

TECHSPEC® 0.69X IN-LINE ILLUMINATION

CobaltTL™ TELECENTRIC LENSES

#15-873 • f/4.5 - f/22

TECHSPEC® CobaltTL Telecentric Lenses are designed for semiconductor and electronics inspection, measurement, and gauging applications. These telecentric lenses achieve high light throughput with industry leading low f/#s. Featuring less than 0.015° telecentricity and low 0.013% distortion, these lenses are ideal for image stitching applications. These 17.6mm diagonal sensor format lenses are compatible with the Sony IMX304 1.1" sensors and other similar format sensors such as the Sony IMX183.



Primary Magnification:	0.69X
Working Distance ¹ :	110mm
Depth of Field ² :	±1.21 mm at f/11 (20% @ 20 lp/mm)
Max. Sensor Format:	1.1"
Camera Mount:	C-Mount
Aperture (f/#):	f/4.5 - f/22
TV Distortion %:	<0.022%
Object Space NA:	0.0765

1. From front housing 2. Image space MTF contrast

Telecentricity:	<0.014°
Type:	Telecentric Lens
Length:	175.0mm
Front Diameter:	55mm
Weight:	
RoHS:	Compliant
Number of Elements (Groups):	9 (7)
AR Coating:	λ/4 MgF ₂

At 110mm W.D.								
Sensor Size	1/4"	1/3"	1/2.5"	1/2"	1/1.8"	2/3"	1"	1.1"
Field Of View ³	5.2mm	7.0mm	8.3mm	9.3mm	10.4mm	12.7mm	18.5mm	20.4mm

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

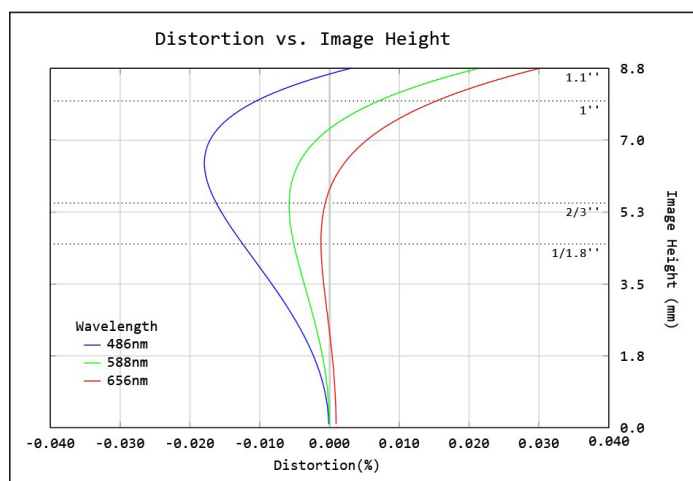


Figure 1: Distortion at the maximum sensor format. Positive values correspond to pincushion distortion, negative values correspond to barrel distortion.

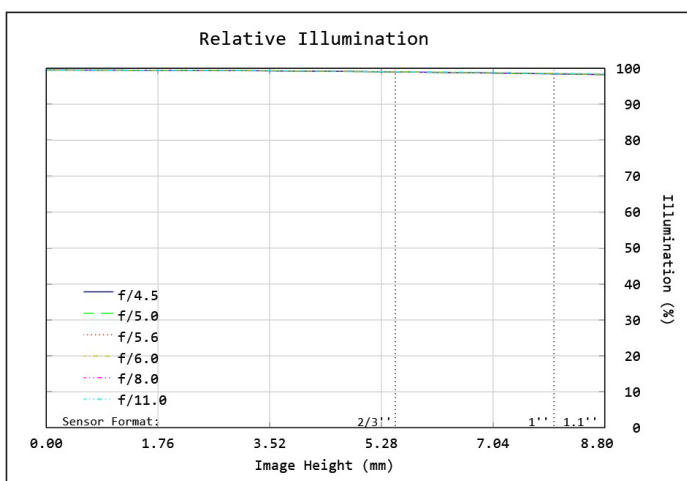


Figure 2: Relative illumination (center to corner)

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
WD: 110mm
HORIZONTAL FOV: 20.4mm

