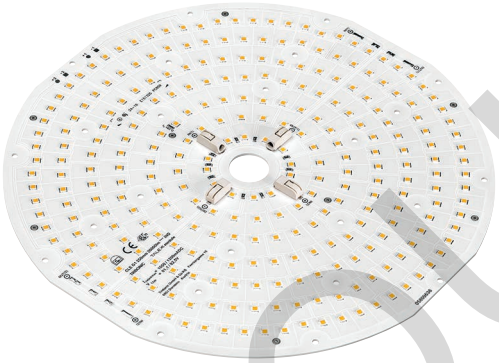
Module CLE G1 250mm ADV IND

Modules CLE advanced

Product description

- LED modules for diffuse highbay applications
- Luminous flux: 26,000 lm per module
- Efficacy of the module up to 155 lm/W
- High colour rendering index CRI > 80
- Small colour tolerance MacAdam 3①
- Colour temperatures 4,000, 5,000 and 6,500 K
- Push terminals for quick and simple wiring of LED module
- Simple installation (e.g. screws)
- 5-year guarantee



Standards, page 3

Colour temperatures and tolerances, page 7

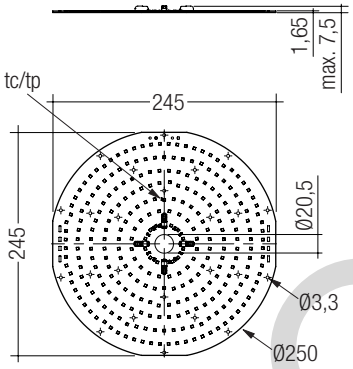
RoHS

Module CLE G1 250mm ADV IND

Modules CLE advanced

Technical data

Beam characteristic	120°
Ambient temperature range	-25 … +45 °C
tp rated	65 °C
tc	85 °C
Irated	1,050 mA
Imax	1,200 mA
Max. DC forward current	1,500 mA
Max. permissible LF current ripple	1,650 mA
Max. permissible peak current	4,000 mA / max. 10 ms
Max. working voltage for insulation[2]	500 V
Insulation test voltage	2 kV
CTI of the printed circuit board	≥ 600
ESD classification	severity level 4
Risk group (IEC 62471:2008) for 4,000 K[3]	RG0
Risk group (IEC 62471:2008) for 5,000 / 6,000 K[3]	RG2 (Ethr = 342 lx, RG1 at d > tbd)
Classification acc. to IEC 62031	Built-in
Type of protection	IP00



Details see 3.4 Mounting instructions

Ordering data

Type	Article number	Colour temperature	Packaging carton	Weight per pc.
CLE G1 250mm 26000lm 840 ADV IND	**89602747**	4,000 K	25 pc(s).	0.235 kg
CLE G1 250mm 26000lm 850 ADV IND	**89602748**	5,000 K	25 pc(s).	0.235 kg
CLE G1 250mm 26000lm 865 ADV IND	**89602749**	6,500 K	25 pc(s).	0.235 kg

