

# TECHSPEC® CA SERIES

## FIXED FOCAL LENGTH LENSES

### #11-320 • 50mm • f/1.8 - f/16

TECHSPEC® CA (Compact APS) Series Fixed Focal Length Lenses are designed for high resolution large format sensors. Covering the APS-C format sensors with a 28mm diagonal image circle, these lenses feature a TFL Mount. TFL Mounts feature a M35 x 0.75 thread with a 17.5mm flange distance, and offers the same flange distance, robustness, and ease of use as a C-Mount.



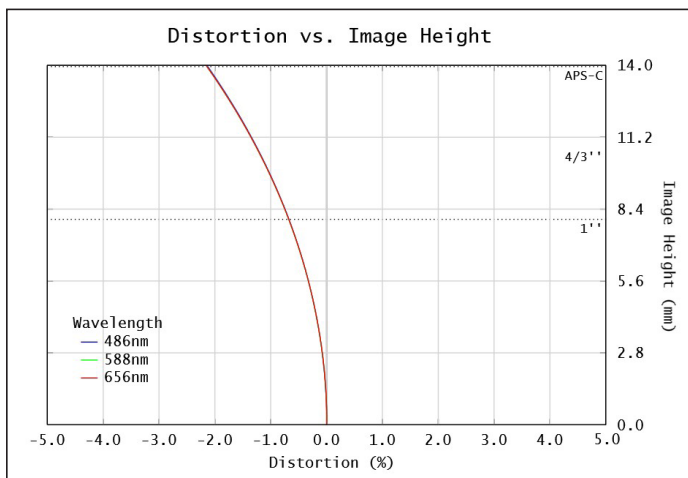
|                                      |                     |
|--------------------------------------|---------------------|
| <b>Focal Length:</b>                 | 50mm                |
| <b>Working Distance<sup>1</sup>:</b> | 200mm - ∞           |
| <b>Max. Sensor Format:</b>           | APS-C               |
| <b>Camera Mount:</b>                 | M12 x 0.5 (S-Mount) |
| <b>Aperture (f/#):</b>               | f/1.8 - f/16        |
| <b>Distortion %<sup>2</sup>:</b>     | <2.16%              |
| <b>Object Space NA<sup>2</sup>:</b>  | 0.037976            |

1. From front housing 2. At Minimum W.D.

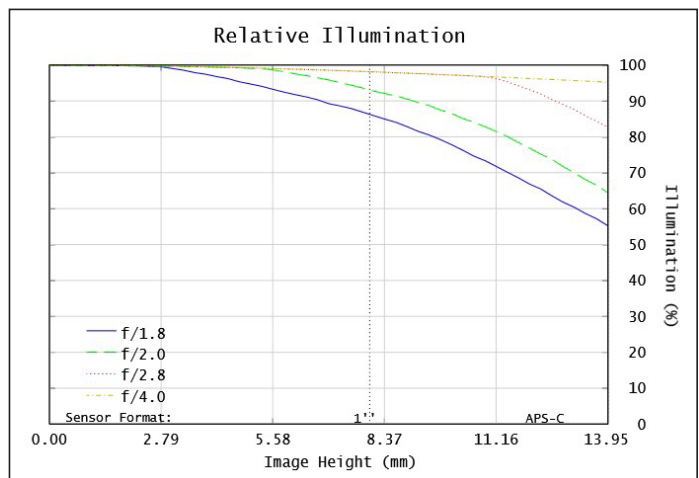
|                                     |                            |
|-------------------------------------|----------------------------|
| <b>Magnification Range:</b>         | 0 - 0.239X                 |
| <b>Type:</b>                        | Fixed Focal Length Lens    |
| <b>Length:</b>                      | 72.58mm                    |
| <b>Weight:</b>                      | 276g                       |
| <b>RoHS:</b>                        | Compliant                  |
| <b>Number of Elements (Groups):</b> | 7 (5)                      |
| <b>AR Coating:</b>                  | 400-700nm MgF <sub>2</sub> |

