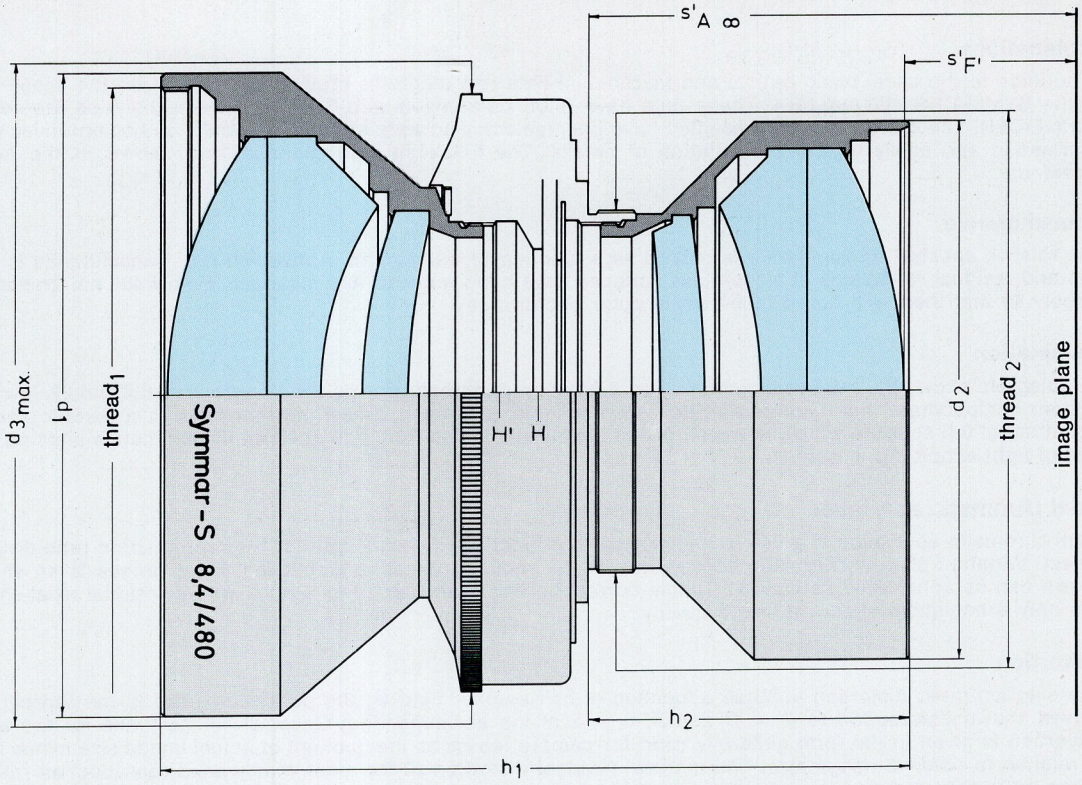
DATA SHEET: SYMMAR-S 8,4/480

The SYMMAR-S – with its 6-element, 4-group construction – is the latest development of the world-famous Symmar. The carefully balanced performance, improved image quality, introduction of multicoating and adaptation of mechanical mount and design to today's challenging demands characterize the SYMMAR-S as the superior taking lens for the professional photographer.

SYMMAR-S lenses are made by SCHNEIDER in focal lengths of 100, 135, 150, 180, 210, 240, 300, 360 and 480 mm for various large formats. Data sheets for these lenses will be mailed on request.

