TECHSPEC® LH SERIES
FIXED FOCAL LENGTH LENSES
#13-758 • f/2.8 - f/22.0

TECHSPEC® LH Series Fixed Focal Length Lenses are designed for 120 Megapixel sensors in an APS-H format. The LH Series are the first large format lenses to truly support the 2.2µm pixel size featured on the Canon 120MP CMOS Sensor. These ultra-high resolution lenses work with APS-H sensors (35.5mm diagonal) and also on larger 35mm full frame sensors (43.3mm diagonal). TECHSPEC® LH Series Fixed Focal Length Lenses provide a solution for the ultra-high resolution requirements of machine vision and many factory automation and display inspection applications.

Focal Length:	35mm
Working Distance[1]:	250mm - ∞
Max. Sensor Format:	35mm (Full Frame)
Optimized Sensor Format:	APS-H
Camera Mount:	F-Mount or TFL-II
Aperture (f/#):	f/2.8 - f/22
Distortion%[2]:	<6.8% (on APS-H Sensor)
Object Space NA[3]:	0.021370

Magnification Range:	0X - 0.124X
Type:	Fixed Focal Length Lens
Length[3]:	141.2mm
Weight:	1029g
Filter Thread:	M72 x 0.75
RoHS:	Compliant
Number of Elements (Groups):	11 (9)
AR Coating:	MgF_2 (400-700nm)

1. From front housing 2. At 750mm W.D. 3. At minimum W.D.

At Minimum W.D. (250mm)									
Sensor Size	1/2"	1/1.8"	2/3"	1"	1.1"	4/3"	APS-C	APS-H	35mm (Full Frame)
Field Of View[4]	51.8mm - 10.5°	58.3mm - 11.8°	71.3mm - 14.4°	104.2mm - 20.9°	115.9mm - 23.2°	142.0mm - 28.2°	185.9mm - 36.4°	247.3mm - 47.3°	312.5mm - 57.8°

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

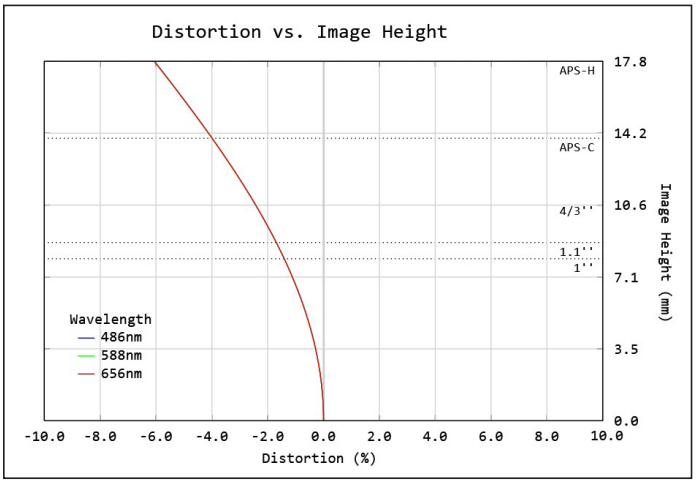

Figure 1: Distortion at the maximum sensor format. Positive values correspond to pincushion distortion, negative values correspond to barrel distortion.

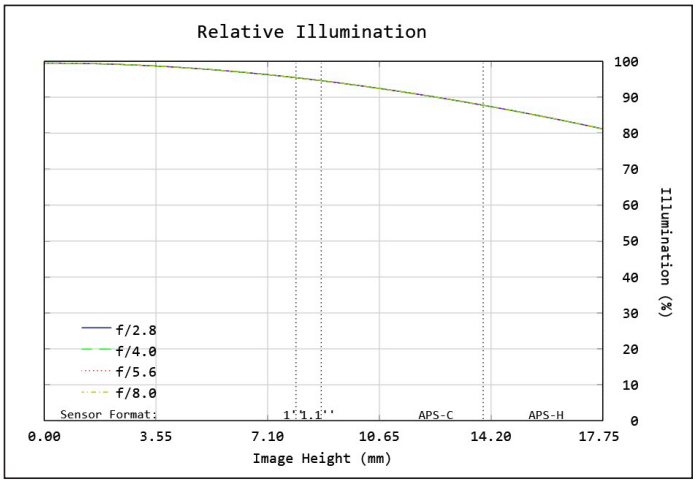

Figure 2: Relative illumination (center to corner)

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/2.8
WD: 500mm
HORIZONTAL FOV: 466mm