| At Minimum W.D. (200mm)    |               |               |               |               |               |                |                |                |                |                |
|----------------------------|---------------|---------------|---------------|---------------|---------------|----------------|----------------|----------------|----------------|----------------|
| Sensor Size                | 1/4"          | 1/3"          | 1/2.5"        | 1/2"          | 1/1.8"        | 2/3"           | 1"             | 1.1"           | 4/3"           | APS-C          |
| Field Of View <sup>3</sup> | 15.1mm - 4.1° | 20.1mm - 5.5° | 24.3mm - 6.6° | 26.8mm - 7.3° | 30.1mm - 8.2° | 36.8mm - 10.0° | 53.6mm - 14.6° | 59.5mm - 16.1° | 72.4mm - 19.6° | 93.8mm - 25.2° |

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



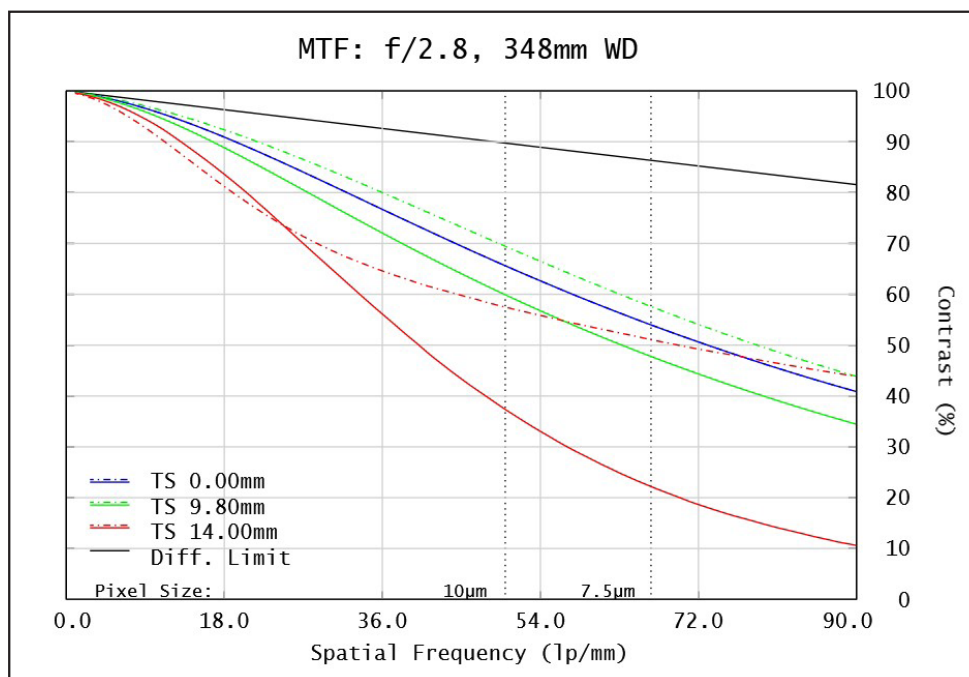
**Figure 1:** Distortion at the maximum sensor format. Positive values correspond to pincushion distortion, negative values correspond to barrel distortion.



