

# TECHSPEC® Silver TL™ SERIES

## FIXED FOCAL LENGTH LENSES

### #88-344 • f/6 - f/22

TECHSPEC® SilverTL™ Telecentric Lenses are ideal for both on-line and off-line machine vision production applications that require accurate measurements. These lenses combine high quality optics with a simplified non-focusing mechanical design and adjustable iris with a locking set screw.



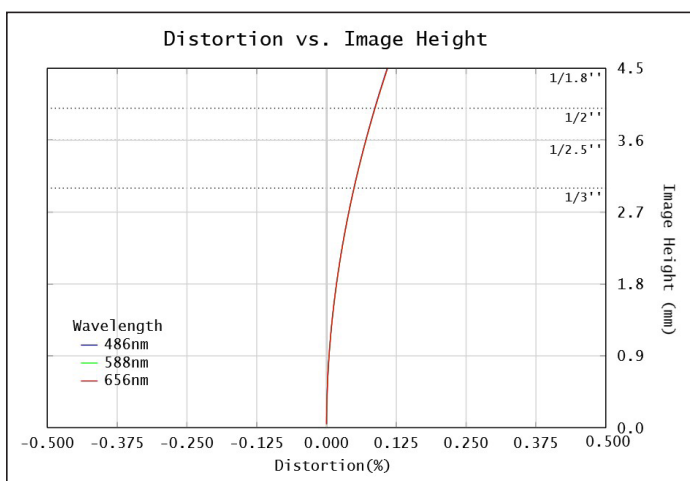
<b>Primary Magnification:</b>	0.5X
<b>Working Distance<sup>1</sup>:</b>	120mm
<b>Depth of Field<sup>2</sup>:</b>	±2.1mm at f/10 (20% @ 20 lp/mm)
<b>Max. Sensor Format:</b>	1/1.8"
<b>Camera Mount:</b>	C-Mount
<b>Aperture (f/#):</b>	f/6 - f/22
<b>Distortion %:</b>	<0.109%
<b>Object Space NA:</b>	0.041

1. From front housing 2. Image space MTF contrast

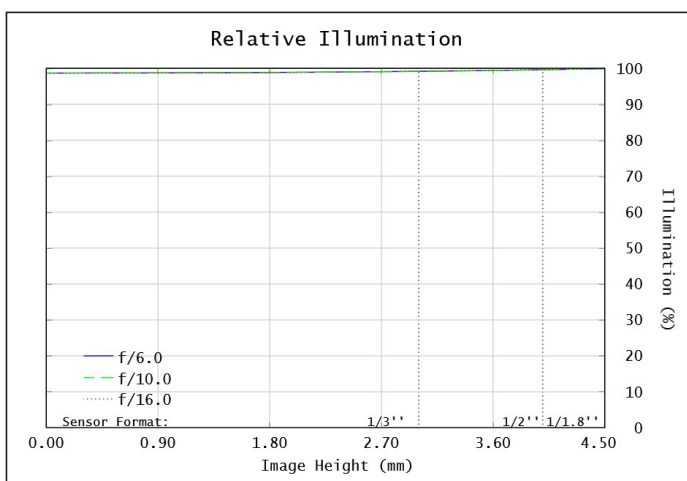
<b>Telecentricity:</b>	<0.08°
<b>Type:</b>	Telecentric Lens
<b>Length:</b>	156.2mm
<b>Front Diameter:</b>	40mm
<b>Weight:</b>	233g
<b>RoHS:</b>	Compliant
<b>Number of Elements (Groups):</b>	7 (6)
<b>AR Coating:</b>	425 - 675nm BBAR

At Minimum W.D. (120mm)					
Sensor Size	1/4"	1/3"	1/2.5"	1/2"	1/1.8"
Field Of View <sup>3</sup>	7.2mm	9.7mm	11.7mm	12.9mm	14.5mm