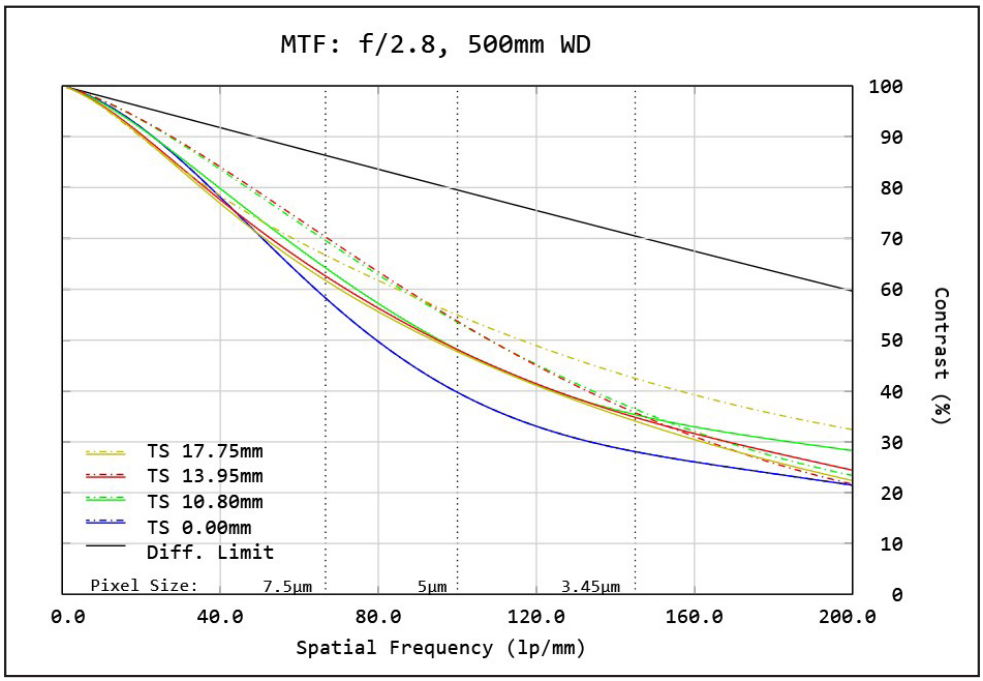

Figure 3: Image space polychromatic diffraction FFT Modulation Transfer Function (MTF) for λ = 486nm to 656nm. Included are the Tangential and Sagittal values for field points on center, 4/3" sensor, APS-C sensor, and the optimized sensor format (APS-H). Solid black line indicates diffraction limit determined by f/#-defined aperture. Frequencies corresponding to the Nyquist resolution limit of pixel sizes are indicated.

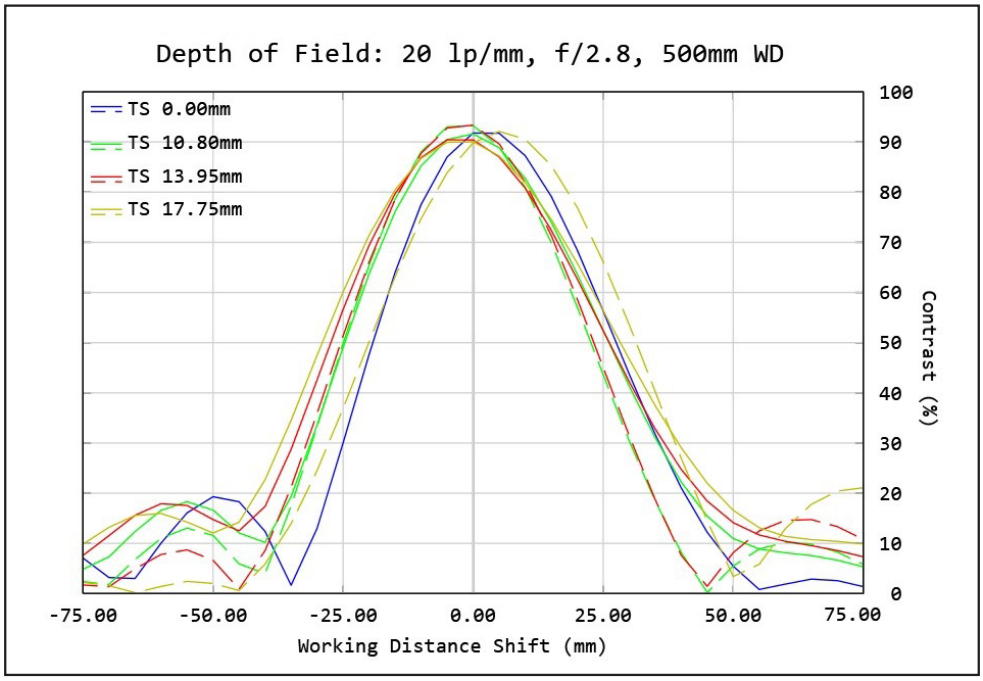

Figure 4: Polychromatic diffraction through-focus MTF at 20 linepairs/mm (image space). Contrast is plotted to two times the focus distance. Note object spatial frequency changes with working distance.

