

Line Scan Lens

XENON-SAPPHIRE 3.5/96, beta' = -0.35

This high-resolution, high-speed lens is optimized for the use with 16k pixel line scan sensors. It is broadband coated and can be used in the range of 400 – 1000 nm.

The V-mount makes it easy to install and rotate into the desired azimuth position for a wide range of high resolution applications.

The XENON Sapphire 3.5/96 provides three significant stop positions that are especially marked on the stop ring:

- F#3.5 is the maximum opening of the stop and provides maximum brightness. The mechanical vignetting at this F/number is approx. 15% at the edge of the field. The MTF for 100 lp/mm is very high up to the edge of a 58 mm field. Due to the high aperture the lens is more sensitive with respect to change of magnification.
- F#4.4 shows maximum MTF and practically diffraction limited performance over the whole field. The depth of field is bigger but the lens is still sensitive to magnification changes. At F#4.4 the lens is free of artificial vignetting.
- F#5.2 produces more diffraction which reduces the MTF slightly but is now extremely homogenous over the entire field. The lens shows this performance for the complete magnification range from $-0.37 < \beta' < -0.325$ and performs well for a magnification range of $-0.39 < \beta' < -0.30$ at a 16k performance of 100 lp/mm.



XENON-SAPPHIRE lens

Key Features

- for 16k line scan cameras (57.3mm length / pixel sizes 3.5µm)
- for 12k line scan cameras (62mm length / pixel sizes appr. 5µm)
- High resolution optics 400 - 1000 nm
- Robust mechanics for industrial environment
- Vibration insensitive
- Focus and iris setting lockable

Applications

- High-resolution 16k line scan applications
- 12k TDI inspection
- Machine Vision and other imaging applications with high throughput
- Flat panel inspection
- Quality control

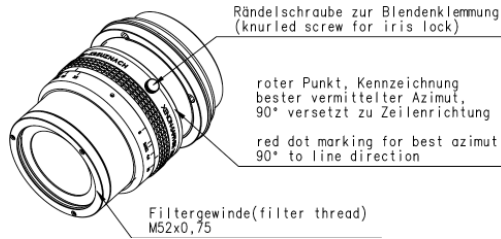
Technical Specifications	XENON-SAPPHIRE 3,5/96-0001
F# range	3.5 - 8
Focal length	95.5 mm
Image circle	62.5 mm
Beta'	-0.35 (-0.30 ... -0.39)
Object to image distance	488 (529 ... 464) mm
Transmission	400 -1000 nm
Interface	Schneider V-mount 70
Weight	755 gr.
Code no.	1068012

Accessories

Adapter V70 / M72 x 0.75	10 mm	Code no. # 1072419
Extension tube 5 mm		# 1072420
Extension tube 10 mm		# 1072421
Extension tube 25 mm		# 26406
Extension tube 50 mm		# 1054733

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Pyramid Imaging



XENON SAPPHIRE 3.5/96

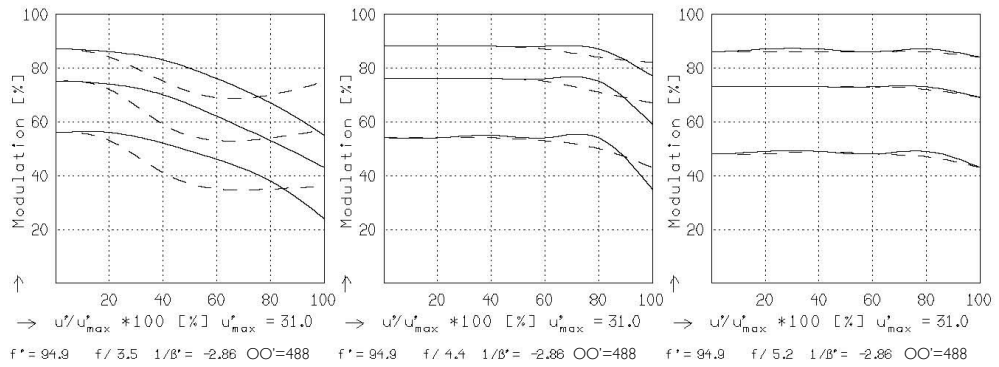
$f' =$	95.5 mm	$\beta'_P =$	1.01
$s_F =$	-49.85 mm	$s_{EP} =$	44.43 mm
$s'_F =$	52.31 mm	$s'_{AP} =$	-44.43 mm
$HH' =$	-9.10 mm	$\Sigma d =$	79.74 mm