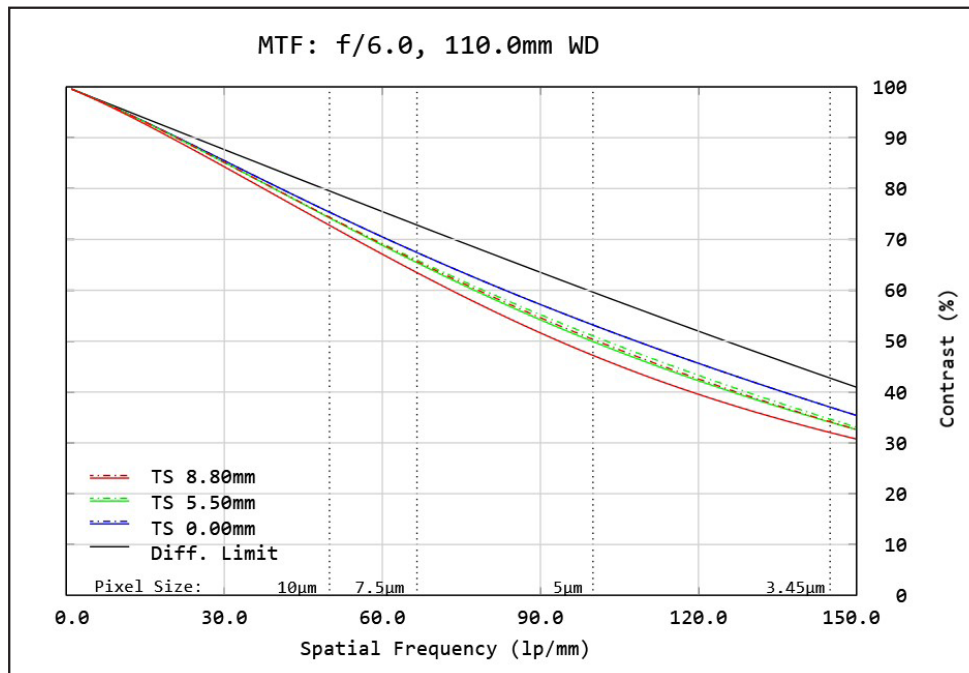


Figure 3: Image space polychromatic diffraction FFT Modulation Transfer Function (MTF) for $\lambda = 470\text{nm}$ to 630nm . Included are the Tangential and Sagittal values for field points on center, at 70% of full field and the maximum sensor format. Solid black line indicates diffraction limit determined by f/#-defined aperture. Frequencies corresponding to the Nyquist resolution limit of pixel sizes are indicated.

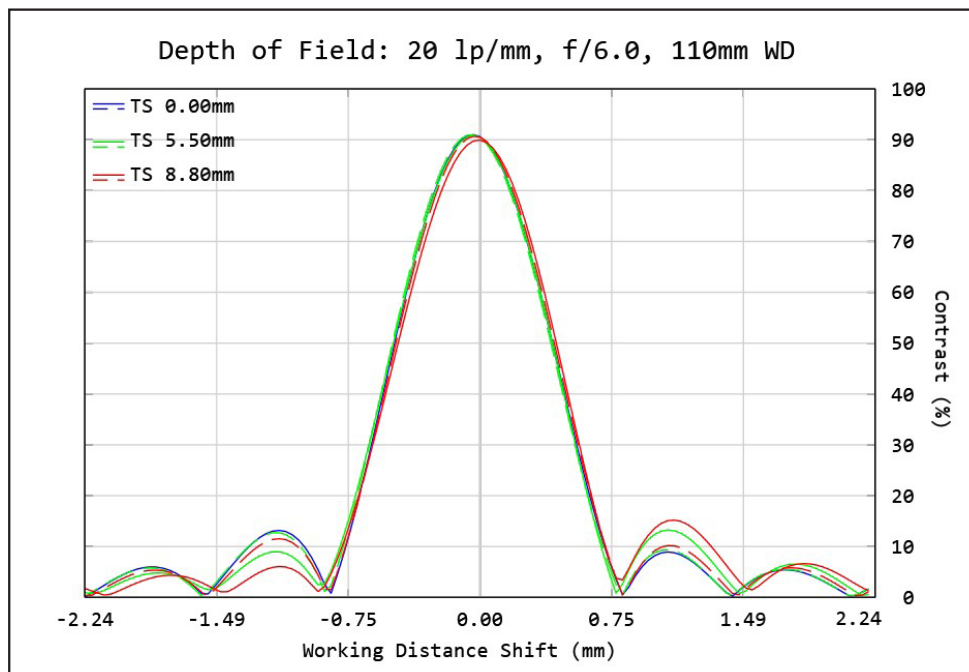


Figure 4: Polychromatic diffraction through-focus MTF at 20 linepairs/mm (image space). Contrast is plotted to two times the focus distance. Note object spatial frequency changes with working distance.