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

MTF & DOF: f/4.0
WD: 500mm
HORIZONTAL FOV: 466mm

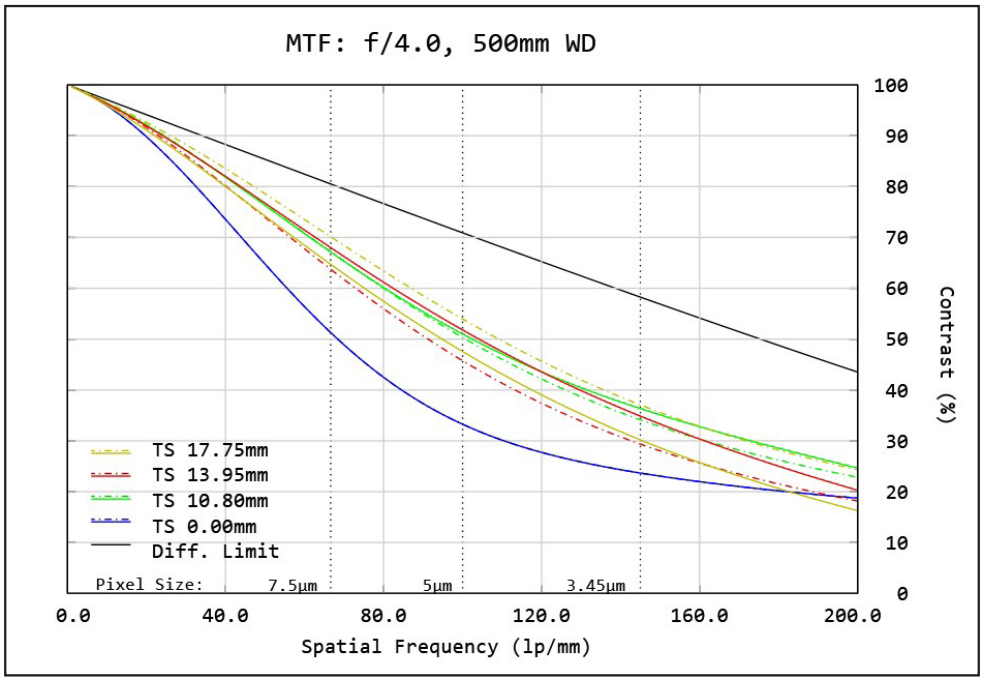

Figure 5: Image space polychromatic diffraction FFT Modulation Transfer Function (MTF) for λ = 486nm to 656nm. Included are the Tangential and Sagittal values for field points on center, 4/3" sensor, APS-C sensor, and the optimized sensor format (APS-H). Solid black line indicates diffraction limit determined by f/#-defined aperture. Frequencies corresponding to the Nyquist resolution limit of pixel sizes are indicated.

