

Line Scan Lens

XENON-SAPPHIRE 3.7/96, beta' = -0.29

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 3.7/96 provides three significant stop positions that are especially marked on the stop ring:

- F#3.7 is the maximum opening of the stop and provides maximum brightness. The mechanical vignetting at this F/number is only 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.
- F#5.4 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 $-0.315 < \beta' < -0.27$ and performs well for a magnification range of $-0.33 < \beta' < -0.255$ 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 (62.5mm 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, etc.

Technical Specifications

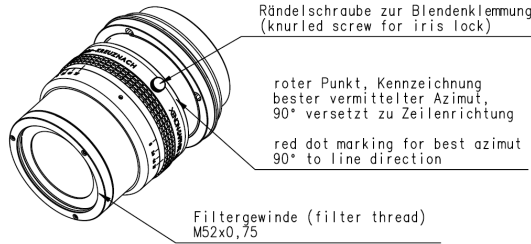
XENON-SAPPHIRE 3.7/96

F/stop range	3.7 - 8
Focal length	95.5 mm
Image circle	62.5 mm
Beta'	-0.29 (-0.255 ... -0.33)
Object to image distance	539 (581 ... 503)mm
Transmission	400 -1000 nm
Interface	Schneider V-mount 70
Weight	ca. 700 gr.
Code no.	1071818

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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$f = 95,5 \text{ mm}$	$B'_P = 1,05$
$s_F = -48,02 \text{ mm}$	$s_{EP} = 43,32 \text{ mm}$
$s'_F = 53,65 \text{ mm}$	$s'_{AP} = -46,24 \text{ mm}$
$HH' = -9,28 \text{ mm}$	$\Sigma d = 80,09 \text{ mm}$

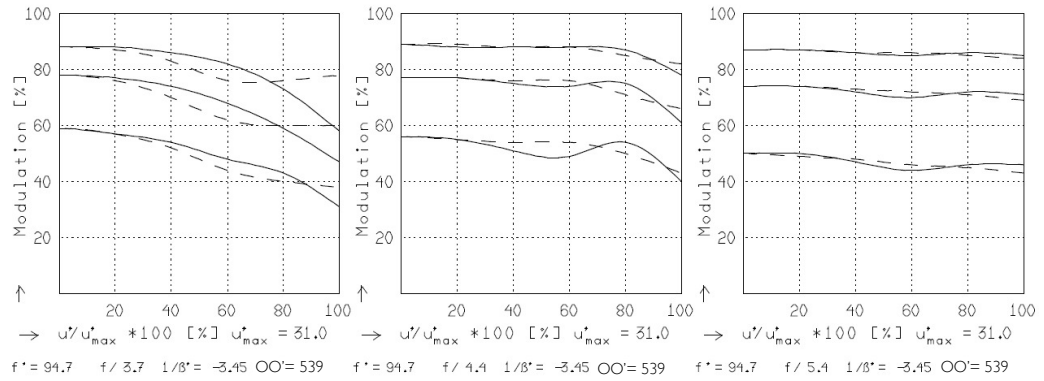
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MODULATION with reference to the relative image height

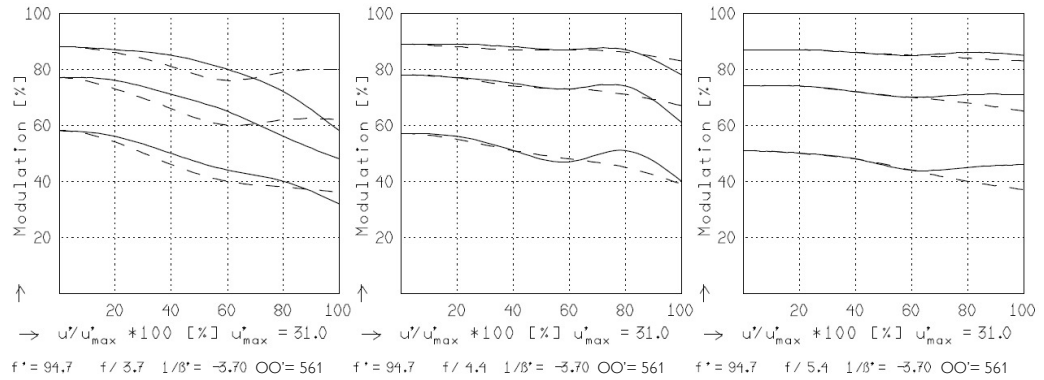
Wavelength λ [nm] :	525	675	625	575	475	425
Spectral weighting [%] :	26.5	6.4	24.2	27.8	13.6	1.5
Spatial frequency R [1/mm] :	25	50	100			
Image- \emptyset $f / 3.7$ [mm] :	62.0					
Image- \emptyset $f / 5.4$ [mm] :	62.0					

