

# TCSE16M036-I | DATASHEET

High-resolution telecentric lenses for 4/3", APS-C, APS-H and full frame sensors



## KEY ADVANTAGES

**Wide image circle** for sensors up to 45.7 mm.

**Excellent resolution and low distortion** for accurate measurements.

**Long working distance** perfect for the inspection of electronic components.

**Robust design** ideal for industrial environments.

Detailed **test report** with **certified** optical parameters.

**TCSE series** series features very high-resolution telecentric lenses designed for various large sensor formats up to full frame. TCSE lenses offer excellent optical performance ensuring unmatched resolution and low distortion.

## SPECIFICATIONS

### Optical specifications

|   |            |              |
|---|------------|--------------|
| Magnification                             |            | 0.920        |
| Image circle                              | (mm)       | 45.7         |
| Max sensor size                           |            | FF           |
| Working distance <sup>1</sup>             | (mm)       | 240          |
| Wavelegh range                            | (nm)       | 460-640      |
| $wf/N^2$                                  |            | 8-16         |
| 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)       | 0.49         |
| Resolution (max) <sup>6</sup>             | ( $\mu$ m) | 6            |

### Mechanical specifications

|                               |      |                   |
|-------------------------------|------|-------------------|
| Mount <sup>7</sup>            |      | M58x0.75 FD 11.48 |
| Phase adjustment <sup>8</sup> |      | Yes               |
| Length <sup>9</sup>           | (mm) | 351.4             |
| Front diameter                | (mm) | 80.0              |
| Mass                          | (g)  | 1731              |

## FIELD OF VIEW

| Sensors                           | (mm x mm)     |
|-----------------------------------|---------------|
| 4/3" (15.29 x 15.30 mm x mm)      | 16.62 x 16.63 |
| APS" (22.36 x 16.77 mm x mm)      | 24.30 x 18.23 |
| CHR70M" (31.00 x 21.99 mm x mm)   | 33.70 x 23.90 |
| CMV50000" (36.43 x 27.62 mm x mm) | 39.60 x 30.02 |

<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  $\mu$ m.

<sup>6</sup> Object side, calculated with the Rayleigh criterion with  $\lambda = 520$  nm

<sup>7</sup> FD stands for Flange Distance (in mm), defined as the distance from the mounting flange to the camera detector plane.

<sup>8</sup> Indicates the availability of an integrated camera phase adjustment feature.

<sup>9</sup> Measured from the front end of the mechanics to the camera flange.