Specific technical data

Type[4]	Photo-metric code[6]	Typ. luminous flux at tp = 25 °C[5] [6]	Typ. luminous flux at tp = 65 °C[5] [6]	Typ. forward current[7]	Min. forward voltage at tp = 65 °C[7]	Max. forward voltage at tp = 25 °C[7]	Typ. power consumption at tp = 65 °C[5] [7]	Efficacy of the module at tp = 25 °C[6]	Efficacy of the module at tp = 65 °C[6]	Efficacy of the system at tp = 65 °C[6]	Colour rendering index CRI[6]
Operating mode HE at 700 mA											
CLE G1 250mm 26000lm 840 ADV IND	840/359	18,930 lm	18,020 lm	700 mA	75.5 V	84.1 V	55.1 W	166 lm/W	163 lm/W	147 lm/W	> 80
CLE G1 250mm 26000lm 850 ADV IND	850/359	19,350 lm	18,280 lm	700 mA	75.5 V	84.1 V	55.1 W	170 lm/W	166 lm/W	149 lm/W	> 80
CLE G1 250mm 26000lm 865 ADV IND	865/359	19,220 lm	18,150 lm	700 mA	75.5 V	84.1 V	55.1 W	168 lm/W	164 lm/W	148 lm/W	> 80
Operating mode NM at 1,050 mA											
CLE G1 250mm 26000lm 840 ADV IND	840/359	27,600 lm	26,270 lm	1,050 mA	78.5 V	87.3 V	85.9 W	155 lm/W	153 lm/W	138 lm/W	> 80
CLE G1 250mm 26000lm 850 ADV IND	850/359	28,210 lm	26,650 lm	1,050 mA	78.5 V	87.3 V	85.9 W	159 lm/W	155 lm/W	140 lm/W	> 80
CLE G1 250mm 26000lm 865 ADV IND	865/359	28,000 lm	26,450 lm	1,050 mA	78.5 V	87.3 V	85.9 W	158 lm/W	154 lm/W	139 lm/W	> 80
Operating mode HO at 1,200 mA											
CLE G1 250mm 26000lm 840 ADV IND	840/359	31,150 lm	29,650 lm	1,200 mA	79.8 V	88.6 V	99.7 W	151 lm/W	148 lm/W	133 lm/W	> 80
CLE G1 250mm 26000lm 850 ADV IND	850/359	31,780 lm	30,020 lm	1,200 mA	79.8 V	88.6 V	99.7 W	154 lm/W	150 lm/W	135 lm/W	> 80
CLE G1 250mm 26000lm 865 ADV IND	865/359	31,550 lm	29,800 lm	1,200 mA	79.8 V	88.6 V	99.7 W	153 lm/W	149 lm/W	134 lm/W	> 80

[1] Integral measurement over the complete module.

[2] If mounted with M3 screws.

[3] Measured at operating mode HO.

[4] HE … high efficiency, NM … nominal mode, HO … high output.

[5] Tolerance range for optical and electrical data: ±10 %.

[6] Value for the whole module.

[7] Value per channel (2 channels per module, see 3.2 Wiring).

1. Standards

IEC 62031
IEC 62471
IEC 61000-4-2

1.1 Photometric code

Key for photometric code, e. g. 830 / 449

1st digit		2nd + 3rd digit	4th digit	5th digit	6th digit	
Code	CRI	Colour temperature in Kelvin x 100	MacAdam initial	MacAdam after 25% of the life-time (max.6000h)	Luminous flux after 25% of the life-time (max.6000h)	
					Code	Luminous flux
7	70 – 79				7	≥ 70 %
8	80 – 89				8	≥ 80 %
9	≥90				9	≥ 90 %

1.2 Energy classification

Type	Energy classification
CLE G1 250mm 26000lm 840 ADV IND	A++
CLE G1 250mm 26000lm 850 ADV IND	A++
CLE G1 250mm 26000lm 865 ADV IND	A++

2. Thermal details

2.1 tc point, ambient temperature and life-time

The temperature at tp reference point is crucial for the light output and life-time of a LED product.

For CLE a tp temperature of 65 °C has to be complied in order to achieve an optimum between heat sink requirements, light output and life-time.

Compliance with the maximum permissible reference temperature at the tc point must be checked under operating conditions in a thermally stable state. The maximum value must be determined under worst-case conditions for the relevant application.

The tc and tp temperature of LED modules from Tridonic are measured at the same reference point.

2.2 Storage and humidity

Storage temperature	-30 … +80 °C

Operation only in non condensing environment.
Humidity during processing of the module should be between 0 to 70 %.

2.3 Thermal design and heat sink

The rated life of LED products depends to a large extent on the temperature. If the permissible temperature limits are exceeded, the life of the CLE will be greatly reduced or the CLE may be destroyed.

2.4 Heat sink values

CLE G1 250mm 26000lm 8xx ADV IND			
ta	**tp**	**Forward current**	**$R_{th, hs-a}$**
25 °C	65 °C	1,050 mA	0.38 K/W
35 °C	65 °C	1,050 mA	0.28 K/W
40 °C	65 °C	1,050 mA	0.23 K/W
45 °C	65 °C	1,050 mA	0.19 K/W
50 °C	65 °C	1,050 mA	0.14 K/W
55 °C	65 °C	1,050 mA	0.09 K/W
65 °C	65 °C	1,050 mA	0.04 K/W

Notes
The actual cooling surface can differ because of the material, the structural shape, outside influences and the installation situation. Depending on the heat sink a heat conducting paste or heat conducting film might be necessary to keep the specified tp temperature.

