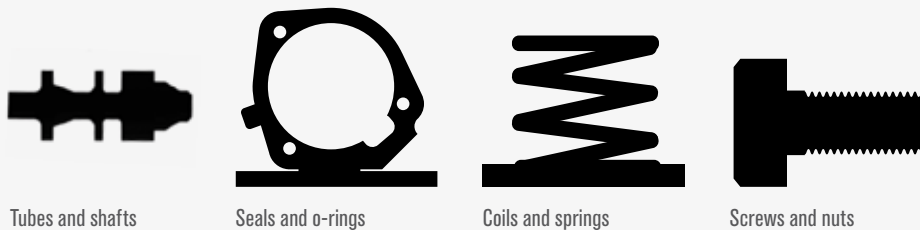




Opto Engineering collimated illuminators have been specifically designed to back illuminate objects imaged by telecentric lenses. This type of illumination is strongly recommended for high accuracy measurement of round or cylindrical parts where diffusive back lighting would offer poor performances.



**EXAMPLES OF MEASUREMENT APPLICATIONS WHERE LTCL ILLUMINATORS ARE NEEDED**



**OPTICAL AND MECHANICAL SPECIFICATIONS & COMPATIBILITY CHART**

Choose the best matching collimated light for your bi-telecentric lens with the chart below:

Part Number (*)	Beam Diameter (mm)	AVAILABLE COLOURS						MECHANICAL SPECS		COMPATIBLE TELECENTRIC LENSES					
		/R	/G	/B	/W	/IR 890	/IR 940	Length (mm)	Outer Diameter (mm)	TC13yyy yyy=	TC12yyy yyy=	TC23yyy yyy=	TC4Myyy yyy=	TC2Myyy yyy=	TC16M yyy=
LT CL 23/x	16	x	x	x	x	x	x	88,6	28	n.a.	n.a.	0x,12	04,07,09	n.a.	n.a.
LT CL 16/x	20	x	x	x	x	x	x	86,7	38	n.a.	16	16	16	16	n.a.
LT CL 24/x	30	x	x	x	x	x	x	115,5	44	n.a.	24	24	24	24	n.a.
LT CL 36/x	45	x	x	x	x	x	x	138,9	61	36	36	36	36	36	36
LT CL 48/x	60	x	x	x	x	x	x	174,0	75	n.a.	48	48	48	48	48
LT CL 56/x	70	x	x	x	x	x	x	197,3	80	n.a.	56	56	56	56	56
LT CL 64/x	80	x	x	x	x	x	x	218,4	100	64	64	64	64	64	64
LT CL 80/x	100	x	x	x	x	x	x	264	116	n.a.	80	72, 80	72, 80	80	80
LT CL 96/x	120	x	x	x	x	x		309	143	96	96	85, 96	85, 96	96	96
LT CL 120/x	150	x	x		x			395	180	n.a.	120	110, 120	110, 120	120	120
LT CL 144/x	180	x	x					454	200	n.a.	144	130, 144	130, 144	144	144
LT CL 192/x	250	x	x					595	260	n.a.	192	172, 192	172, 192	192	n.a.
LT CL 240/x	300	x	x					756	322	n.a.	n.a.	200, 240	200, 240	n.a.	n.a.



**KEY ADVANTAGES**

**COMPLETE LIGHT COUPLING**

All the light emitted by a LTCL source is collected by a telecentric lens and transferred to the camera detector, ensuring very high signal-to-noise ratio.

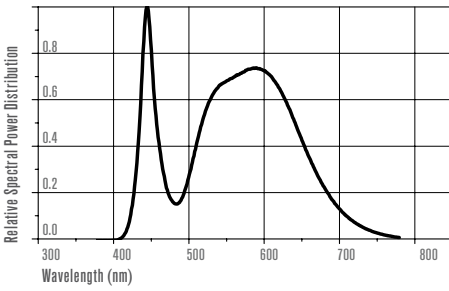
**BORDER EFFECTS REMOVAL**

Diffused back-illuminators often make objects seem smaller than real because of light reflections on the object sides, while collimated rays are much less reflected.

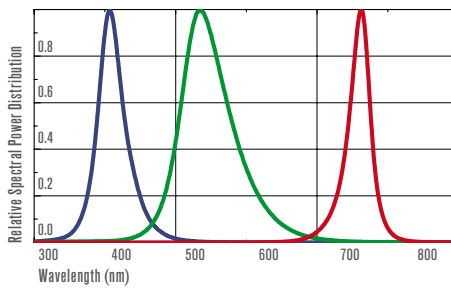
**FIELD DEPTH AND TELECENTRICITY IMPROVEMENT**

Collimated illumination increases the field depth and telecentricity of a telecentric lens far beyond its nominal specs.