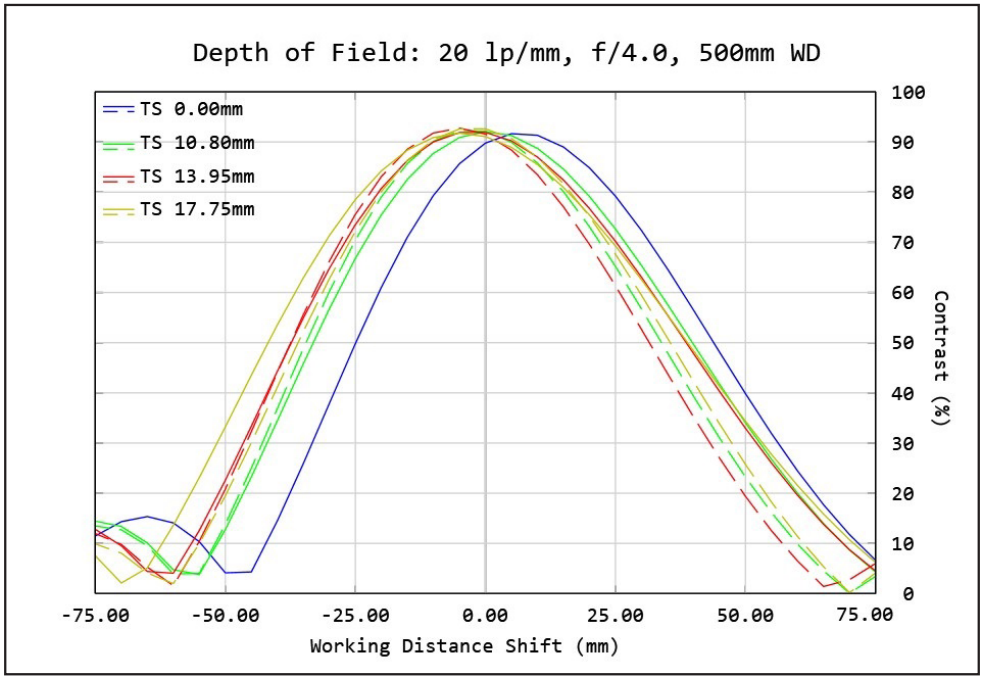

Figure 6: Polychromatic diffraction through-focus MTF at 20 linepairs/mm (image space). Contrast is plotted to two times the focus distance. Note object spatial frequency changes with working distance.

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

MTF & DOF: f/2.8
WD: 750mm
HORIZONTAL FOV: 685mm

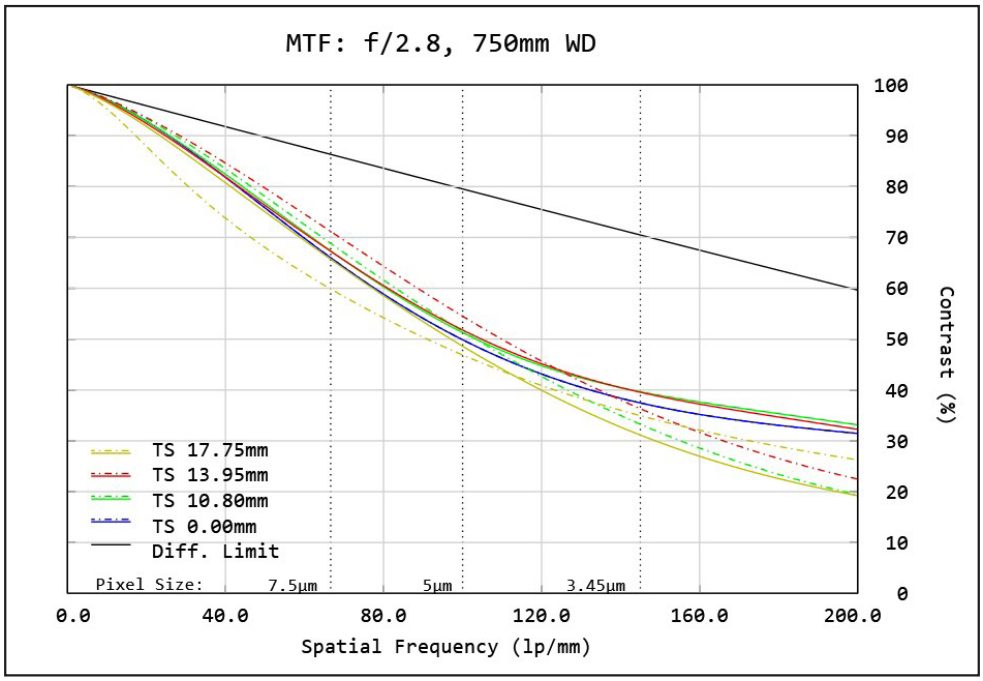

Figure 7: Image space polychromatic diffraction FFT Modulation Transfer Function (MTF) for λ = 486nm to 656nm. Included are the Tangential and Sagittal values for field points on center, 4/3" sensor, APS-C sensor, and the optimized sensor format (APS-H). Solid black line indicates diffraction limit determined by f/#-defined aperture. Frequencies corresponding to the Nyquist resolution limit of pixel sizes are indicated.

