

TECHSPEC® GOLD SERIES FOCUSABLE TELECENTRIC LENS

#56-948 • 170- 220mm WD • 0.08X

Important tools for machine vision systems and metrology applications, TECHSPEC® Gold Series Focusable Telecentric Lenses yield images from which precise measurements can be taken. These lenses yield constant magnification over a defined depth of field and are optimized to provide $<0.2^\circ$ telecentricity when used in the specified working distance range. Anywhere within the specified working distance, the same magnification can be obtained simply by refocusing. Both the aperture and focusing adjustment positions can be fixed by set screws to remain secure in high vibration environments.



Primary Magnification:	0.08X
Working Distance¹:	170 - 220mm
Depth of Field²:	$\pm 81.0\text{mm}$ at f10 (20% @ 20 lp/mm)
Length:	277.2mm
Filter Thread:	M154 x 1.5
Max. Sensor Format:	$\frac{2}{3}"$
Camera Mount:	C-Mount

Telecentricity:	$<0.2^\circ$
Distortion:	$<0.35\%$
Resolution²:	$>65\%$ @ 40 lp/mm
Aperture (f/#):	f/6 - closed, lockable
Object Space NA:	0.006
Number of Elements (Groups):	11 (7)
AR Coating:	425 - 675nm BBAR
Weight:	5.54kg

Sensor Size	$\frac{1}{4}"$	$\frac{1}{3}"$	$\frac{1}{2.5}"$	$\frac{1}{2}"$	$\frac{1}{1.8}"$	$\frac{2}{3}"$	1"	$\frac{4}{3}"$
Field of View ³	45.0mm	60.0mm	71.25mm	80.0mm	89.7mm	110.0mm	N/A	N/A

1. From front of housing 2. Image space MTF contrast 3. Horizontal FOV on standard 4:3 sensor format

Specifications subject to change

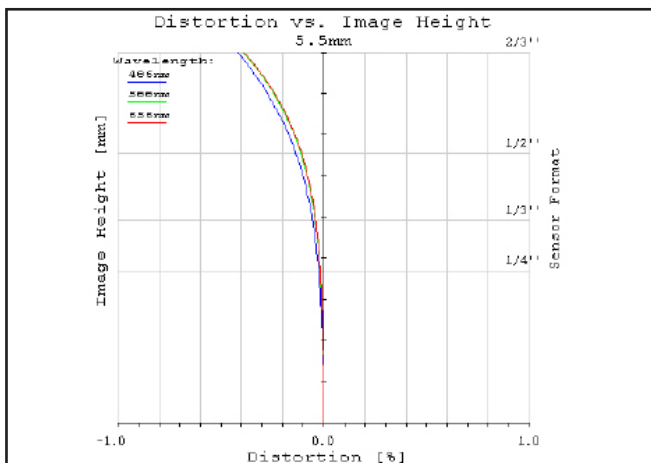


Figure 1: Distortion at the maximum sensor format. Positive values correspond to pincushion distortion, negative values correspond to barrel distortion.

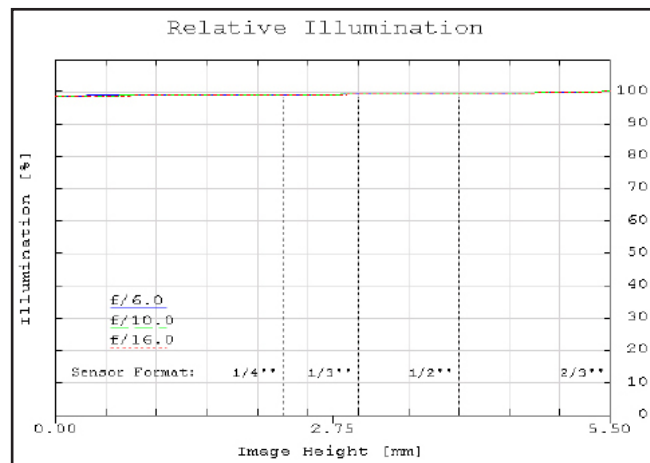


Figure 2: Relative illumination (center to corner)

In both plots, field points corresponding to the image circle of common sensor formats are included. Plots represent theoretical values from lens design software. Actual lens performance varies due to manufacturing tolerances.