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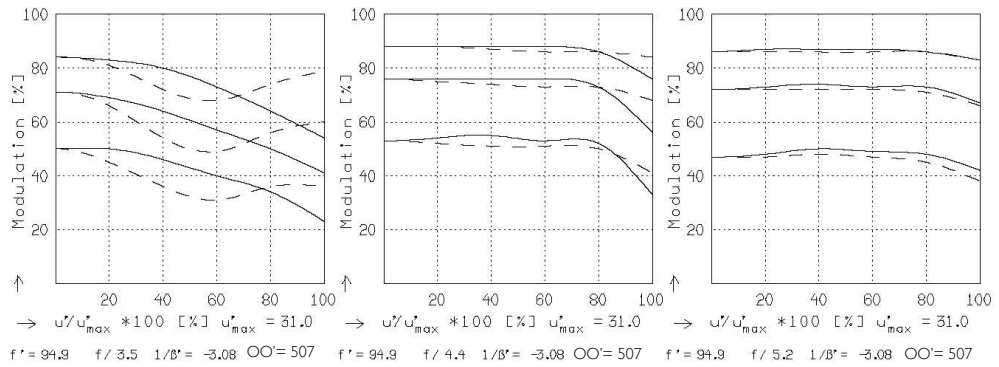
MODULATION with reference to the relative image height

Wavelength λ	[nm] :	525	675	625	575	475	425
Spectral weighting	[%] :	26.5	6.4	24.2	27.8	13.6	1.5
Spatial frequency R	[1/mm] :	25	50	100			
Image- \emptyset f / 3.5	[mm] :	62.0					
Image- \emptyset f / 5.2	[mm] :	62.0					