3. Horizontal FOV on Standard (4:3) sensor format. Min W.D.



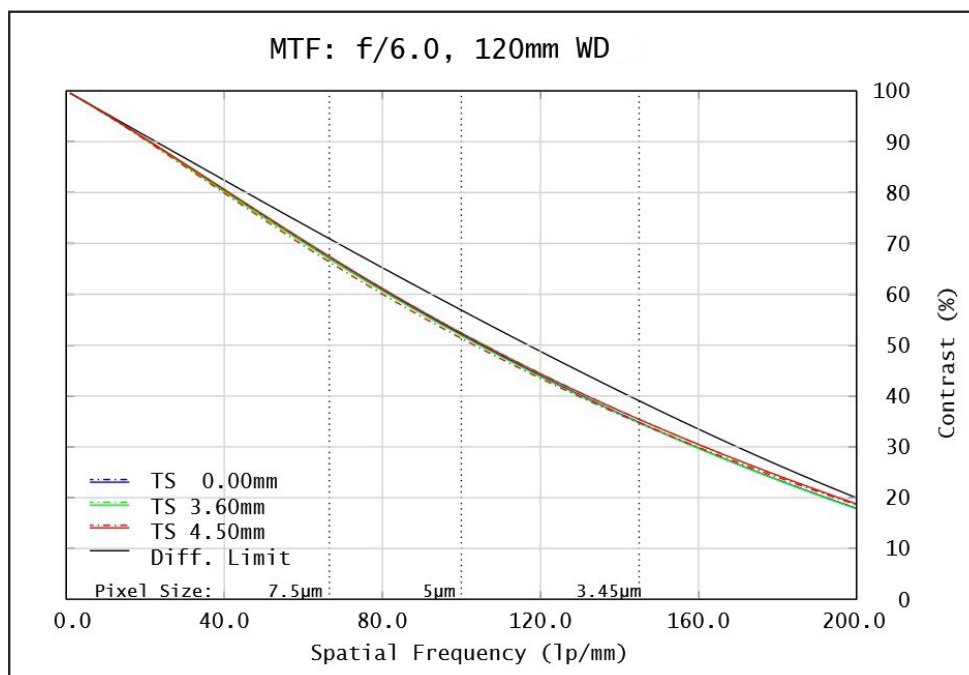
**Figure 1:** Distortion at the maximum sensor format. Positive values correspond to pincushion distortion, negative values correspond to barrel distortion.



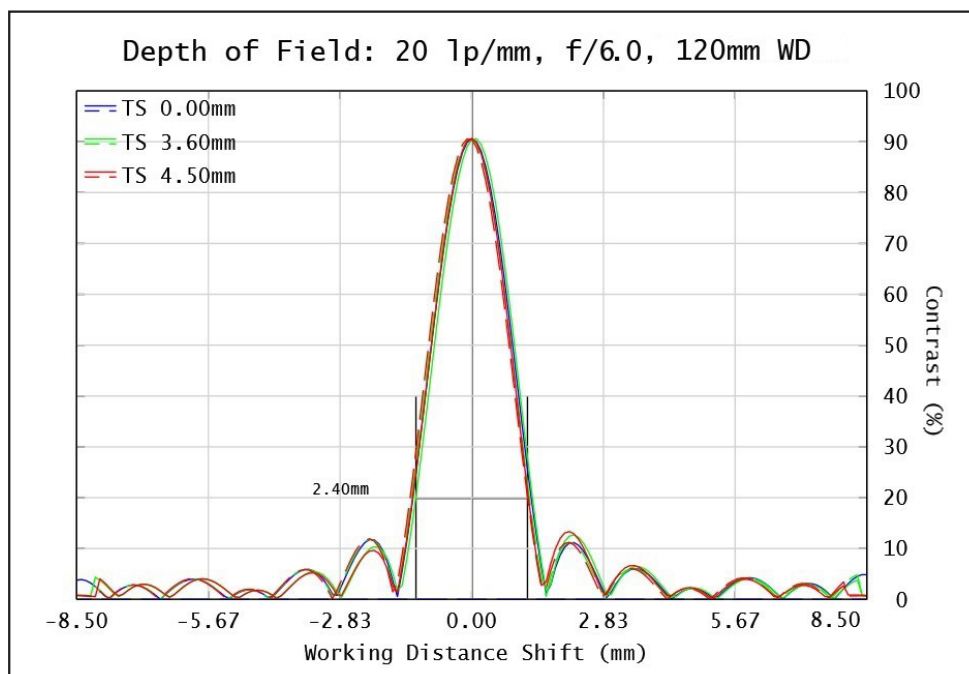
**Figure 2:** Relative illumination (center to corner)

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.

**MTF & DOF: f/6.0**  
**WD: 120mm**  
**HORIZONTAL FOV: 14.5mm**



**Figure 3:** Image space polychromatic diffraction FFT Modulation Transfer Function (MTF) for  $\lambda = 486\text{nm}$  to  $656\text{nm}$ . Included are the Tangential and Sagittal values for field points on center, at 70% of full field and 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.