3. Installation / wiring

3.1 Electrical supply/choice of LED Driver

CLE modules from Tridonic are not protected against overvoltages, overcurrents, overloads or short-circuit currents. Safe and reliable operation can only be guaranteed in conjunction with a LED Driver which complies with the relevant standards. The use of LED Driver from Tridonic in combination with CLE modules guarantees the necessary protection for safe and reliable operation.

If a LED Driver other than Tridonic is used, it must provide the following protection:
- Short-circuit protection
- Overload protection
- Overtemperature protection

CLE modules must be supplied by a constant current LED Driver. Operation with a constant voltage LED Driver will lead to an irreversible damage of the module.

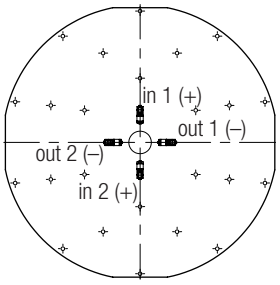
Wrong polarity can damage the CLE.

Parallel wiring of the channel is not allowed.

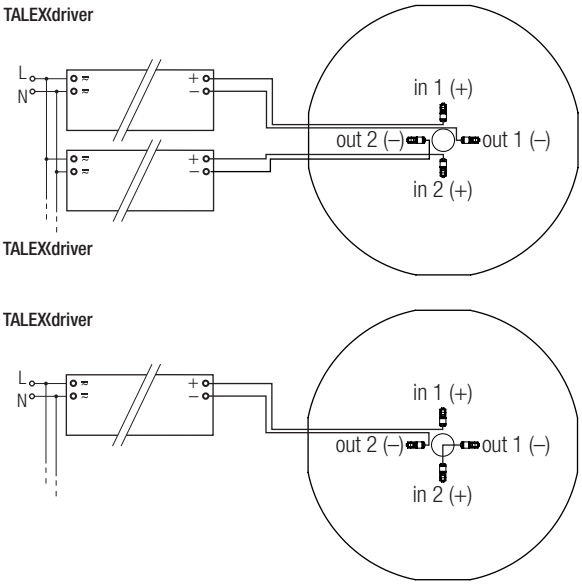
CLE modules can be operated from LED Drivers with LV output voltage.

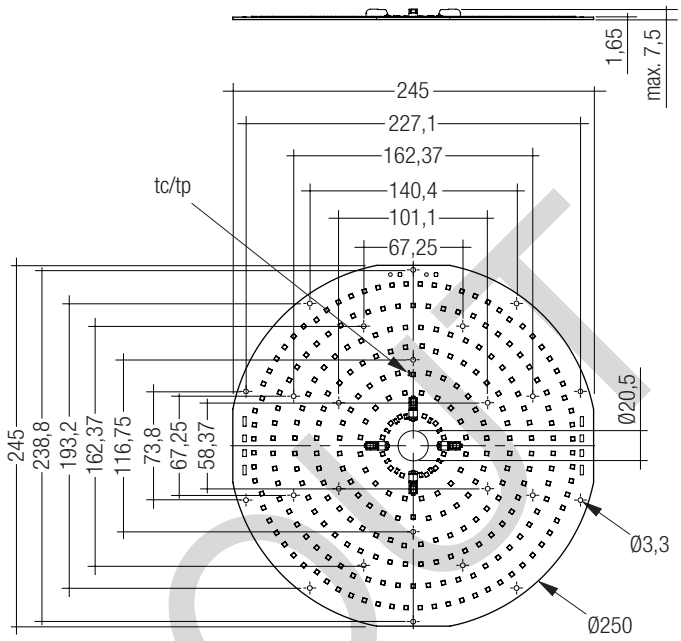
CLE modules are basic isolated up to 500 V (if mounted with M3 screws with head diameter 7 mm) against ground and can be mounted directly on earthed metal parts of the luminaire. If the max. output voltage of the LED Driver (also against earth) is above 500 V, an additional isolation between LED module and heat sink is required (for example by isolated thermal pads) or by a suitable luminaire construction.
At voltages > 60 V an additional protection against direct touch (test finger) to the light emitting side of the module has to be guaranteed. This is typically achieved by means of a non removable light distributor over the module.

3.2 Wiring



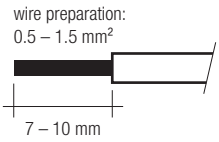
Wiring examples





3.3 Wiring type and cross section

The wiring can be in stranded wires or solid with a cross section of 0.5 to 1.5 mm².
For the push-wire connection you have to strip the insulation (7–10 mm).



