



# Bi Telecentric Objectives

- High accuracy optical measurement
- Mechanical part inspection
- Plastic part inspection
- Pharmaceutical device inspection
- Glass component inspection
- Electronic device inspection
- High definition print inspection
- Photolithography mask measurement
- Cellular imaging

German quality as standard. A bi-telecentric lens from Opto represents the pinnacle of optical quality, innovation, and performance.



100% tested and certified to  
German engineering standards



- Large Field Depth
- Zero perspective error with three dimensional objects
- Homogeneous image acquisition with high light sensitivity
- High resolution object and image side telecentric imaging
- Universal C-Mount
- C-Mount cameras supported up to 2/3"

#### Applications

- **Measurement of profiles**
- **Diameter measurements**
- **Optical metrology**
- **Electronic component alignment**

## Parallax free

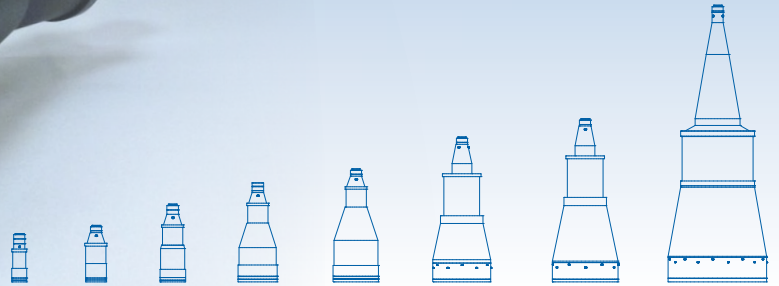
Opto telecentric lenses have been developed for high-precision measurement applications in machine vision. The advantage of these high-quality optics lies in their bi-telecentric design – meaning that they are fully telecentric on both the object and image side of the optic. Due to the object-sided telecentricity being spatially extended, 3D objects are imaged with zero error perspective. With its image-sided telecentricity, the optical system is far less reliant on the mechanical tolerances of the camera, and exhibits a far more uniform projection onto the camera chip with zero edge vignetting.

## Large Depth of Field

All Opto telecentric lenses have been optically designed in such a way as to perfectly balance F-number and resolution, leading to a large Depth of field. This makes an Opto Telecentric lens the ideal choice for perfectly imaging the profile of deep objects.



All Opto Telecentric lenses are bi-telecentric, eliminating the accuracy issues associated with mono-telecentric lenses



## Low Distortion

Lens distortion is one of the most limiting factors in achieving an accurate optical measurement setup. A telecentric lens from Opto eliminates all of the common dis-tortion effects found in many machine vision lenses.

All Opto telecentrics are optimized for C-mount cameras with chip sizes up to 2/3", and represent the ideal solution for measurements of precision components with the best price : performance ratio.

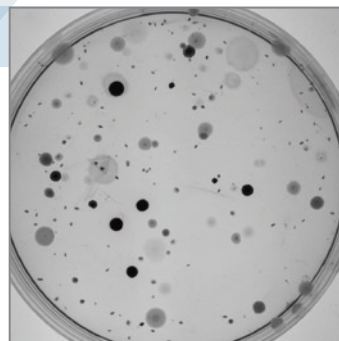
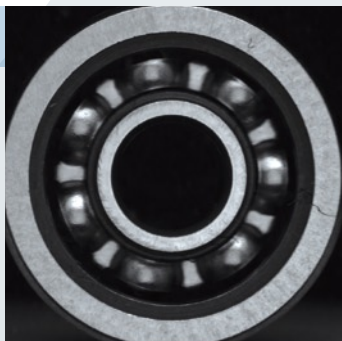
## Light Intensity

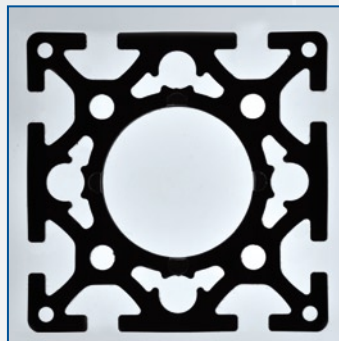
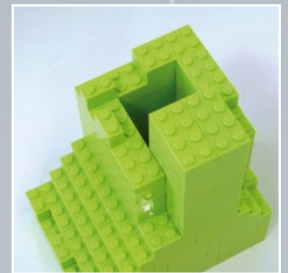
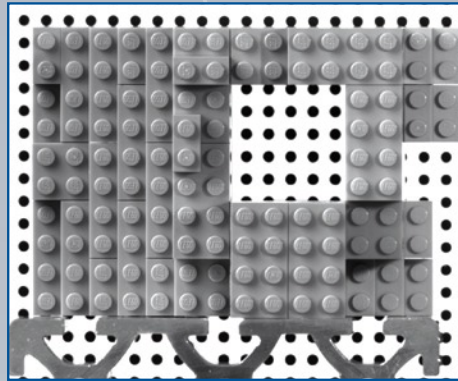
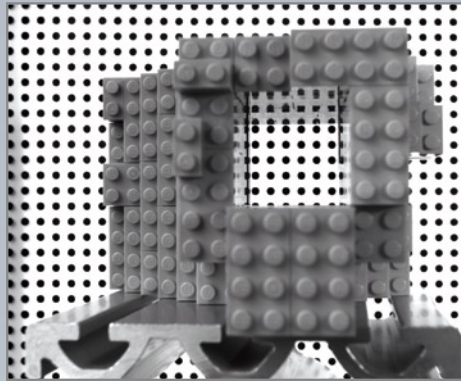
Thanks to its perfectly optimised optomechanical design, an Opto telecentric lens exhibits significantly enhanced light intensity and light efficiency as compared to many other lenses. This makes an Opto lens the ideal choice for every light-critical application such as textile inspection and print control.

