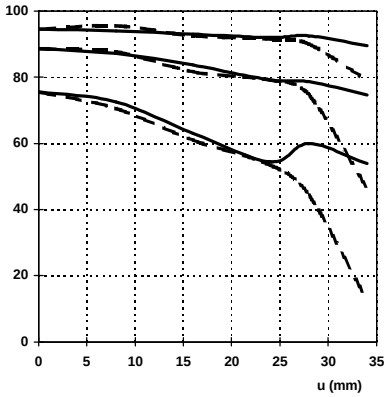
Cat. No. 10 47 71

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

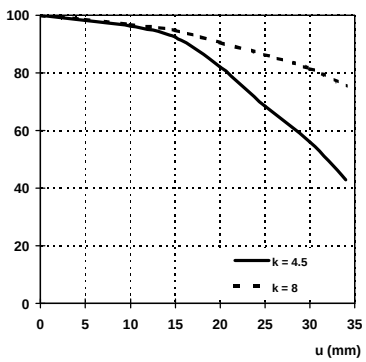
f-number **k = 4.5** **f = 70 mm**



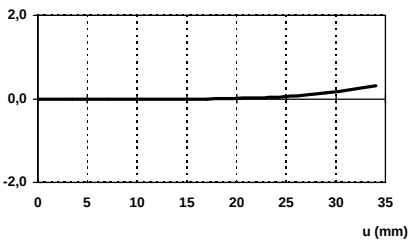
f-number **k = 8** **f = 70 mm**



Relative illuminance **f = 70 mm**



Distortion in % of image height u **f = 70 mm**



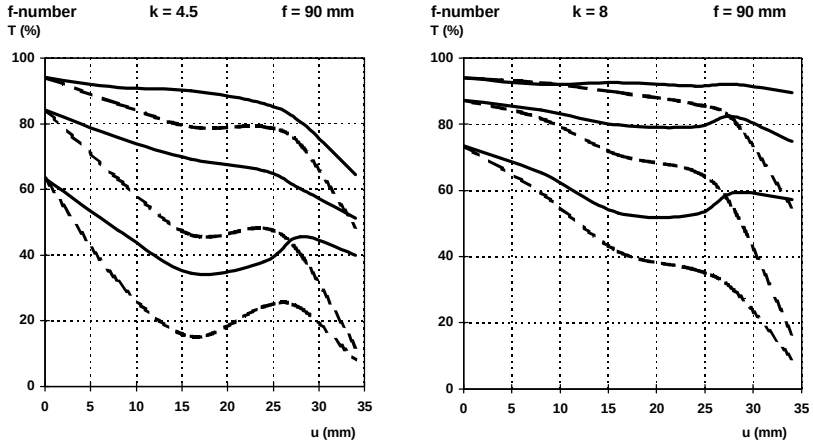
Performance data:

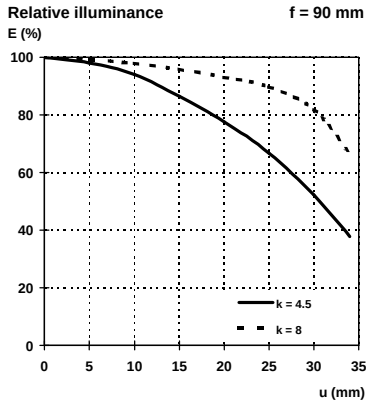
Vario-Sonnar® T* 4.5/45-90

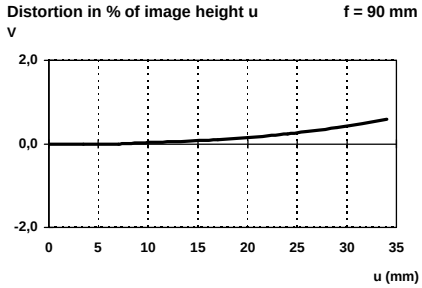
Cat. No. 10 47 71

Modulation transfer T as a function of image height u. **Slit orientation:** —— sag – – tan

White light. Spatial frequencies R = 10, 20 and 40 cycles/mm





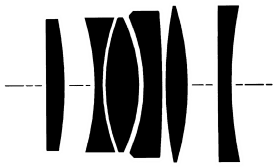


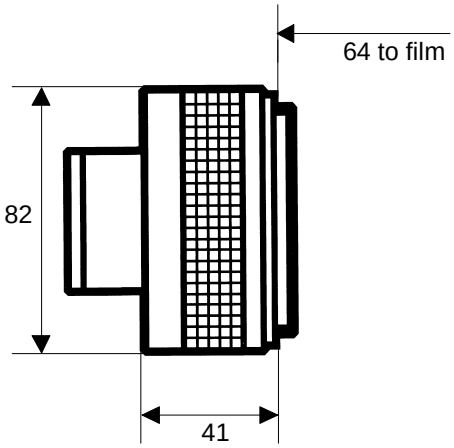
Subject to change.

Printed in Germany 09.09.2002

Carl Zeiss
Camera Lens Division
73446 Oberkochen
Germany
Telephone ++49-7364-20-6175
Fax ++49-7364-20-4045
eMail: photo@zeiss.de
http://www.zeiss.de/photo

Mutar® 1.4x T*





CONTAX® 645

The Carl Zeiss **Mutar**® 1.4 x T* converter is specifically designed to build a high-quality combination with the **Tele-Apotessar**® T* 4/350 lens and incorporates 6 lens elements in 5 groups. Also, it works very well with the other telephoto lenses in the Contax 645 system, the **Sonnar**® T* 2,8/140 and the **Sonnar**® T* 4/210. Due to its protruding front element, which enables favourable performance with telephoto lenses, the **Mutar**® 1.4 x T* converter cannot be used with the non-telephoto lenses in the system because collision of lens surfaces would occur. Stray light absorption and image brilliance are excellent. The **Mutar**® 1.4 x T* converter for Contax 645 is included with the **Tele-Apotessar**® T* 4/350, building a powerful 5,6/490 mm telephoto lens.
It is also available as separate item.

Cat. No. of lens	**10 43 46**
Number of elements	6
Number of groups	5
Max. aperture	Reduction of lens aperture set by a factor 1.4.
Increase in focal length	1.4x
Negative size	41.5 x 56 mm
Camera mount	Contax 645
Focusing range	No major changes. See lens used.
Distance between first and last lens vertex	56.2 mm
Weight	510 g

Subject to change.
Printed in Germany 22.08.2000

Carl Zeiss
Photoobjektive
D-73446 Oberkochen
Telephone (07364) 20-6175
Fax (07364) 20-4045
eMail: photo@zeiss.de
http://www.zeiss.de