To remove the wires use a suitabel tool (e.g. Microcon release pin) or through twist and pull .

3.4 Mounting instruction

None of the components of the CLE (substrate, LED, electronic components etc.) may be exposed to tensile or compressive stresses.

Max. torque for fixing: 0.5 Nm.

The LED modules are mounted with M3 screws.

Chemical substance may harm the LED module. Chemical reactions could lead to colour shift, reduced luminous flux or a total failure of the module caused by corrosion of electrical connections.

Materials which are used in LED applications (e.g. sealings, adhesives) must not produce dissolver gas. They must not be condensation curing based, acetate curing based or contain sulfur, chlorine or phthalate.
Avoid corrosive atmosphere during usage and storage.

3.5 EOS/ESD safety guidelines

The device / module contains components that are sensitive to electrostatic discharge and may only be installed in the factory and on site if appropriate EOS/ESD protection measures have been taken. No special measures need be taken for devices/modules with enclosed casings (contact with the pc board not possible), just normal installation practice. Please note the requirements set out in the document EOS / ESD guidelines (Guideline_EOS_ESD.pdf) at: http://www.tridonic.com/esd-protection

4. Life-time

4.1 Life-time, lumen maintenance and failure rate

The light output of an LED Module decreases over the life-time, this is characterized with the L value.
L70 means that the LED module will give 70 % of its initial luminous flux.
This value is always related to the number of operation hours and therefore defines the life-time of an LED module.

As the L value is a statistical value and the lumen maintenace may vary over the delivered LED modules.
The B value defines the amount of modules which are below the specific L value, e.g. L70B10 means 10 % of the LED modules are below 70 % of the inital luminous flux, respectivly 90 % will be above 70 % of the initial value. In addition the percentage of failed modules (fatal failure) is characterized by the C value.

The F value is the combination of the B and C value. That means for F degradation and complete failures are considered, e.g. L70F10 means 10 % of the LED modules may fail or be below 70 % of the initial luminous flux.

4.2 Lumen maintenance for CLE

Forward current	tp temperature	L90 / F10	L90 / F50	L80 / F10	L80 / F50	L70 / F10	L70 / F50
700 mA	45 °C	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	50 °C	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	55 °C	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	60 °C	47,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	65 °C	40,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	70 °C	34,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	75 °C	29,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	80 °C	25,000 h	43,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	85 °C	21,000 h	35,000 h	48,000 h	50,000 h	50,000 h	50,000 h
1.050 mA	45 °C	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	50 °C	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	55 °C	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	60 °C	43,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	65 °C	37,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	70 °C	31,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	75 °C	27,000 h	47,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	80 °C	23,000 h	39,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	85 °C	19,000 h	32,000 h	45,000 h	50,000 h	50,000 h	50,000 h
1,200 mA	45 °C	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	50 °C	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	55 °C	49,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	60 °C	42,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	65 °C	35,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	70 °C	30,000 h	50,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	75 °C	26,000 h	45,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	80 °C	22,000 h	37,000 h	50,000 h	50,000 h	50,000 h	50,000 h
	85 °C	19,000 h	31,000 h	43,000 h	50,000 h	50,000 h	50,000 h

5. Electrical values

5.1 Declaration of electrical parameters

Irated ... Nominal operating current the module is designed for.

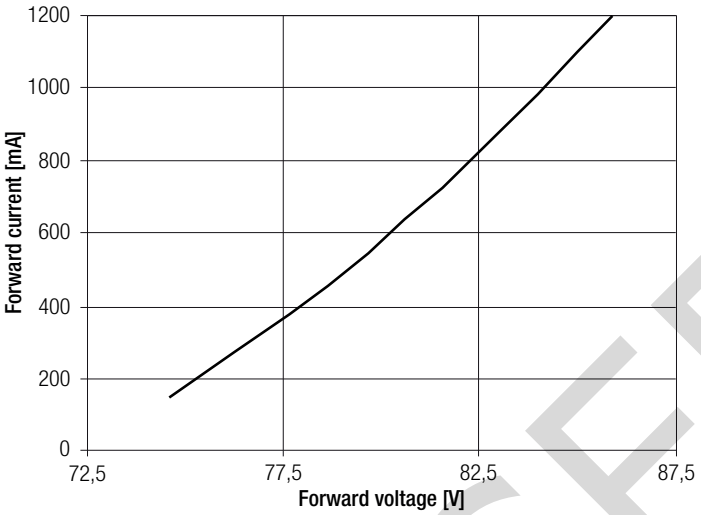
Imax ... Max. permissible continuous operating current.