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MTF & DOF: f/6.0

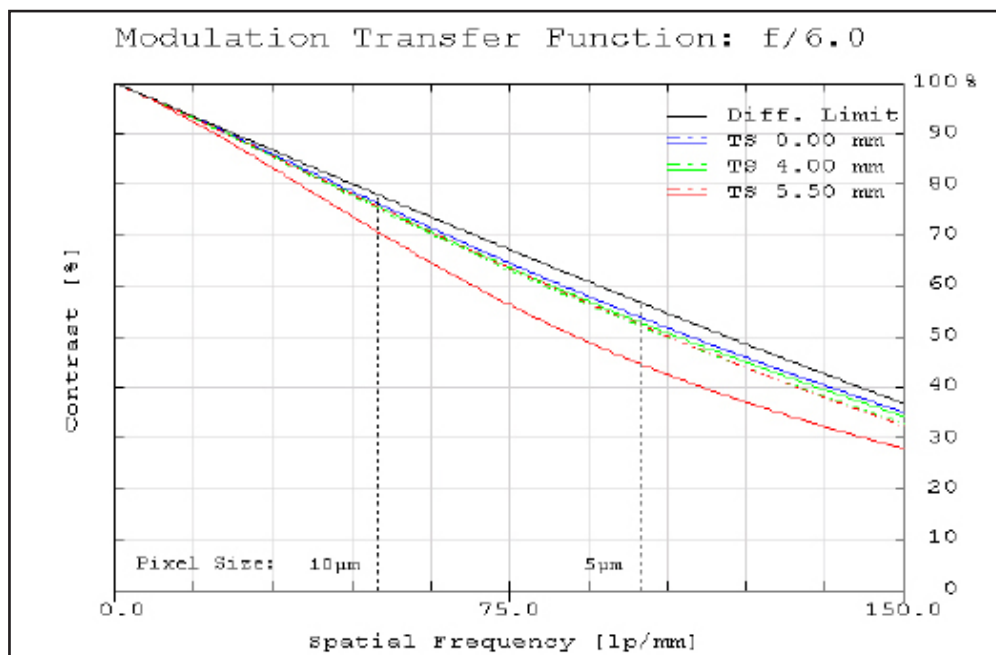


Figure 3: Image space polychromatic diffraction FFT Modulation Transfer Function (MTF) for $\lambda = 486\text{nm}$ to 656nm . Included are Tangential and Sagittal values for field points on center, at 70% of full field and at the maximum sensor format. Solid black line indicates diffraction limit determined by $f/\#$ -defined aperture. Frequencies corresponding to the Nyquist resolution limit of pixel sizes are indicated.

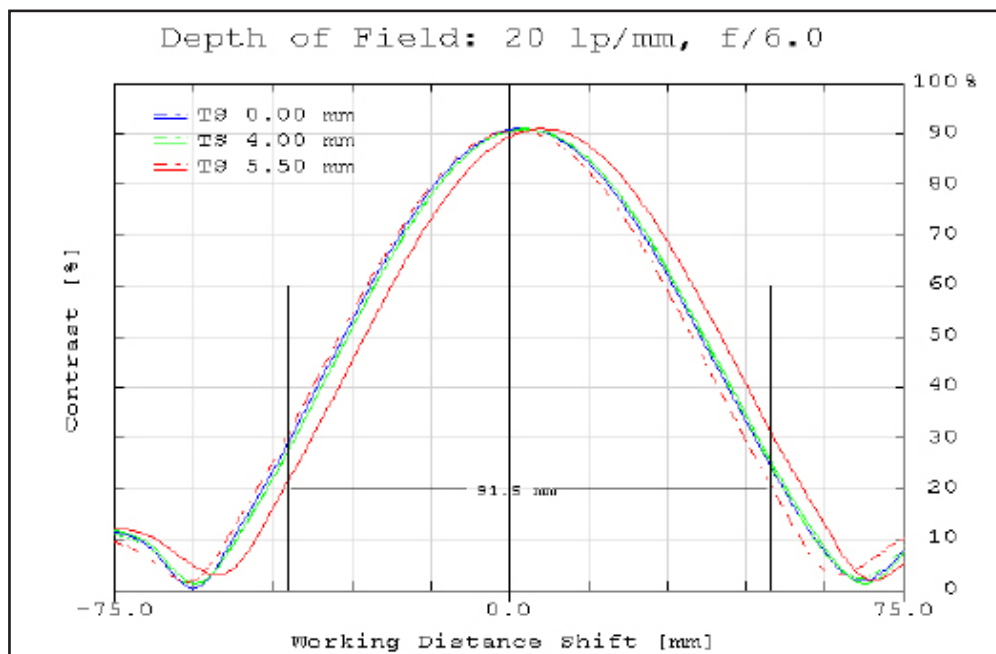


Figure 4: Polychromatic diffraction through-focus MTF at 20 linepairs/mm (image space). The depth of field at the maximum sensor format for the plotted frequency and $f/\#$ at 20% contrast is indicated by the measurement bars.

