

# 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 3.5 $\mu$ m)
- for 12k line scan cameras (62.5mm length / pixel sizes appr. 5 $\mu$ m)
- 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

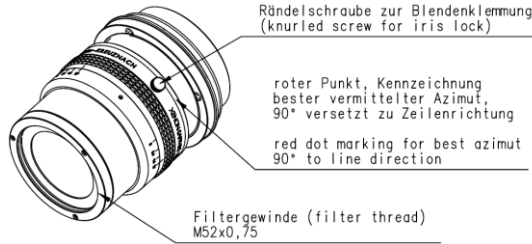
#### XENON-SAPPHIRE 3.7/96

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

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

# XENON-SAPPHIRE 3.7/96



## XENON SAPPHIRE 3.7/96

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

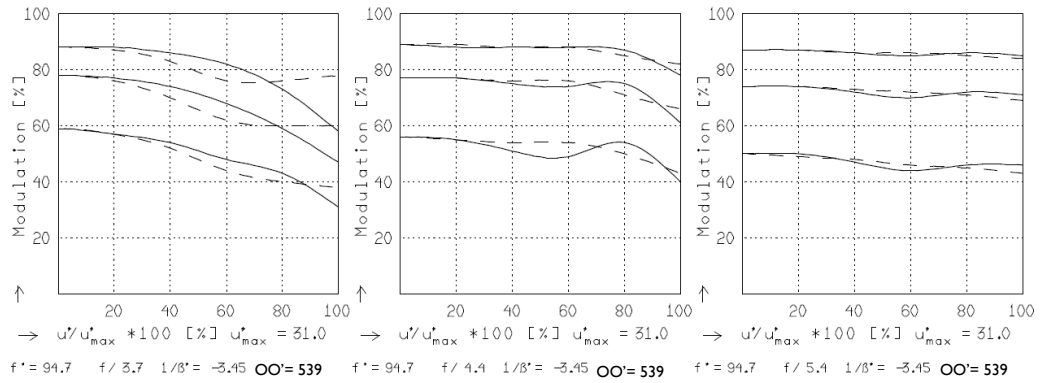
### XENON SAPPHIRE 3.7/96

MODULATION with reference to the relative image height

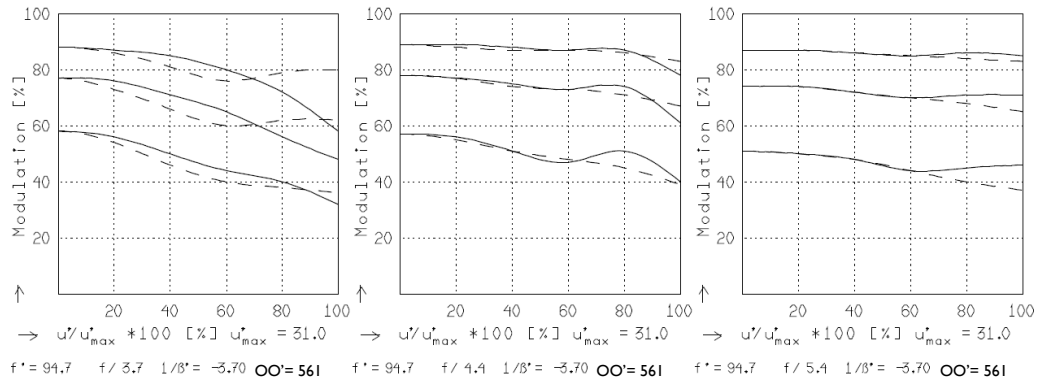
Wavelength $\lambda$ [nm] :	525	675	625	575	475	425
Spectral weighting [%] :	26.5	6.4	24.2	27.8	13.6	1.5
Spatial frequency $R$ [1/mm] :	25	50	100			
Image- $\emptyset$ $f / 3.7$ [mm] :	62.0					
Image- $\emptyset$ $f / 5.4$ [mm] :	62.0					