SCHNEIDER OPTIK KREUZNACH

JOS. SCHNEIDER GmbH & CO. OPTISCHE WERKE D-6550 BAD KREUZNACH 0671/6011 947 042800



OPTICAL DATA

(Notation and signs conforming to DIN 1335 and DIN 4522)

Focal length	f'	470.4	mm
Maximum aperture	k	64	
Minimum aperture	k	8.4	
Half angular field at minimum aperture	w	21.5°	
Half angular field at f/22 and smaller	w	28°	
Field size at minimum aperture		370.2	mm
Field size at f/22 and smaller		500.0	mm
Back focal distance	$s'_{F'}$	400.8	mm
Front nodal-point distance	s_H	62.3	mm
Rear nodal-point distance	$s'_{H'}$	– 69.6	mm
Nodal-point separation	HH'	– 5.5	mm
Overall length of optical system	Σd	126.4	mm
Distance from entrance pupil to front vertex	s_{EP}	69.9	mm
Distance from exit pupil to rear vertex	s'_{AP}	– 62.1	mm
Image scale of pupil	β'_P	0.98	mm

MECHANICAL DIMENSIONS

Front mount diameter	d_1	110 mm
Filter screw thread	$thread_1$	M 105 x 1
Rear mount diamter	d_2	92 mm
Screw thread	$thread_2$	M 62x0.75
Overall mechanical length	h_1	128.1 mm
Seating face to rear edge of mount:		
Copal 3	h_2	55.0 mm
Compur 3	h_2	55.0 mm
NK 3	h_2	55.0 mm
Compur elec. 3	h_2	55.0 mm
Compur elec. 5	h_2	53.5 mm
Flange focal distance: *)	$s'_A \infty$	455.2 mm
SCHNEIDER gelatin filter holder **)		Size III
Adapter		Size IIId

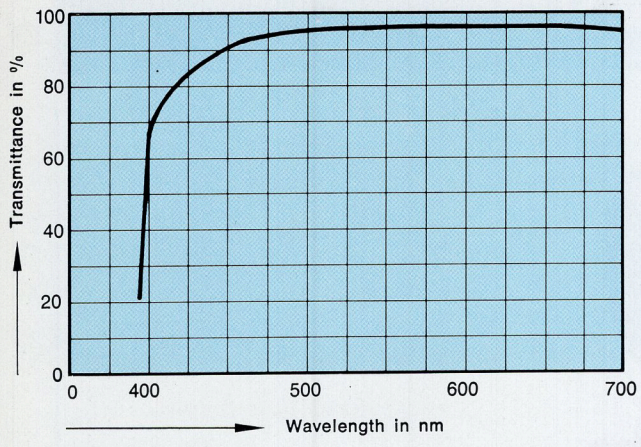
*) Further measurements see page 4

**) Technical data upon request

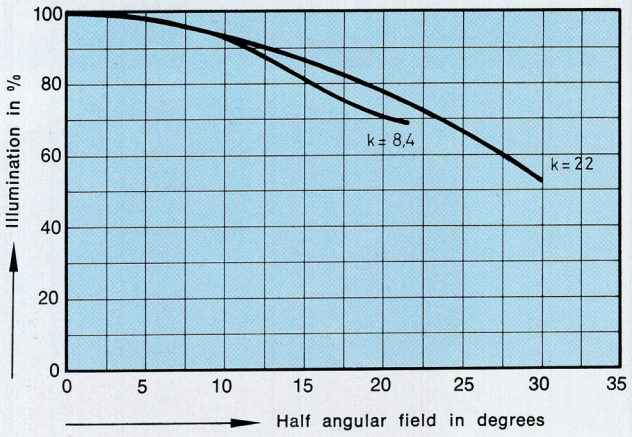
Admissible lens motion in mm at f/22, focused at infinity

Nominal negative size	Actual size	Image diagonal	Movement in relation to frame vertically	horizontally	diagonally
13 x 18 cm²	122 x 171 mm²	210.1 mm	174 mm	157 mm	145 mm
18 x 24 cm²	171 x 231 mm²	287.4 mm	136 mm	119 mm	106 mm
24 x 30 cm²	230 x 290 mm²	370.2 mm	88 mm	77 mm	65 mm
30 x 40 cm²	300 x 400 mm²	500.0 mm	0 mm	0 mm	0 mm
5" x 7"	121 x 170 mm²	208.7 mm	174 mm	157 mm	146 mm
8" x 10"	194 x 245 mm²	312.5 mm	121 mm	108 mm	94 mm
10" x 12"	245 x 295 mm²	383.5 mm	79 mm	70 mm	58 mm