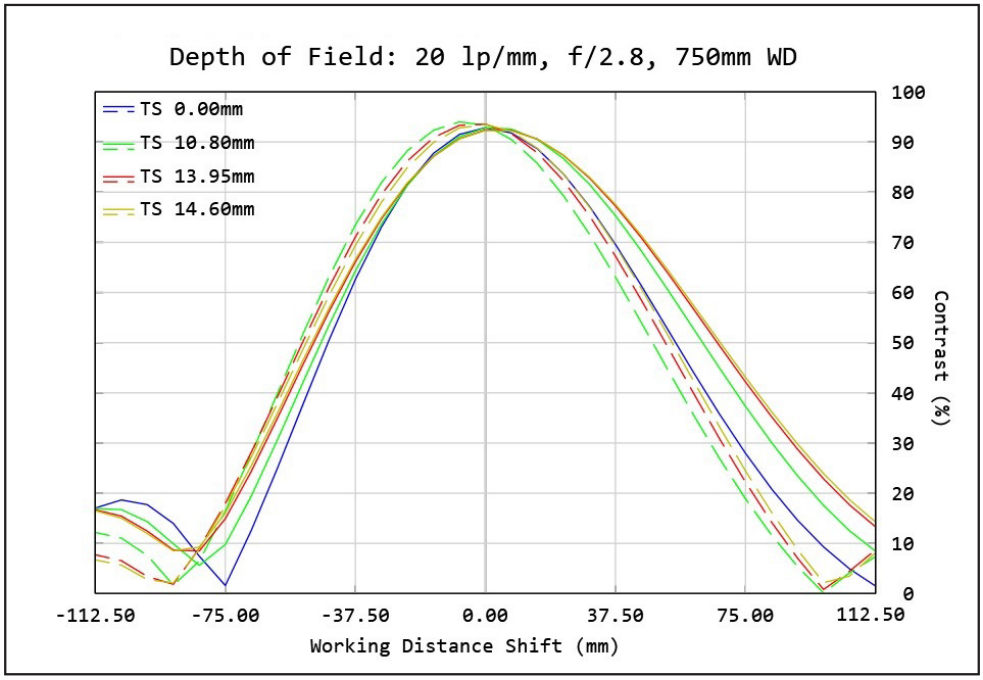

Figure 8: Polychromatic diffraction through-focus MTF at 20 linepairs/mm (image space). Contrast is plotted to two times the focus distance. Note object spatial frequency changes with working distance.

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

MTF & DOF: f/4.0
WD: 750mm
HORIZONTAL FOV: 685mm

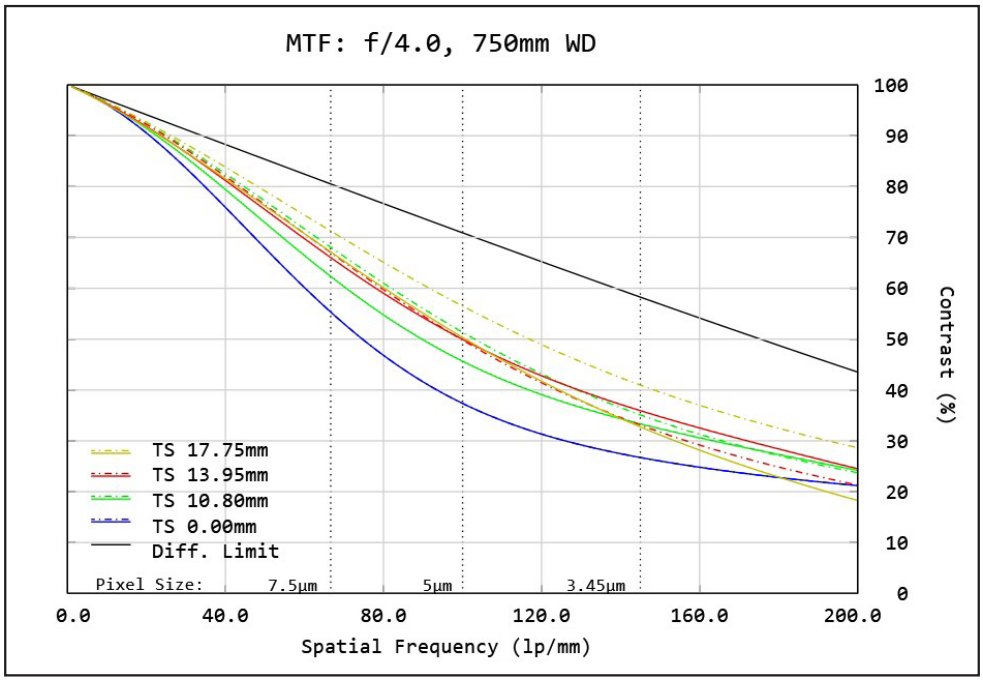

Figure 9: Image space polychromatic diffraction FFT Modulation Transfer Function (MTF) for λ = 486nm to 656nm. Included are the Tangential and Sagittal values for field points on center, 4/3" sensor, APS-C sensor, and the optimized sensor format (APS-H). Solid black line indicates diffraction limit determined by f/#-defined aperture. Frequencies corresponding to the Nyquist resolution limit of pixel sizes are indicated.