radial —  
tangential - -

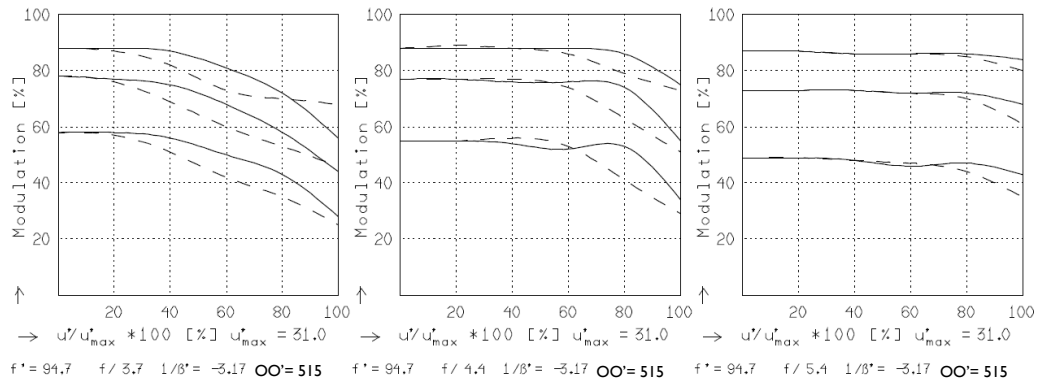
$\beta' = -0.29$



$\beta' = -0.27$

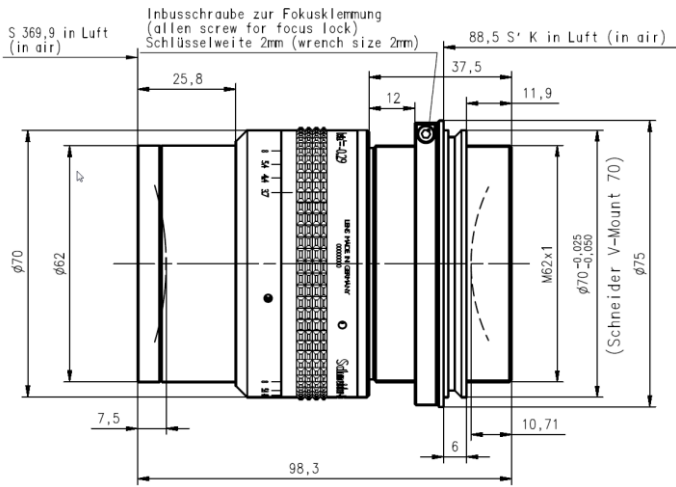


$\beta' = -0.315$



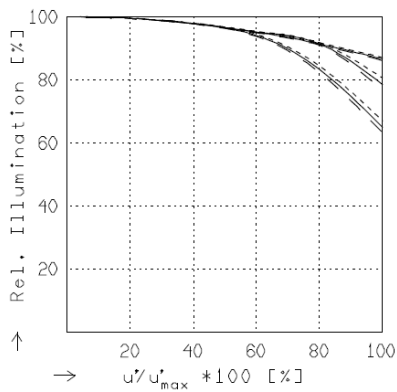
Focusing :  $MTF_{max}$  at  $f / 4.4$  ,  $R = 50$  1/mm.  $u'/u'_{max} = 0$

# XENON-SAPPHIRE 3.7/96



## XENON SAPPHIRE 3.7/96

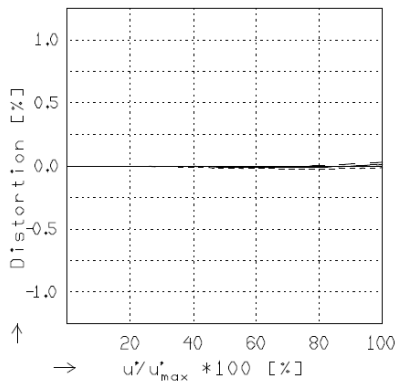
$f = 95,5 \text{ mm}$	$\beta'_P = 1,05$
$s'_F = -48,02 \text{ mm}$	$s_{EP} = 43,32 \text{ mm}$
$s'_F = 53,65 \text{ mm}$	$s'_{AP} = -46,24 \text{ mm}$
$HH' = -9,28 \text{ mm}$	$\square d = 80,09 \text{ mm}$



## RELATIVE ILLUMINATION

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

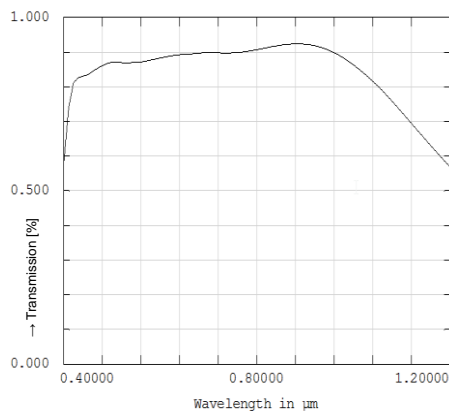
$f / 3.7$	$f / 4.4$	$f / 5.4$
— $\beta' = -0.2900$	$u'_{max} = 31.0$	$OO' = 539$
- - $\beta' = -0.2700$	$u'_{max} = 31.0$	$OO' = 561$
- - - $\beta' = -0.3150$	$u'_{max} = 31.0$	$OO' = 515$



## 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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