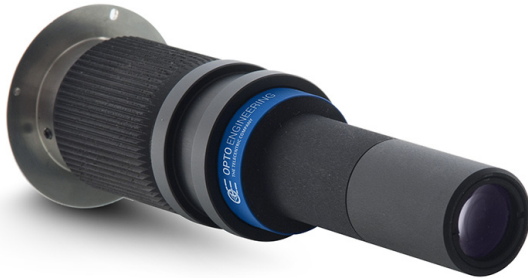




# TC4M004-F | DATASHEET

## High resolution telecentric lens for 4/3" detectors, magnification 4.000x, F mount



### KEY ADVANTAGES

- Wide image circle for sensors up to 4/3".
- Excellent resolution and low distortion.
- Simple and robust design for industrial environments.
- Detailed [test report](#) with [certified optical parameters](#).
- C, F M42X1 (-E) mount options Easy phase adjustment

**TC4MHR series** are high resolution telecentric lenses designed for sensors up to 4/3" and is the perfect choice for advanced metrology applications.

### SPECIFICATIONS

#### Optical specifications

Magnification		4.000
Image circle	(mm)	22.0
Max sensor size		4/3"
Working distance <sup>1</sup>	(mm)	56.0
$wf/N^2$		22
Telecentricity typical (max) <sup>3</sup>	(°)	<0.08 (0.10)
Distortion typical (max) <sup>4</sup>	(%)	<0.08 (0.10)
Field depth <sup>5</sup>	(mm)	0.1
Resolution (max) <sup>6</sup>	(µm)	3

#### Mechanical specifications

Mount		F
Phase adjustment <sup>7</sup>		No
Length <sup>8</sup>	(mm)	177.7
Front diameter	(mm)	28.0
Mass	(g)	465

### FIELD OF VIEW

Sensors	(mm x mm)
1" (14.19 x 7.51 mm x mm)	3.55 x 1.88
1.1" (14.16 x 10.37 mm x mm)	3.54 x 2.59
4/3" (18.93 x 10.61 mm x mm)	4.73 x 2.65

- <sup>1</sup> Working distance: distance between the front end of the mechanics and the object. Set this distance within  $\pm 3\%$  of the nominal value for maximum resolution and minimum distortion.
- <sup>2</sup> working  $f/N$ : the real  $f/N$  of a lens in operating conditions.
- <sup>3</sup> Maximum angle between chief rays and optical axis on the object side. Typical (average production) values and maximum (guaranteed) values are listed.
- <sup>4</sup> Percent deviation of the real image compared to an ideal, undistorted image. Typical (average production) values and maximum (guaranteed) values are listed.
- <sup>5</sup> At the borders of the field depth the image can be still used for measurement but, to get a very sharp image, only half of the nominal field depth should be considered. Pixel size used for calculation is 3.45 µm.
- <sup>6</sup> Object side, calculated with the Rayleigh criterion with  $\lambda = 520$  nm
- <sup>7</sup> Indicates the availability of an integrated camera phase adjustment feature.
- <sup>8</sup> Measured from the front end of the mechanics to the camera flange.

### COMPATIBLE PRODUCTS

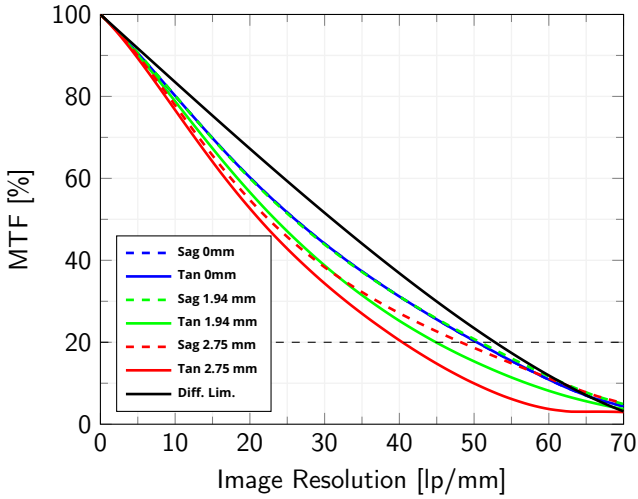
Full list of compatible products available [here](#).