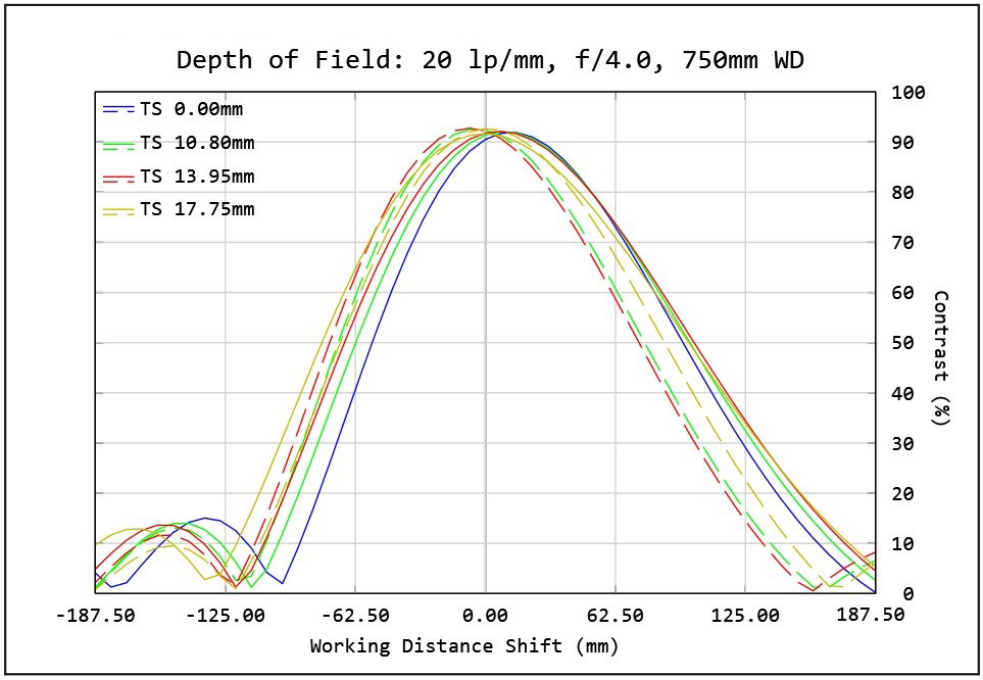

Figure 10: Polychromatic diffraction through-focus MTF at 20 linepairs/mm (image space). Contrast is plotted to two times the focus distance. Note object spatial frequency changes with working distance.

