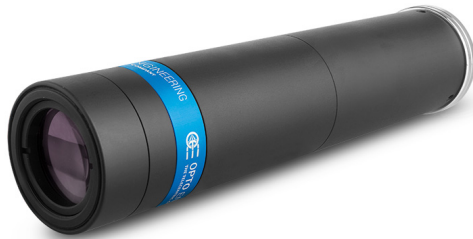




# TCLWD350 | DATASHEET

## Long working distance telecentric lens for 2/3" detectors, WD 132.3mm, magnification 3.500x, C mount



### KEY ADVANTAGES

#### Long working distance

Perfect for electronic components inspection and tool pre-setting machines.

#### High numerical aperture

For small pixel size / high resolution detectors.

#### Easy rotational phase adjustment

Robust and precise tuning of the lens-camera phase.

#### Full range of compatible products

Fits LTCLHP telecentric illuminators, CMHO clamping supports and LTRN ring illuminators.

Detailed [test report](#) with [measured](#) optical parameters.

**TCLWD** is a range of telecentric lenses specifically designed for electronic and semiconductor Automated Optical Inspection (AOI) and tool pre-setting machines.

### SPECIFICATIONS

#### Optical specifications

Magnification		3.500
Image circle	(mm)	11.0
Max sensor size		2/3"
Working distance <sup>1</sup>	(mm)	132.3
$wf/N^2$		24
Telecentricity typical (max) <sup>3</sup>	(°)	< 0.04 (0.06)
Distortion typical (max) <sup>4</sup>	(%)	< 0.05 (0.10)
Field depth <sup>5</sup>	(mm)	0.1
Resolution (max) <sup>6</sup>	(µm)	4

#### Mechanical specifications

Mount		C
Phase adjustment <sup>7</sup>		Yes
Length <sup>8</sup>	(mm)	174.7
Front diameter	(mm)	37.7
Mass	(g)	448

### FIELD OF VIEW

Sensors	(mm x mm)
1/3" (4.80 x 3.60 mm x mm)	1.37 x 1.03
1/2.5" (5.70 x 4.28 mm x mm)	1.63 x 1.22
1/2" (6.40 x 4.80 mm x mm)	1.83 x 1.37
1/1.8" (7.13 x 5.33 mm x mm)	2.04 x 1.52
2/3" (8.50 x 7.09 mm x mm)	2.43 x 2.03

<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> If not available, phase adjustment can be supplied upon request (except for TC23004, TC23007, TC23009, TC23012).

<sup>8</sup> Measured from the front end of the mechanics to the camera flange.

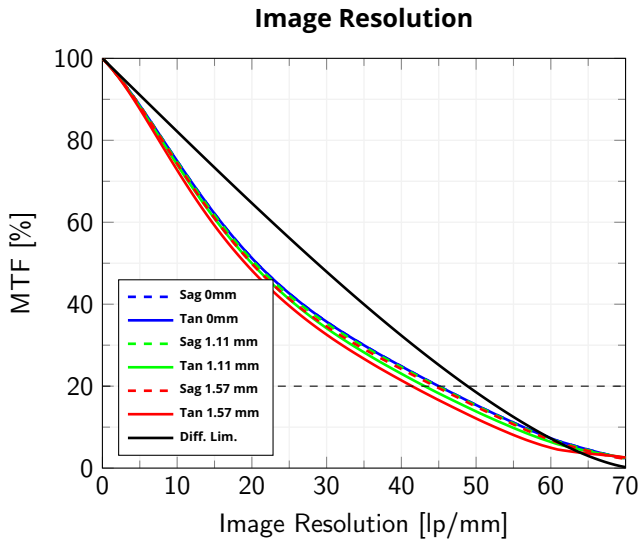
### COMPATIBLE PRODUCTS

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

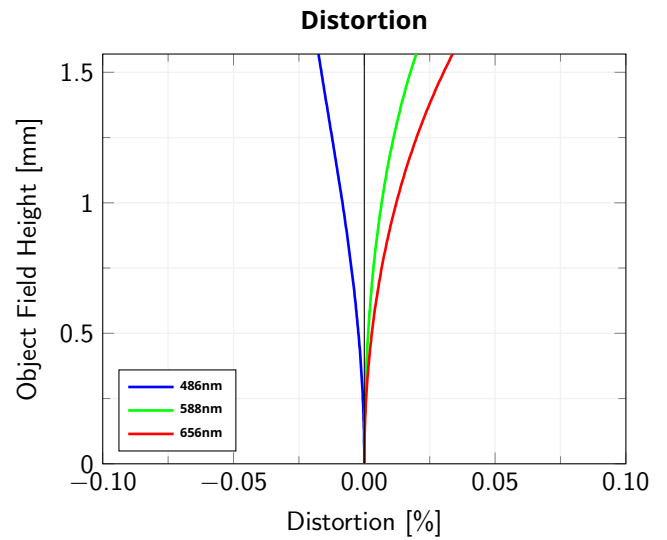


A wide selection of innovative machine vision components.

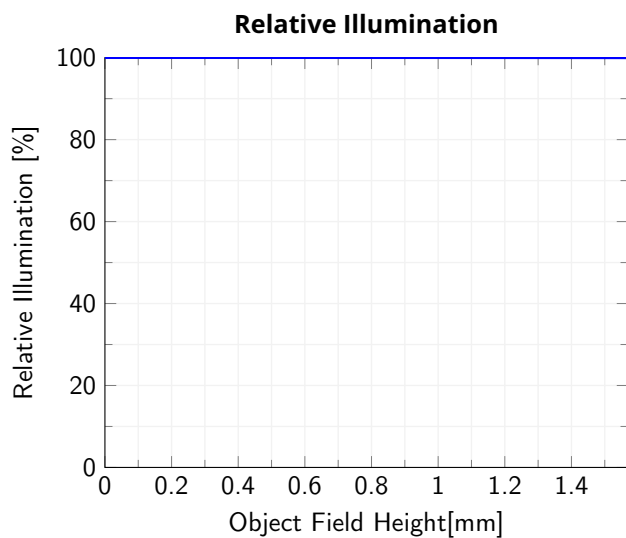
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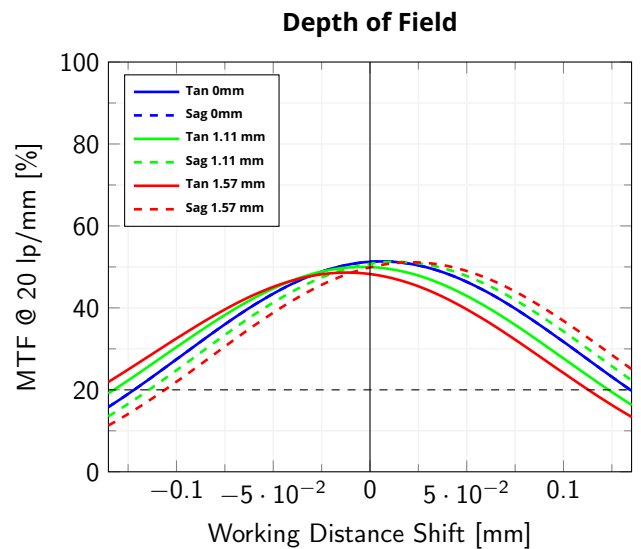
Modulation Transfer Function (MTF) vs. Image Resolution, wavelength range 486 nm - 656 nm



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



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



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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