**TYPICAL EMISSION SPECTRUM OF WHITE**



**TYPICAL EMISSION SPECTRUM OF R,G,B LEDs**

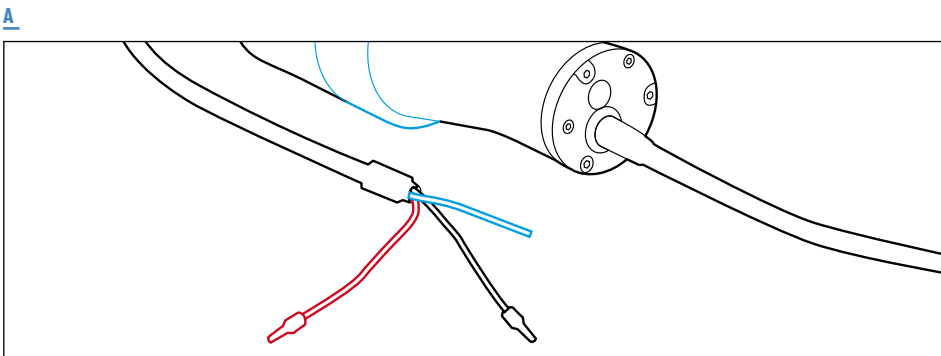
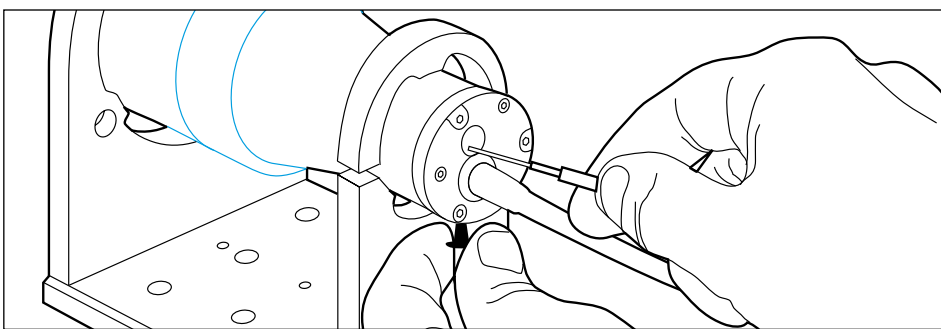
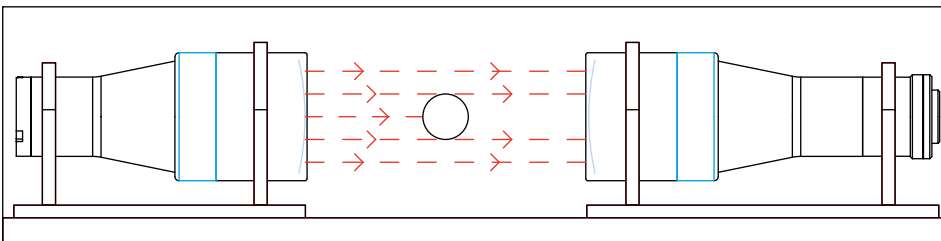


**TYPICAL EMISSION SPECTRUM OF INFRARED**

/IR890 version: peak emission wavelength 890 nm, optical bandpass +/- 30 nm FWHM (class IIIb).

/IR940 version: peak emission wavelength 940 nm, optical bandpass +/- 30 nm FWHM (class IIIb).

Part Number	Light Color, Peak Wavelength	DEVICE POWER RATINGS			LED POWER RATINGS		
		Min DC Voltage (volt)	Max DC Voltage (volt)	Power Consumption (watt)	Forward Voltage (volt)	Forward Current (mA)	Pulse Ratings @10% Duty at 1kHz (mA)
<b>Visible Light</b>							
/R type	red, 630 nm	12	24	< 2	2,5	350	< 1800
/G type	green, 520 nm	12	24	< 2	3,5	350	< 1800
/B type	blue, 460 nm	12	24	< 2	3,5	350	< 1800
/W type	white	12	24	< 2	3,5	300	< 1800
<b>IR Light</b>							
/IR890 type	IR, 890 nm	12	24	< 2	1,6	500	n.a.
/IR940 type	IR, 940 nm	12	24	< 2	1,6	500	n.a.



The following light colors are available:

- /R= red, peak at 630 nm
- /G= green, peak at 520 nm
- /B= blue, peak at 460 nm
- /W = white
- /IR890 = infrared, peak at 890 nm
- /IR940 = infrared, peak at 940 nm

For example the Part Number "LTCL 64 /G" defines a LTCL 64 type collimated source equipped with green (/G) LEDs.

Green light is recommended for high precision measurement applications: it ensures the lowest distortion and the highest telecentricity, also delivering the highest signal/noise ratio and the best image resolution.

**EASY AND PRECISE ALIGNMENT WITH BI-TELECENTRIC LENSES**

Every collimated source up to LTCL144/x can be mounted on the same clamping mechanics (CMHO Series) used to fix and align our telecentric lenses. You can create the perfect optical bench for any precision measurement application by interfacing our bi-telecentric lenses and LTCL collimated illuminators with these precision clamps.

**ELECTRICAL FEATURES**

**A BUILT-IN ELECTRONICS**

You can easily adjust the light intensity of any LTCL illuminator thanks to the built-in electronics board, which ensures a constant current flow through the LED source. This delivers excellent illumination stability and increases the product lifetime.

To do so, just connect the black and brown cables to your 12/24V power supply.

**B DIRECT LED CONTROL**

The inner circuitry can be bypassed in order to drive the LED directly for use in continuous or pulsed mode. To do so, simply connect the black and blue cables to your power supply or external strobe controller.

Make sure that the maximum rates are not exceeded to avoid electrical shorts.

**B**