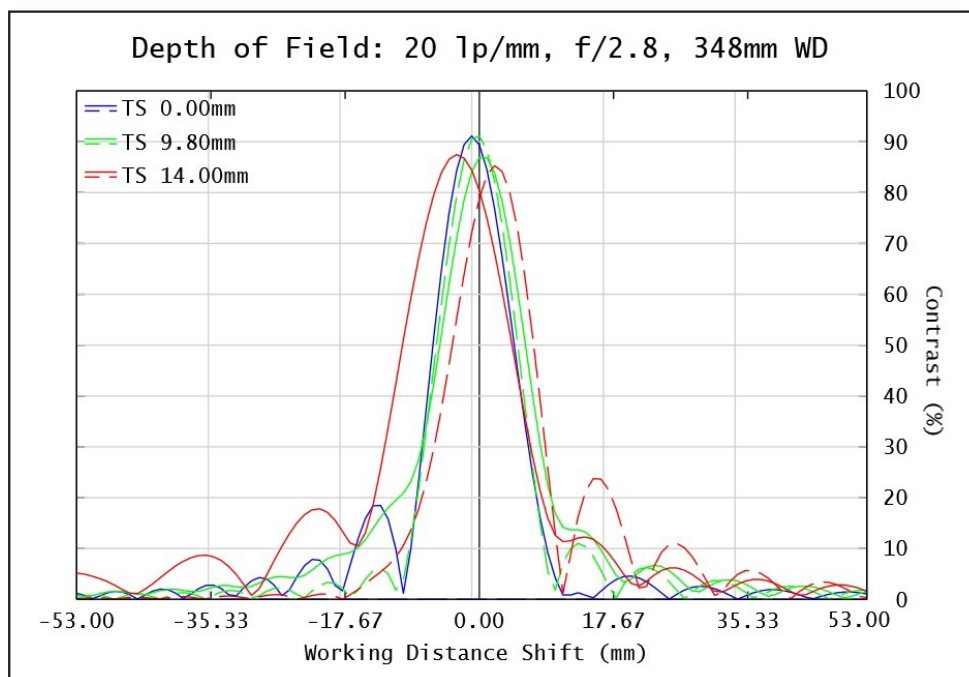
**Figure 2:** Relative illumination (center to corner)

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/2.8**  
**WD: 348mm**  
**HORIZONTAL FOV: 200mm**



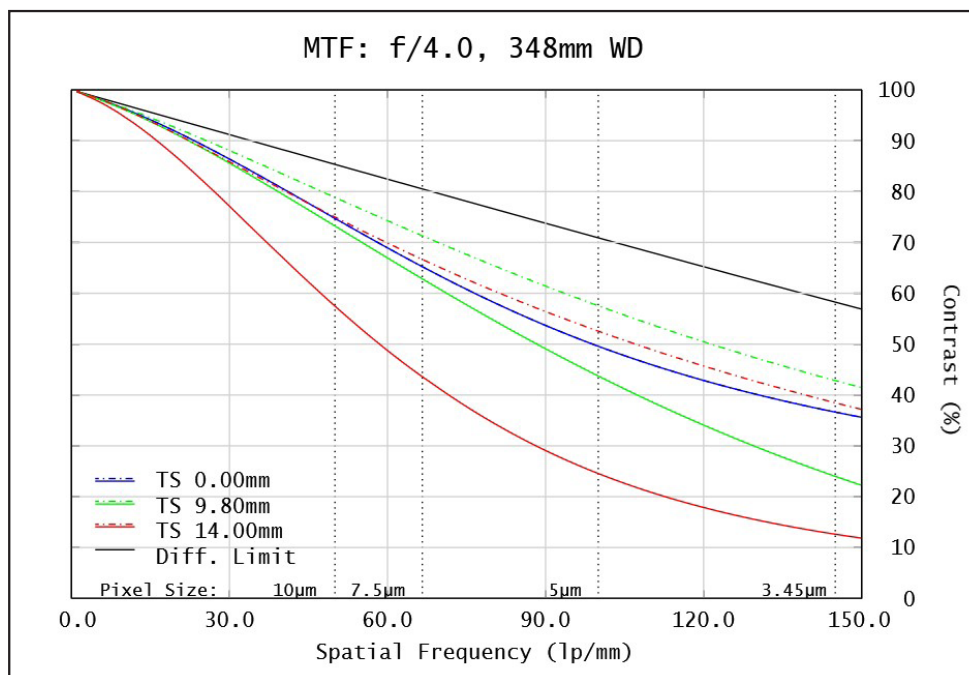
**Figure 3:** Image space polychromatic diffraction FFT Modulation Transfer Function (MTF) for  $\lambda = 486\text{nm}$  to  $656\text{nm}$ . Included are the Tangential and Sagittal values for field points on center, at 70% of full field and the maximum sensor format. Solid black line indicates diffraction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