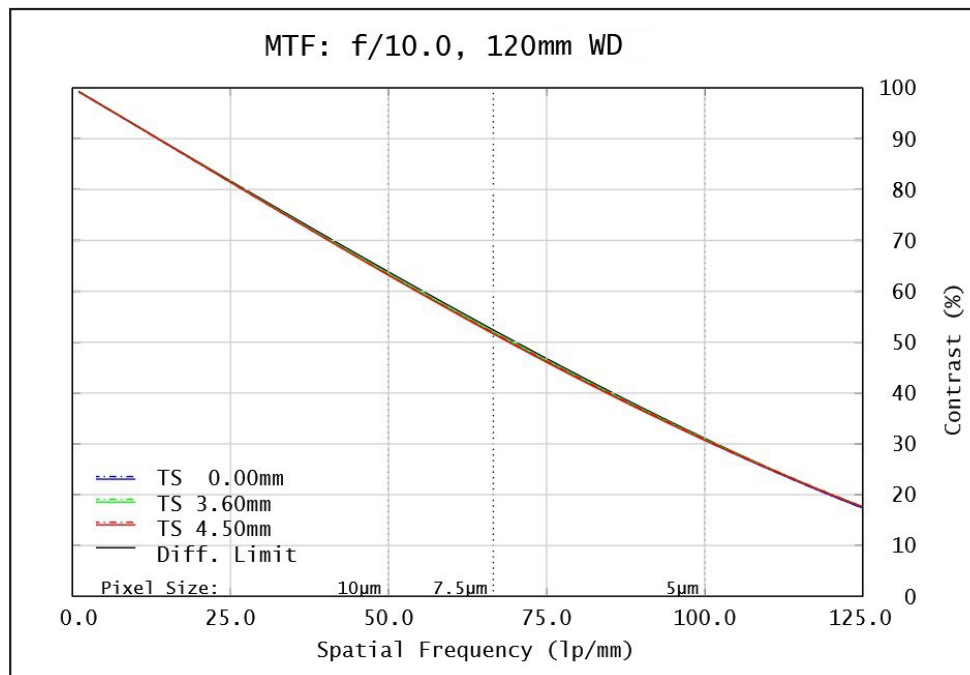
**Figure 4:** Polychromatic diffraction through-focus MTF at 20 linepairs/mm (image space). Contrast is plotted to two times the focus distance. Note object spatial frequency changes with working distance.

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

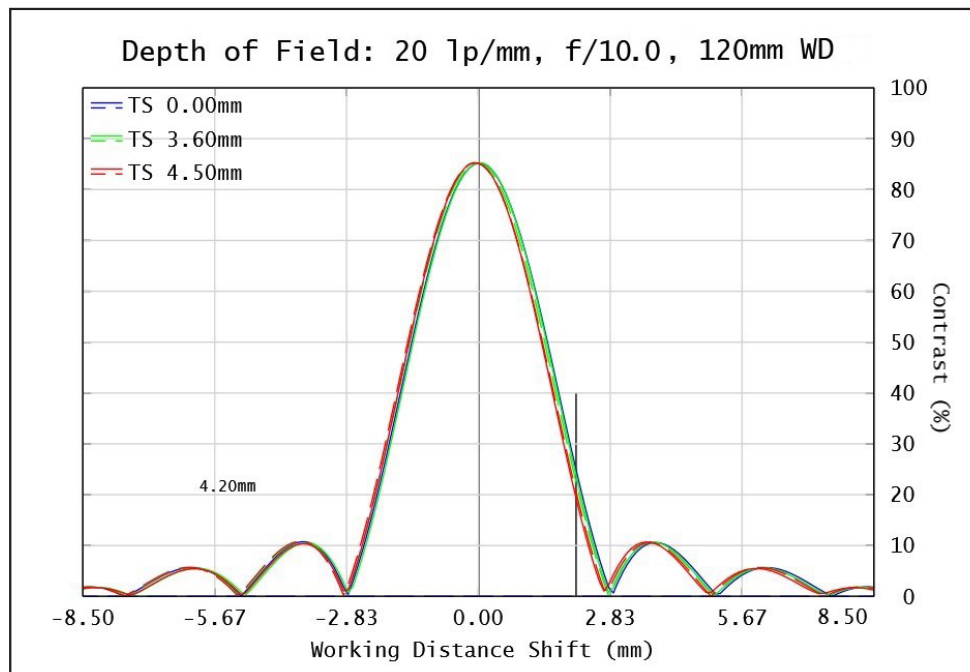
**MTF & DOF: f/10.0**

**WD: 120mm**

**HORIZONTAL FOV: 14.5mm**



**Figure 5:** Image space polychromatic diffraction FFT Modulation Transfer Function (MTF) for  $\lambda = 486\text{nm}$  to  $656\text{nm}$ . Included are the Tangential and Sagittal values for field points on center, at 70% of full field and 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). Contrast is plotted to two times the focus distance. Note object spatial frequency changes with working distance.

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