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

MTF & DOF: f/2.8
WD: 1000mm
HORIZONTAL FOV: 904mm

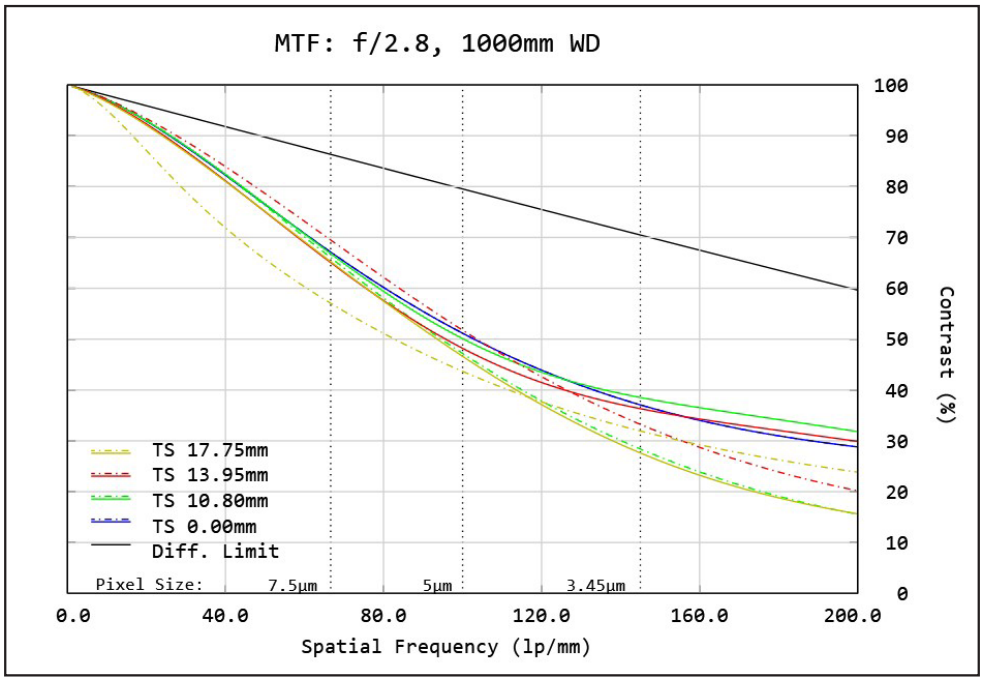

Figure 11: Image space polychromatic diffraction FFT Modulation Transfer Function (MTF) for λ = 486nm to 656nm. Included are the Tangential and Sagittal values for field points on center, 4/3" sensor, APS-C sensor, and the optimized sensor format (APS-H). Solid black line indicates diffraction limit determined by f/#-defined aperture. Frequencies corresponding to the Nyquist resolution limit of pixel sizes are indicated.

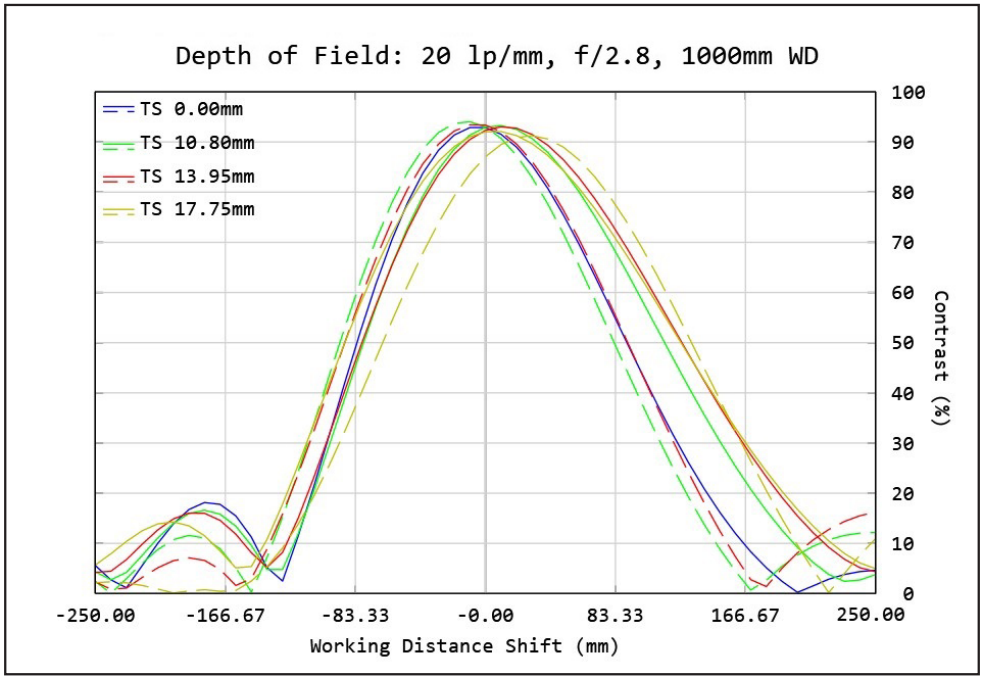

Figure 12: Polychromatic diffraction through-focus MTF at 20 linepairs/mm (image space). Contrast is plotted to two times the focus distance. Note object spatial frequency changes with working distance.