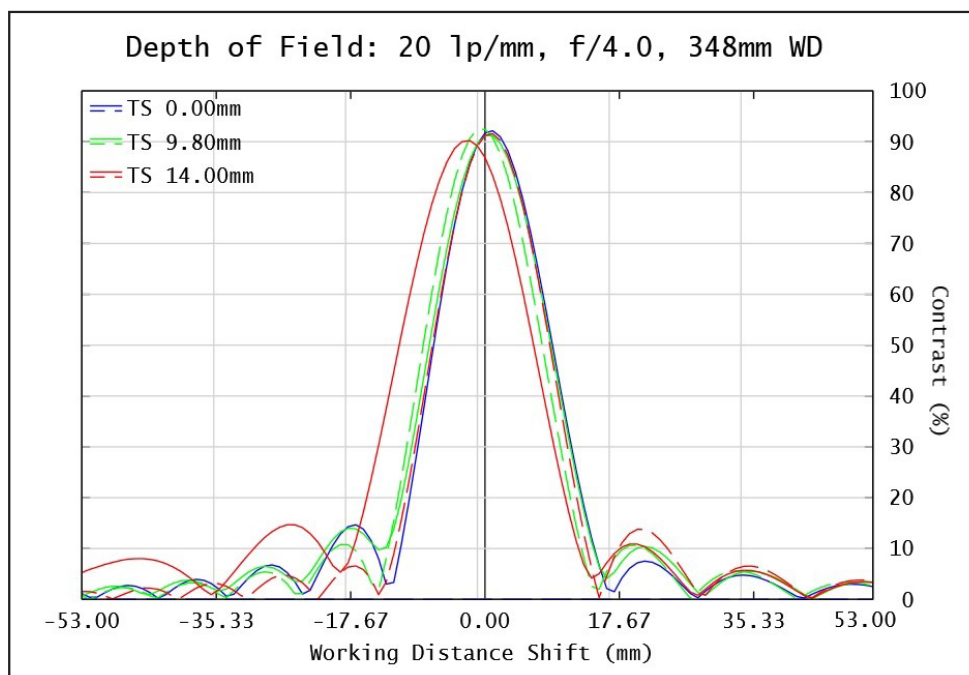
**Figure 4:** Polychromatic diffraction through-focus MTF at 20 linepairs/mm (image space). Contrast is plotted to two times the focus distance. Note object spatial frequency changes with working distance.

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

**MTF & DOF: f/4.0**  
**WD: 348mm**  
**HORIZONTAL FOV: 200mm**



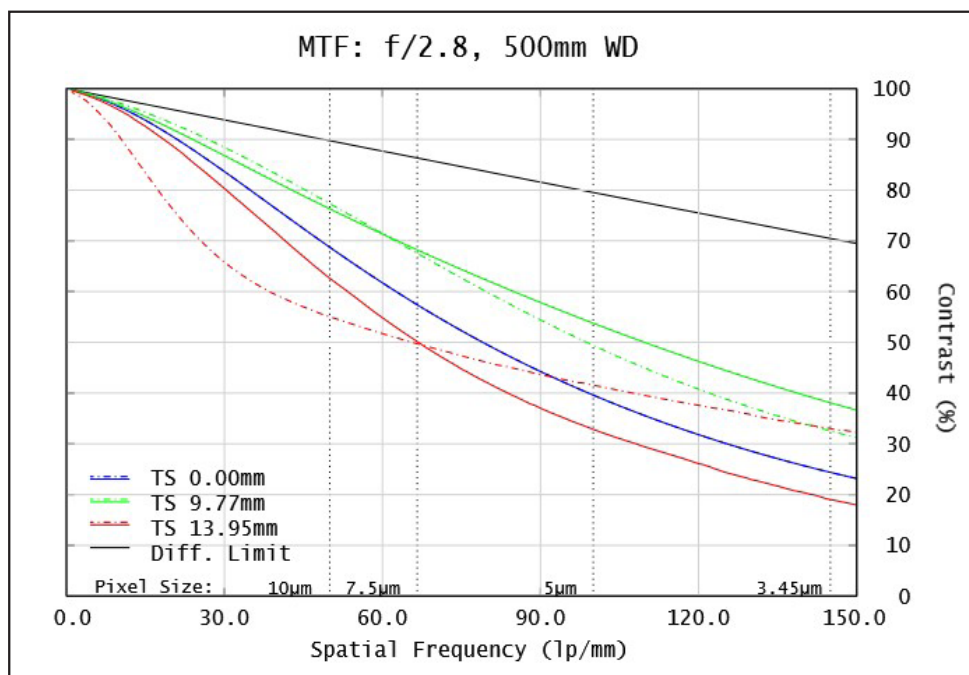
**Figure 5:** Image space polychromatic diffraction FFT Modulation Transfer Function (MTF) for  $\lambda = 486\text{nm}$  to  $656\text{nm}$ . Included are the Tangential and Sagittal values for field points on center, at 70% of full field and the maximum sensor format. Solid black line indicates diffraction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