radial —
tangential - -

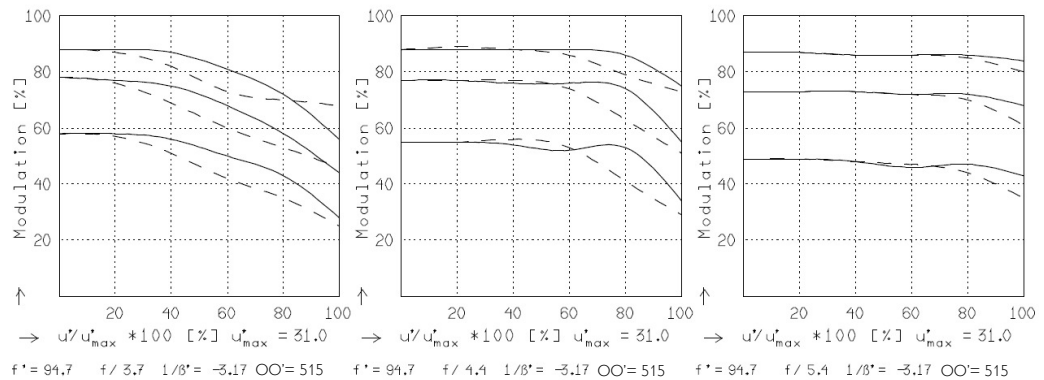
$B' = -0.29$



$B' = -0.27$



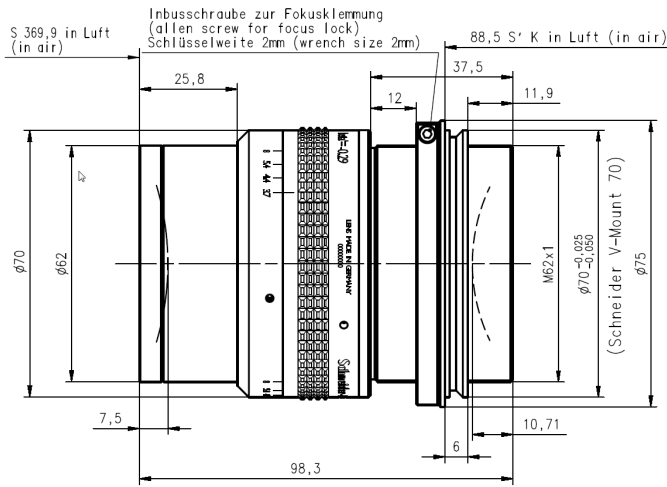
$B' = -0.315$



Focusing : MTF_{max} at $f / 4.4$, $R = 50$ 1/mm. $u'/u'_{max} = 0$

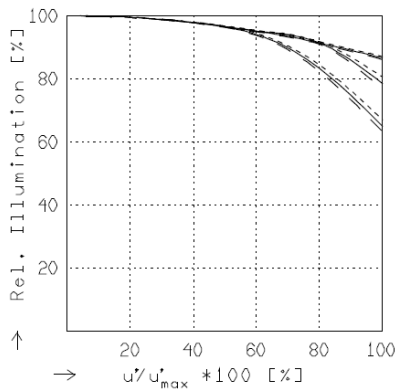
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Pyramid Imaging



XENON SAPPHIRE 3.7/96

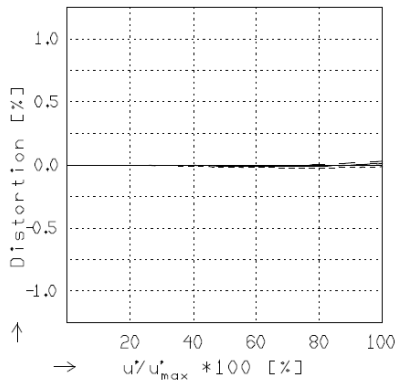
$f' = 95,5 \text{ mm}$	$\beta'_P = 1,05$
$s'_F = -48,02 \text{ mm}$	$s_{EP} = 43,32 \text{ mm}$
$s'_{F'} = 53,65 \text{ mm}$	$s'_{AP} = -46,24 \text{ mm}$
$HH' = -9,28 \text{ mm}$	$\Sigma d = 80,09 \text{ mm}$



RELATIVE ILLUMINATION

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

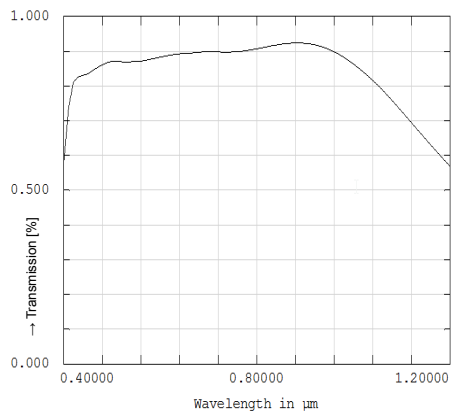
	$f / 3.7$	$f / 4.4$	$f / 5.4$
— $\beta' = -0.2900$	$u'_{max} = 31.0$	$OO' = 539$	
- - $\beta' = -0.2700$	$u'_{max} = 31.0$	$OO' = 561$	
- - - $\beta' = -0.3150$	$u'_{max} = 31.0$	$OO' = 515$	



DISTORTION

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

— $\beta' = -0.2900$	$u'_{max} = 31.0$	$OO' = 539$
- - $\beta' = -0.2700$	$u'_{max} = 31.0$	$OO' = 561$
- - - $\beta' = -0.3150$	$u'_{max} = 31.0$	$OO' = 515$



TRANSMITTANCE

Relative spectral transmittance is shown with reference to wavelength.



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