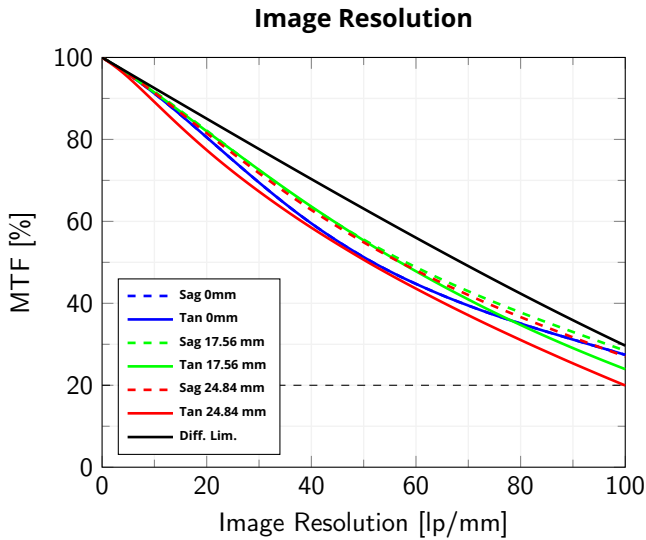
## COMPATIBLE PRODUCTS

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

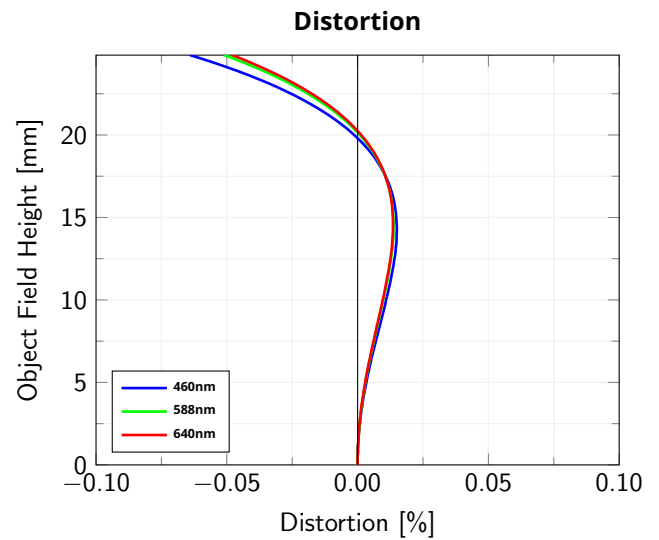


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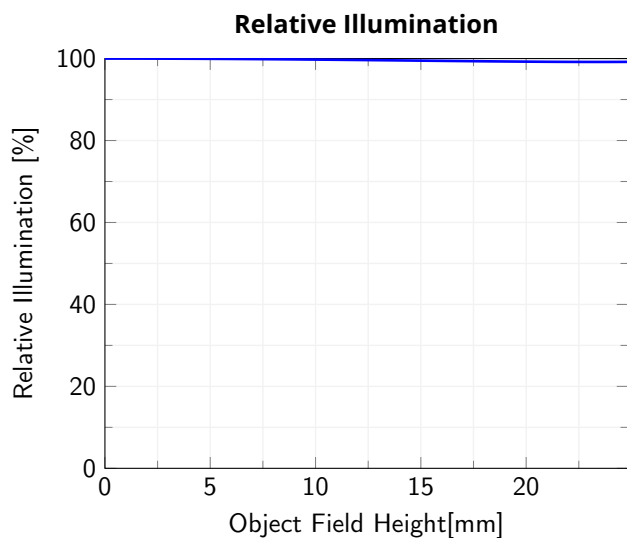
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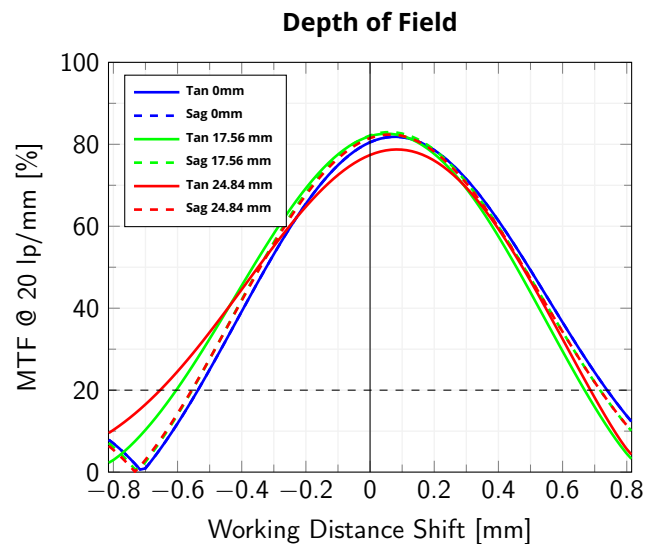
Modulation Transfer Function (MTF) vs. Image Resolution, wavelength range 460-640 nm,  $wf/N = 10$



Object Field Height vs. Distortion, from the optical axis to the corner of the field of view,  $wf/N = 10$



Relative illumination vs. Object Field Height, from the optical axis to the corner of the field of view,  $wf/N = 10$



Modulation Transfer Function (MTF) @ 20 lp/mm vs. Working Distance Shift from the best focus Working Distance, wavelength range 460-640 nm,  $wf/N = 10$

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