A wide selection of innovative machine vision components.

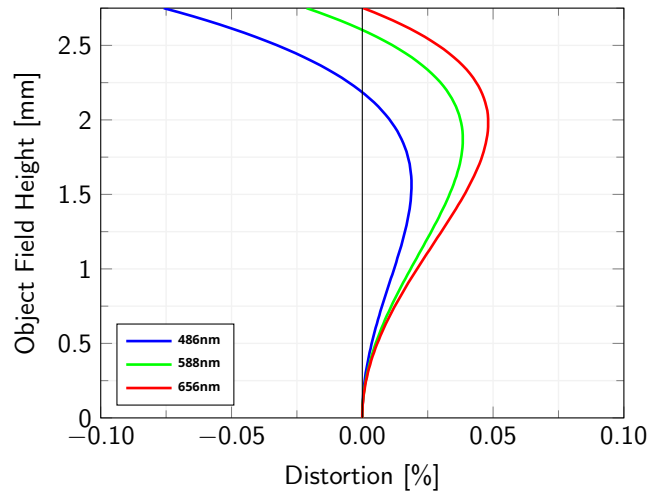
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**Image Resolution**



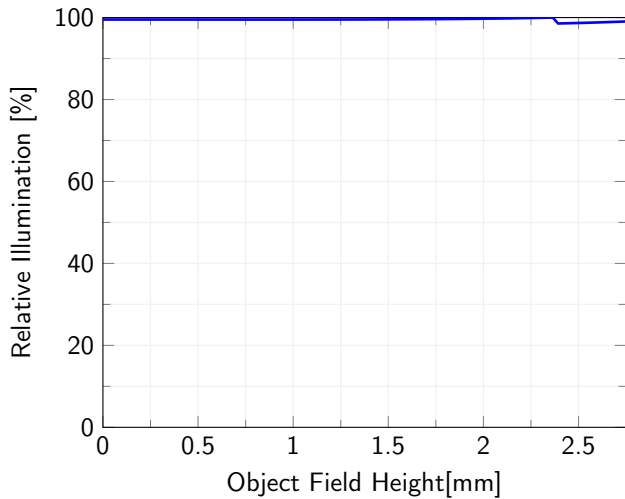
Modulation Transfer Function (MTF) vs. Image Resolution, wavelength range 486 nm - 656 nm

**Distortion**



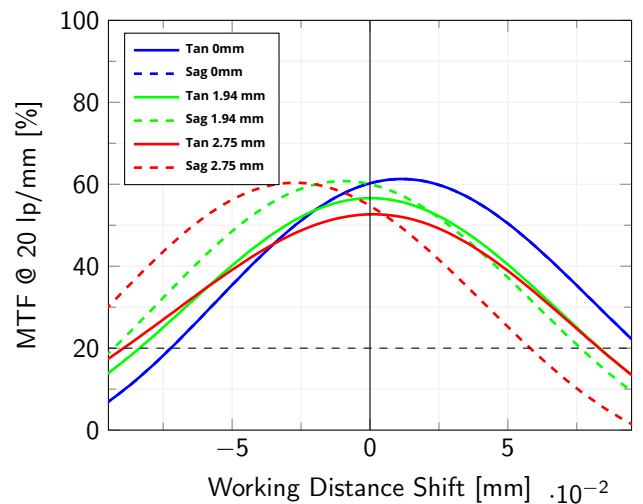
Object Field Height vs. Distortion, from the optical axis to the corner of the field of view

**Relative Illumination**



Relative illumination vs. Object Field Height, from the optical axis to the corner of the field of view

**Depth of Field**



Modulation Transfer Function (MTF) @ 20 lp/mm vs. Working Distance Shift from the best focus Working Distance, wavelength range 486 nm - 656 nm

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