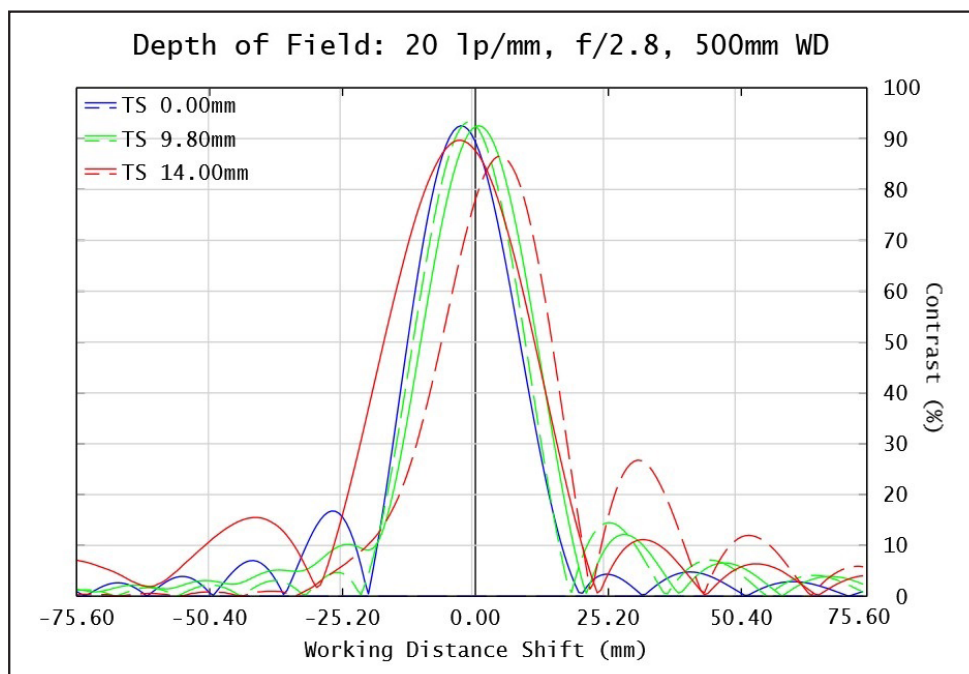
**Figure 6:** Polychromatic diffraction through-focus MTF at 20 linepairs/mm (image space). Contrast is plotted to two times the focus distance. Note object spatial frequency changes with working distance.