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MTF & DOF: f/10.0

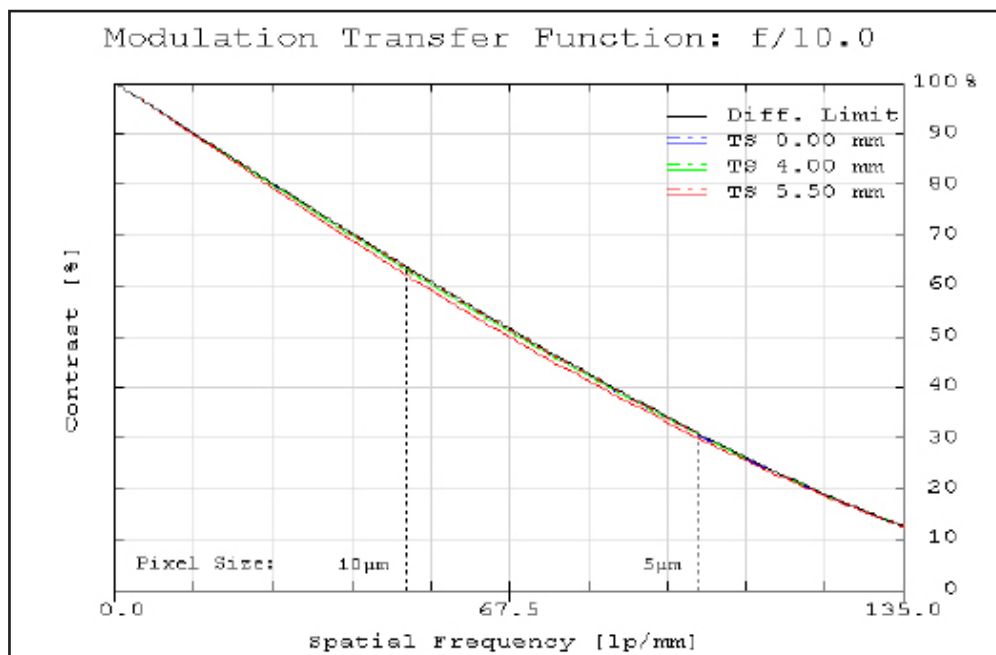


Figure 5: Image space polychromatic diffraction FFT Modulation Transfer Function (MTF) for $\lambda = 486\text{nm}$ to 656nm . Included are Tangential and Sagittal values for field points on center, at 70% of full field and at the maximum sensor format. Solid black line indicates diffraction limit determined by $f/\#$ -defined aperture. Frequencies corresponding to the Nyquist resolution limit of pixel sizes are indicated.

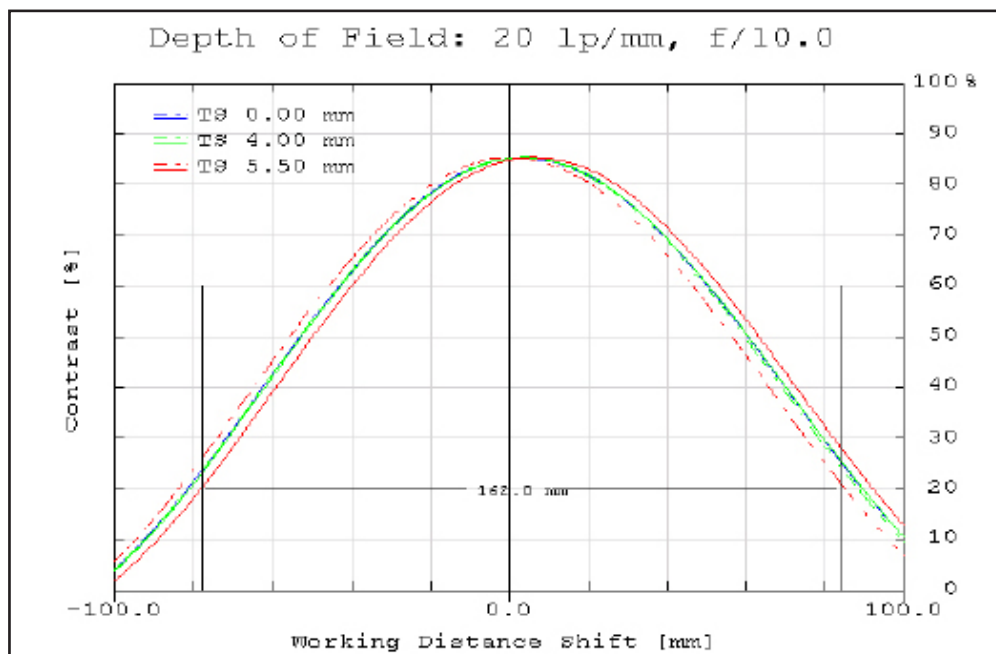


Figure 6: Polychromatic diffraction through-focus MTF at 20 linepairs/mm (image space). The depth of field at the maximum sensor format for the plotted frequency and $f/\#$ at 20% contrast is indicated by the measurement bars.

Plots represent theoretical values from lens design software. Actual lens performance varies due to manufacturing tolerances.