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

MTF & DOF: f/11
WD: 110mm
HORIZONTAL FOV: 20.4mm

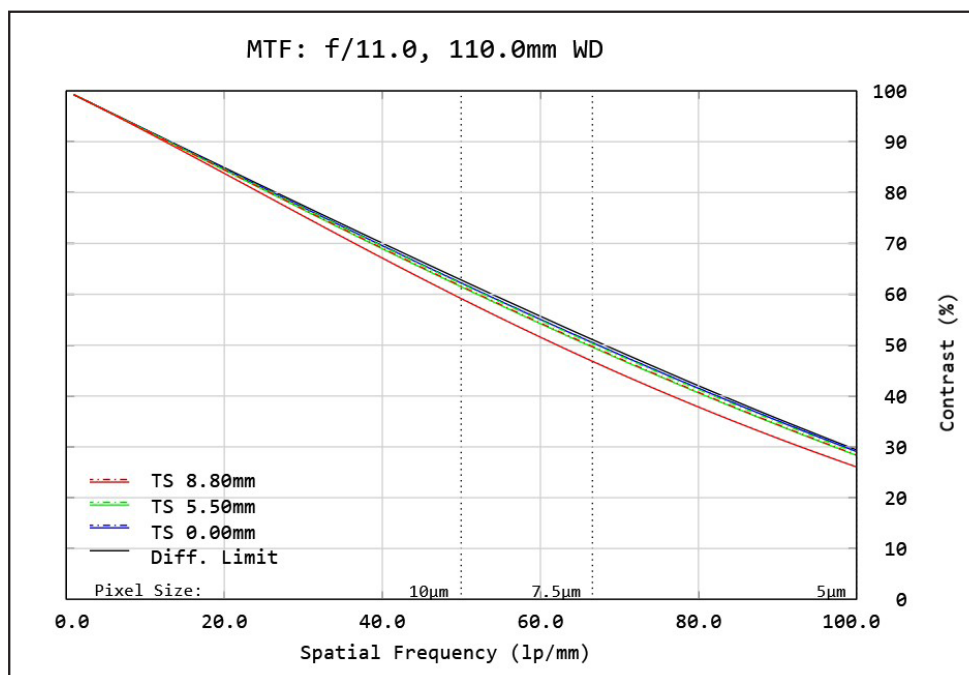


Figure 5: Image space polychromatic diffraction FFT Modulation Transfer Function (MTF) for $\lambda = 470\text{nm}$ to 630nm . Included are the Tangential and Sagittal values for field points on center, at 70% of full field and the maximum sensor format. Solid black line indicates diffraction limit determined by f/#-defined aperture. Frequencies corresponding to the Nyquist resolution limit of pixel sizes are indicated.

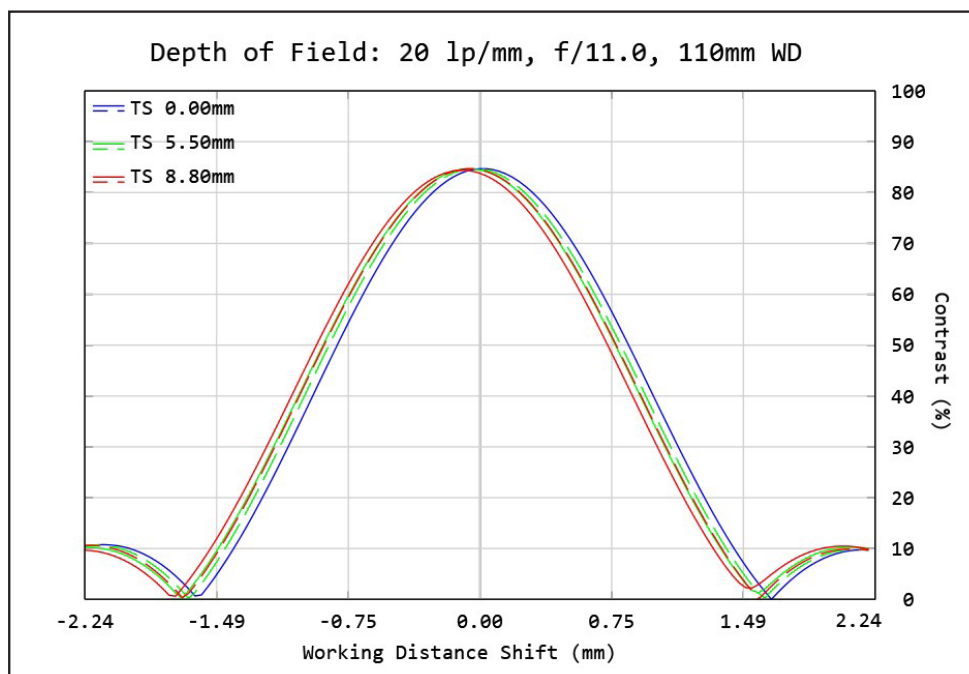


Figure 6: Polychromatic diffraction through-focus MTF at 20 linepairs/mm (image space). Contrast is plotted to two times the focus distance. Note object spatial frequency changes with working distance.

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