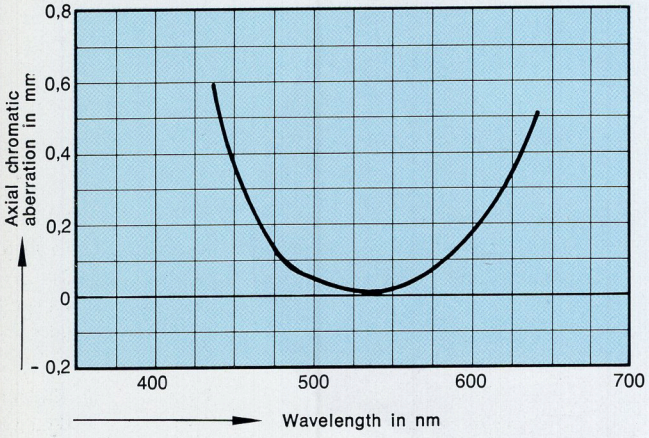
Transmittance



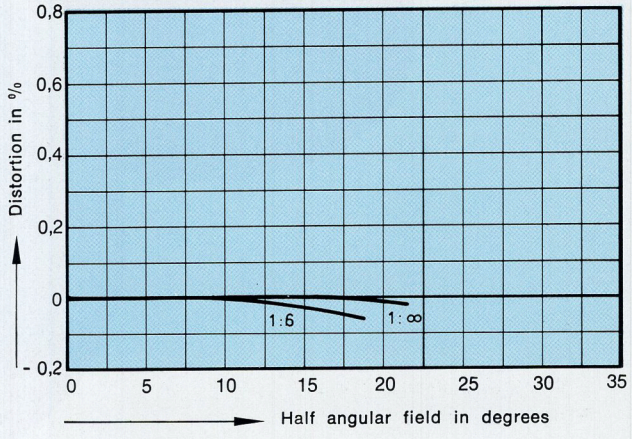
Illumination



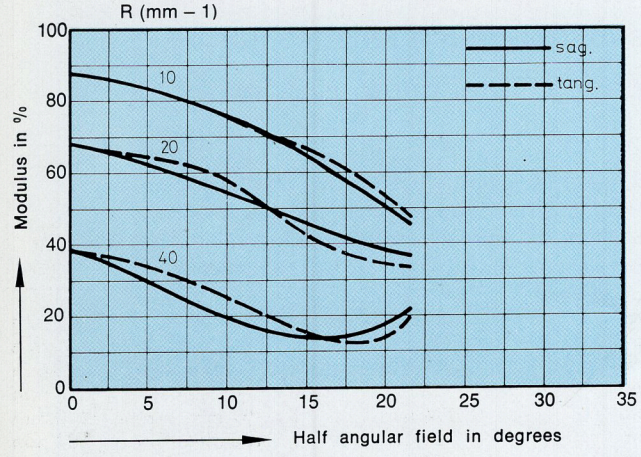
Axial chromatic aberration



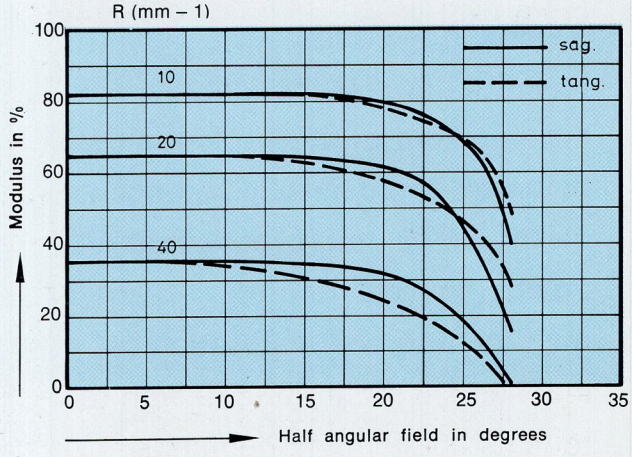
Distortion



MTF for $k = 8,4$



MTF for $k = 22$



Explanations

In addition to the usual basic optical and mechanical data, the diagrams provide information on the image-forming properties of the SYMMAR-S 480 mm f/8.4. These data have been determined with the aid of the techniques developed and tested by SCHNEIDER. The characteristics presented have been selected so as to obtain a well-balanced compromise between necessary information and easily legible presentation of details. The following characteristics are shown in the additional diagrams provided:

Transmittance

The relative spectral transmittance is plotted as a function of wavelength. Above 400 nm, transmittance is very high; absorption and residual reflections at air-to-glass surfaces have been reduced to a minimum. Below 400 nm, transmittance decreases steeply so that there will be no blue cast in color photography.

Illumination

The diagram shows the relative illumination as a function of half angular field w at apertures 8.4 and 22. In order to achieve the desired compactness, the diameters of the lens elements have been chosen so that there is a certain amount of mechanical vignetting at full aperture which, however, is completely eliminated from f/16 at which illumination is affected only by the natural loss of light according to $\cos^4 w$.

Axial chromatic aberration

Axial chromatic aberration is given in millimeters as a function of wavelength for the reproduction ratio $\beta' = O$ and an infinite object. Variation of axial chromatic aberration with the shooting distance within the usual ranges is so slight that the curve shown can be considered as typical. Optical correction has been carried to a point where residual axial chromatic aberration has only a negligible effect on image quality.

Distortion

The diagram gives distortion in % as a function of half angular field w; the parameter used is the reproduction ratio β'; the curves shown correspond to $\beta' = O$ and $\beta' = -1/6$ at the corresponding Gaussian image plane for the wavelength 546 nm. Distortion is given in the form generally used for camera lenses as the quotient of actual image size minus nominal image size in relation to nominal image size. The minimal residual distortion at the most widely used reproduction ratios can in extreme cases be further reduced by selecting a suitable focusing plane.

MTF for k = 8.4

The diagram shows the MTF as a function of half angular field w for spatial frequencies of 10, 20 and 40 mm^{-1} (line pairs per millimeter) at f/8.4; according to the present state of the art, this is a suitable representation of optical performance. It fully covers the range of spatial frequencies that is essential for image formation. The selection of the image plane as the plane of maximum MTF for spatial frequencies around 25 to 30 mm^{-1} in the center makes full allowance for practical requirements where optimum focusing is obtained on the ground glass with the aid of a magnifier. Spectral weighting makes suitable allowance for the different types of light and film speeds.

MTF for k = 22

This diagram shows the MTF for f/22, the half angular field being extended to 28°. At f/22, the MTF over the major part of the angular field is determined only by diffraction and not by residual aberrations. A comparison between the two MTF diagrams reveals the MTF data for apertures between f/8.4 and f/22 and thus allows fairly accurate assessment of optical performance under different conditions.

Versions available

Type	Flange focal distance $s'_A \infty$ (mm)	Screw thread $thread_2$	Maximum lens diameter (mm) Shutter d_{3max}	Barrel d_{3max}	Mount d_1	Weight in grams	Cat. No.
SCHNEIDER barrel 3*	455.2	M 62 x 0.75		78.0	110.0	1456	10 747
Shutters:							
Copal 3	455.2	M 62 x 0.75	102.0		110.0	1667	10 738
Compur 3*	455.2	M 62 x 0.75	96.2		110.0	1694	10 741
Compur elec. 3*	455.2	M 62 x 0.75	96.2		110.0	1706	10 742
Compur elec. 5	453.7	M 92 x 0.75	130 x 158		110.0	2036	10 739

* Minimum aperture $K = 9.4$

All dimensions refer to the connecting faces of the corresponding lens version. The lenses are available with different mount configurations and accessories. Details will be supplied on request.

The above data have been determined by the techniques developed and tested by SCHNEIDER and respresent the state of the art at the time of going to press. We reserve the right to introduce modifications reflecting continual improvement of our products. The data applying in each particular case should therefore be taken from our quotations.

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