

## BI-TELECENTRIC LENSES FOR LINEAR DETECTORS UP TO 4KPIX



TCL Telecentric Lenses for LineScan cameras are the typical choice for those measurement applications requiring accuracy to determine the diameter of cylindrical objects (shafts, turned metal parts, machine tools, ...) or for scanning of large parts (i.e. engine parts, metal sheets, extruded parts, ...).

TCL Bi-Telecentric Lenses have been specifically designed to fit 4k-pixel linear detectors, such as linear 4096 x 7 micron or 2048 x 14 micron detectors. These double-sided telecentric lenses can also be interfaced to Large Detector Cameras with imager diagonal up to 30 mm.

Besides the standard F-mount any other mechanical interface can be easily supplied on request.

Part Number	magn. (x)	Detector Type					Optical Specifications						Dimensions		
		4k		2k		1k	W.D. (1)	F/N (2)	Telecen- tricity (4)	Dist. (%)	Field Depth (3)	CTF @ 70 lp/mm %	Mount	Length (5)	Diam. (mm)
		4k x 7 um (mm)	2k x 14um (mm)	2k x 10um (mm)	2k x 7um (mm)	1k x 10um (mm)									
<b>Object Field of View (mm)</b>															
<b>TCL 040</b>	0,665	43,1	43,1	30,8	21,5	15,3	184	12	<0,1	<0,08	1,8	>30	F	288	75
<b>TCL 060</b>	0,478	60,0	60,0	42,9	29,9	21,3	230	9	<0,08	<0,08	4	>30	F	425,7	107
<b>TCL 080</b>	0,359	80,8	80,8	57,1	39,9	28,4	243	9	<0,1	<0,10	6	>30	F	418,8	116
<b>TCL 120</b>	0,239	120,0	120,0	85,7	59,8	42,7	250	8	<0,1	<0,15	14	>30	F	423,8	146

(1) Working Distance: distance between the front lens and the object. Set this distance within +/- 3% of the nominal value for maximum resolution and minimum distortion

(2) Working F-number: the real F-number of a lens when used as a macro. Lenses with smaller apertures can be supplied on request

(3) 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

(4) Maximum slope of principal rays inside the lens: when converted to millirad, it gives the maximum measurement error for any millimeter of object displacement

(5) Measured from the front end of the mechanics to the camera flange