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

**MTF & DOF: f/2.8**  
**WD: 500mm**  
**HORIZONTAL FOV: 228mm**



**Figure 7:** 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.

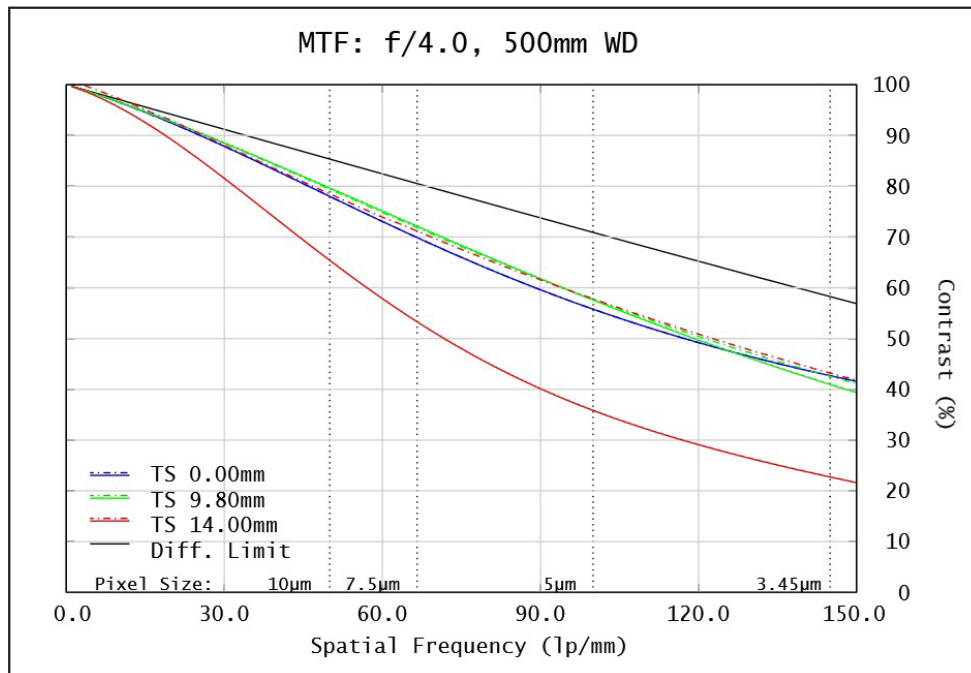


**Figure 8:** Polychromatic diffraction through-focus MTF at 20 linepairs/mm (image space). Contrast is plotted to two times the focus distance. Note object spatial frequency changes with working distance.

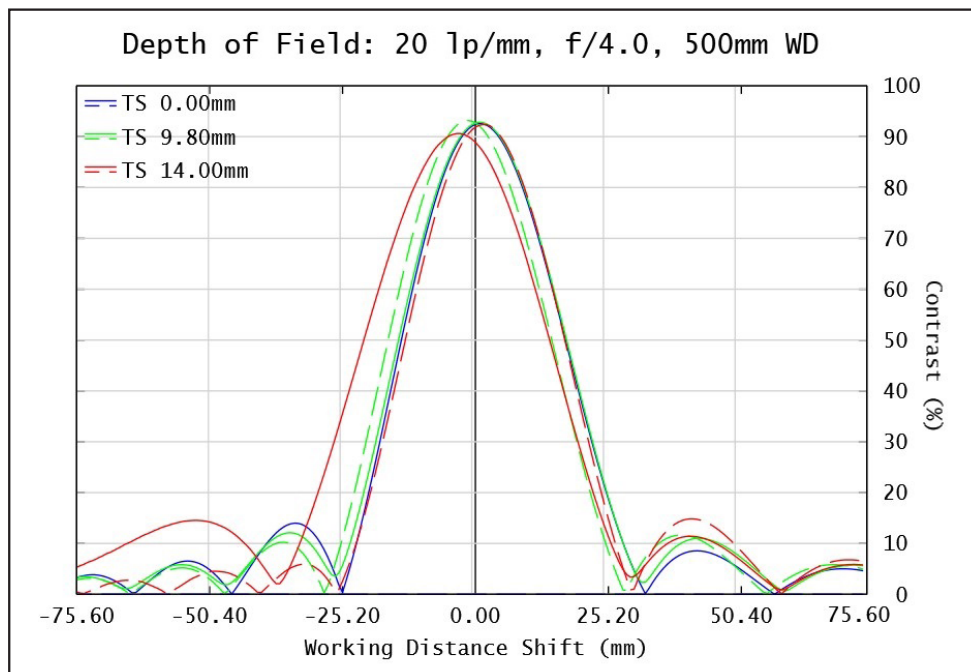
Plots represent theoretical values from lens design software. Actual lens performance varies due to manufacturing tolerances.



**MTF & DOF: f/4.0**  
**WD: 500mm**  
**HORIZONTAL FOV: 228mm**



**Figure 7:** 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 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.