## Easy Setup

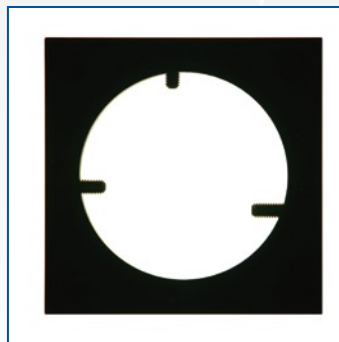
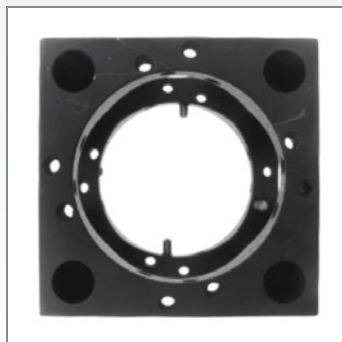
All Opto Telecentric lenses can be specified with our unique QuadraMount feature which provides a highly robust, universal mounting interface, significantly simplifying integration and alignment setup.

Lenses specified with the QuadraMount feature a universal square aluminium profile enabling simple integration, minimal alignment setup, reliable fastening and wide compatibility to the standard aluminium profiles used in many machine vision systems. With this interface, the lenses are far less sensitive to mechanical stress and vibration, and significantly simplify setup procedures.





Images taken with  
Standard Objective (left) and  
Bi-Telecentric Objective (right)



With standard non telecentric lenses, distortion and perspective errors are common making it impossible to perform accurate optical measurements.

With an Opto bi-telecentric lens, distortion and optical parallax are eliminated, enabling perfect optical measurements to be taken.

Article number		100-BTC-003	100-BTC-005	100-BTC-006	100-BTC-008
Magnification		0.03 x	0.05 x	0.06 x	0.08 x
Field of View 1/2" Chip	mm	218 x 163	125 x 94.1	106.7 x 80	79 x 59
Field of View 1/1.8" Chip	mm	242 x 180	139 x 104	118 x 89	88 x 65
Field of View 2/3" Chip	mm	290 x 218 *	167 x 125 *	142 x 106 *	105 x 79 *
Distortion	%	0.05	0.07	0.07	0.07
Telecentricity	°	0.05	0.08	0.08	0.08
Resolution (MTF@70LP/mm)	%	50	50	50	50
Aperture	F/#	8	8	8	8
Field Depth	mm	780	253	186	101
Working Distance	mm	732	416	355	256
Diameter x length	mm	306 x 854	205 x 502	179 x 446	141 x 346
Clamp diameter	mm	220	110	110	63
Clamp length	mm	136.7	120.7	120.8	54.5
Camera thread		C-Mount	C-Mount	C-Mount	C-Mount

Article number		100-BTC-010	100-BTC-016	100-BTC-020	100-BTC-032
Magnification		0.1 x	0.16 x	0.2 x	0.32 x
Field of View 1/2" Chip	mm	65 x 49	40.7 x 30.5	32 x 24	20.1 x 15.1
Field of View 1/1.8" Chip	mm	72 x 54	45 x 33.8	35 x 27	22.3 x 16.7
Field of View 2/3" Chip	mm	86 x 65 *	54 x 40.5 *	42.5 x 32 *	26.7 x 20 *
Distortion	%	0.07	0.08	0.08	0.08
Telecentricity	°	0.08	0.08	0.08	0.08
Resolution (MTF@70LP/mm)	%	50	50	45	45
Aperture	F/#	8	8	8	8
Field Depth	mm	68	27	17	7
Working Distance	mm	210	150	103	71
Diameter x length	mm	122 x 296	79 x 236	68 x 171	46 x 146
Clamp diameter	mm	63	63	63	40
Clamp length	mm	54.5	54.5	54.5	52
Camera thread		C-Mount	C-Mount	C-Mount	C-Mount

Specifications are subject to change without prior notice

\* Slightly vignetting possible

For more details visit [www.opto.de/btc](http://www.opto.de/btc)

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