Some information about Telecentric Lenses

Trying to measure the diameter of a large hole in a thick steel plate using a CCD camera with a standard objective, one can notice different results focusing either at the upper or to the lower end of the hole.

The reason for this occurrence is that the hole is larger than the entrance pupil of the CCD lens, so that the objective has to “look” both to the left and the right, and up and down to see the rim of the hole due to the perspective projection on to the CCD-chip. The hole therefore seems to be larger at the front of the steel plate, than looking through the hole at the back.

This problem can be solved optically by having the rays passing the object field parallel to the optical axis.
The name given to a set of optics designed to produce such a ray construction is named “telecentric”.

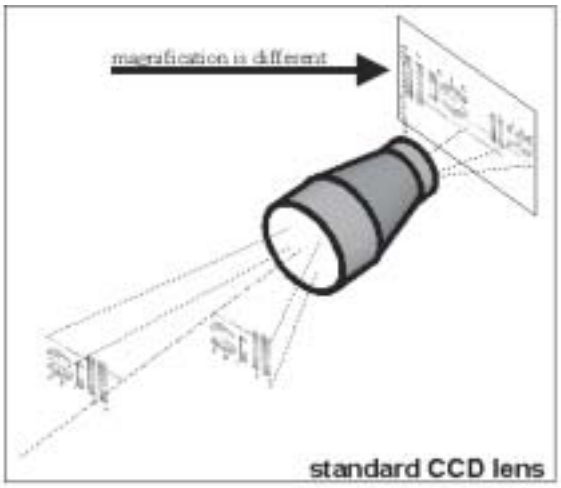
Telecentric objectives are working very successfully where either the distance is not exactly defined, or the length of the optical path is varying during the measurement process.

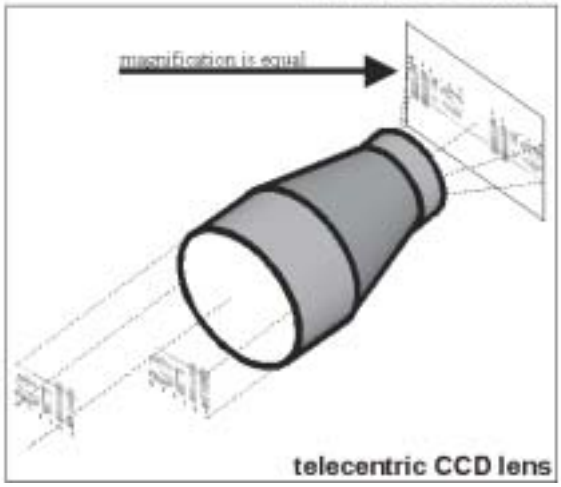
The depth of focus depends on the stop diameter and the allowed lack of focus, in general this range covers at least ± 1/ (Magnification) (in mm). The deviation of the chief rays to the horizontal axis is less than 1 mrad.

Telecentric CCD Camera Lenses are also available with a coaxial surface illumination. Fore more specifications look at our data sheet “Telecentric Lenses with coaxial surface illumination“.

Various lenses can be modified for different working distances. We will charge EUR 30,00 for this service per lens. Please note, that specified distortion figures is no longer valid in this case.

Nikon Bajonett Adapters with Sill P/N S5MEC2005 are available for EUR 53,00 incl. modification of adapter to flange focus distance of 46,50 mm.





What are some of the applications?

Telecentric objectives are mostly used in machine vision applications.
Some examples are as follows:

- Computer integrated manufacturing - measurement and statistical process control
- Profile or contour gauging
- Large field coordinate measuring machines
- Inspection of IC leads and packages
- Gauging and process control of precision manufactured small parts
- Printed circuit board inspection and defect detection
- Inspection of electrical or mechanical connectors
- Wire bonding machinery

Sill Optics GmbH & Co. KG • Johann-Höllfritsch-Str. 13 • D-90530 Wendelstein
Tel.: +49 / 91 29 / 90 23 -0 • Fax: +49 / 91 29 / 90 23 23 • E-mail: info@silloptics.de • Web: http://www.silloptics.de