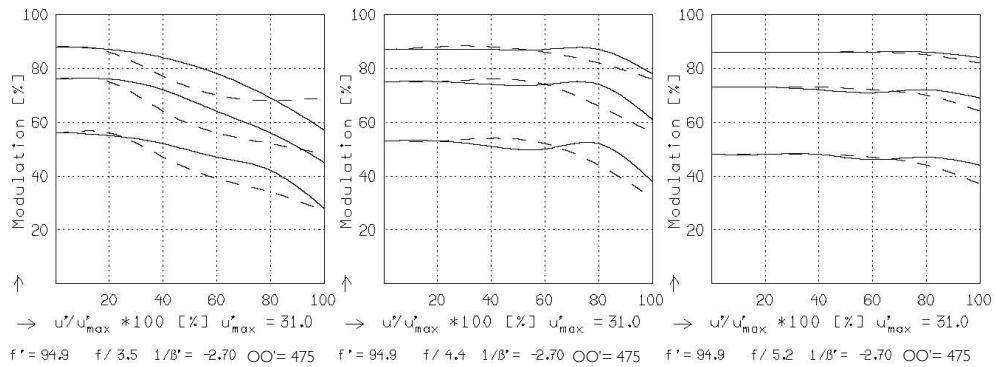
$\beta' = -0.35$



$\beta' = -0.325$

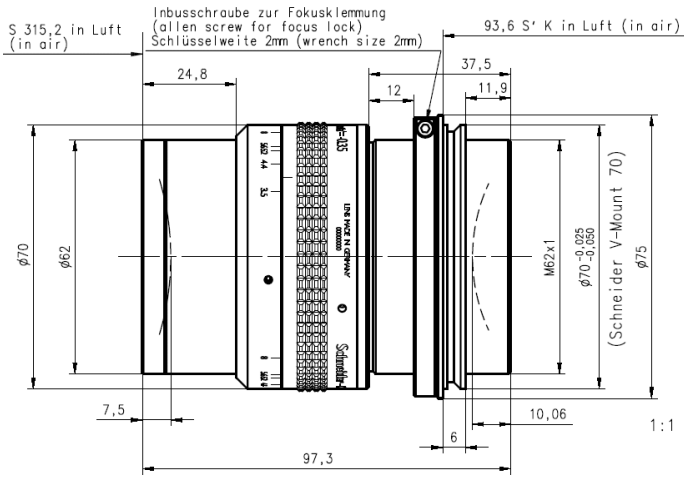


$\beta' = -0.37$



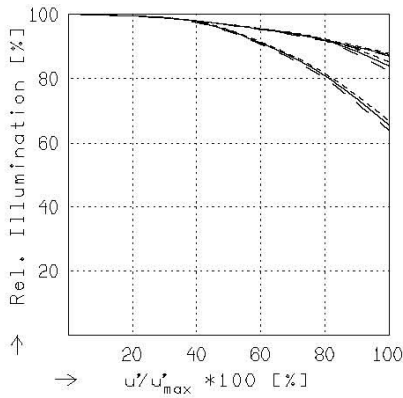
Focusing : MTF_{max} at f / 4.5 , R = 50 1/mm, $u'/u'_{max} = 0$

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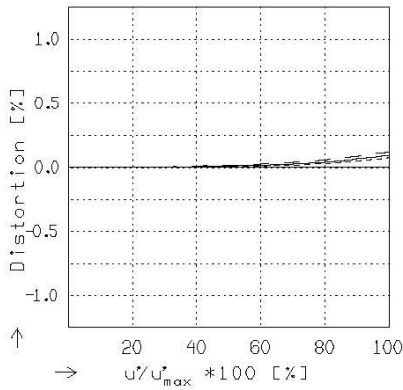
$f = 95.5 \text{ mm}$	$\beta'_P = 1.01$
$s_F = -49.85 \text{ mm}$	$s_{EP} = 44.43 \text{ mm}$
$s'_F = 52.31 \text{ mm}$	$s'_{AP} = -44.43 \text{ mm}$
$HH' = -9.10 \text{ mm}$	$\Sigma d = 79.74 \text{ mm}$



RELATIVE ILLUMINATION

The relative illumination is shown for the given focal distances or magnifications.

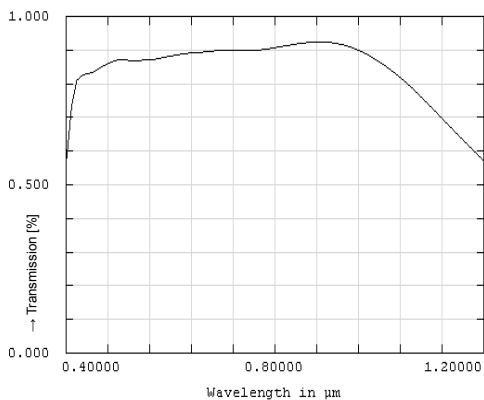
$f / 3.5$	$f / 4.4$	$f / 5.2$
— $\beta' = -0.3500$	$u_{max}^* = 31.0$	$OO' = 488$
- - $\beta' = -0.3250$	$u_{max}^* = 31.0$	$OO' = 507$
--- $\beta' = -0.3700$	$u_{max}^* = 31.0$	$OO' = 475$



DISTORTION

Distortion is shown for the given focal distances or magnifications. Positive values indicate pincushion distortion and negative values barrel distortion.

— $\beta' = -0.3500$	$u_{max}^* = 31.0$	$OO' = 488$
- - $\beta' = -0.3250$	$u_{max}^* = 31.0$	$OO' = 507$
--- $\beta' = -0.3700$	$u_{max}^* = 31.0$	$OO' = 475$



TRANSMITTANCE

Relative spectral transmittance is shown with reference to wavelength.



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