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

MTF & DOF: f/4.0
WD: 1000mm
HORIZONTAL FOV: 904mm

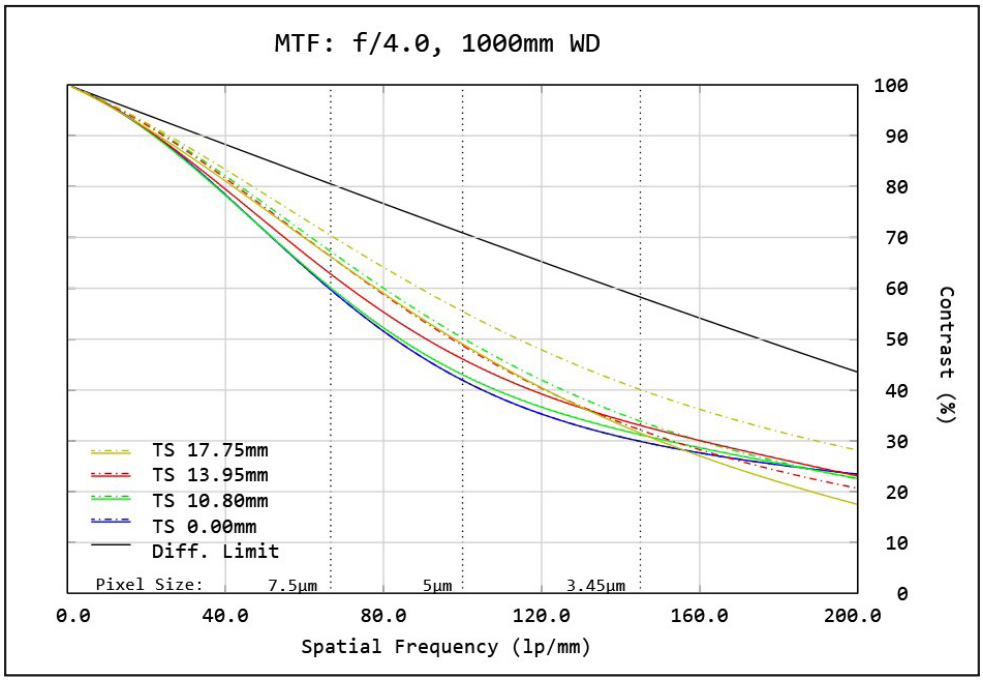

Figure 13: Image space polychromatic diffraction FFT Modulation Transfer Function (MTF) for λ = 486nm to 656nm. Included are the Tangential and Sagittal values for field points on center, 4/3" sensor, APS-C sensor, and the optimized sensor format (APS-H). Solid black line indicates diffraction limit determined by f/#-defined aperture. Frequencies corresponding to the Nyquist resolution limit of pixel sizes are indicated.

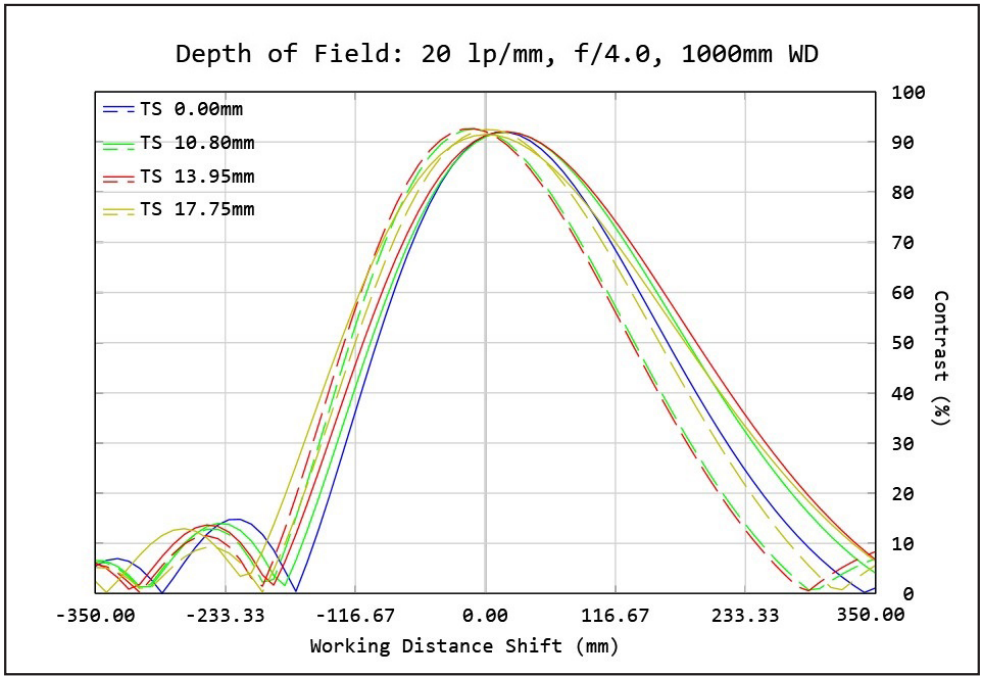

Figure 14: Polychromatic diffraction through-focus MTF at 20 linepairs/mm (image space). Contrast is plotted to two times the focus distance. Note object spatial frequency changes with working distance.

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