Max. DC forward current ... Max. permissible continuous operating current incl. The tolerances of the LED driver. LED module may be destroyed if this value is exceeded.

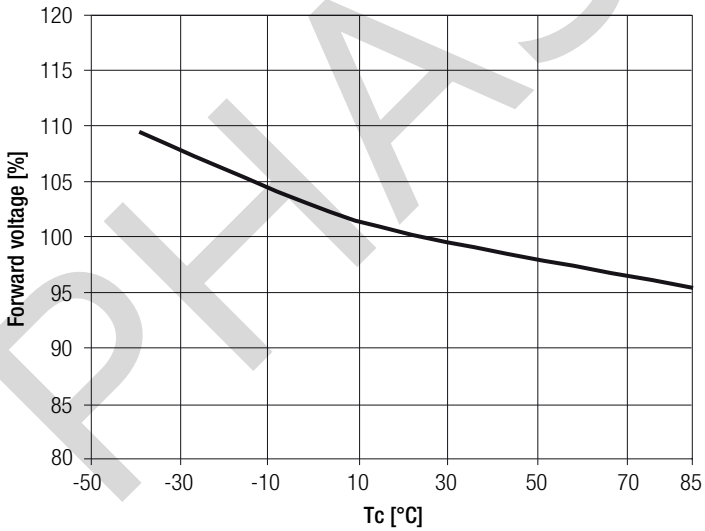
Max. permissible LF current ripple ... Max. output current of the LED driver incl. Tolerances and LF current ripple must not exceed this value.

Max. permissible peak current ... The max. output peak current of the LED driver must not exceed this value.

5.2 Typ. forward voltage vs. forward current



5.2 Forward voltage vs. tp temperature



The diagrams are based on statistic values.
The real values can be different.

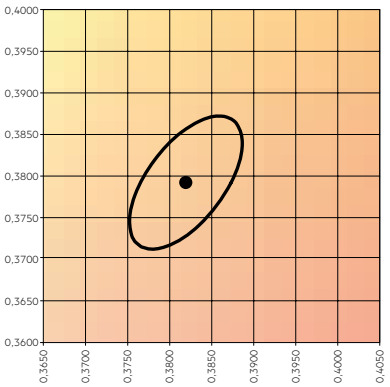
6. Photometric characteristics

6.1 Coordinates and tolerances according to CIE 1931

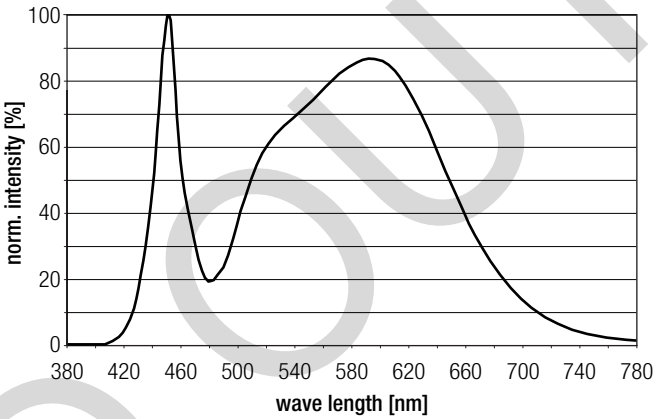
The specified colour coordinates are measured integral by a current impulse of 1,050 mA and a duration of 100 ms.
The ambient temperature of the measurement is ta = 25 °C.
The measurement tolerance of the colour coordinates are ± 0.01.

4,000 K

	x0	y0
Centre	0.3818	0.3797

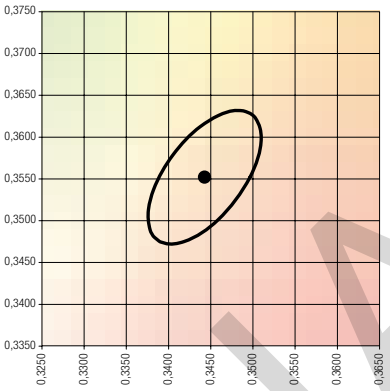


MacAdam Ellipse: 3SDCM

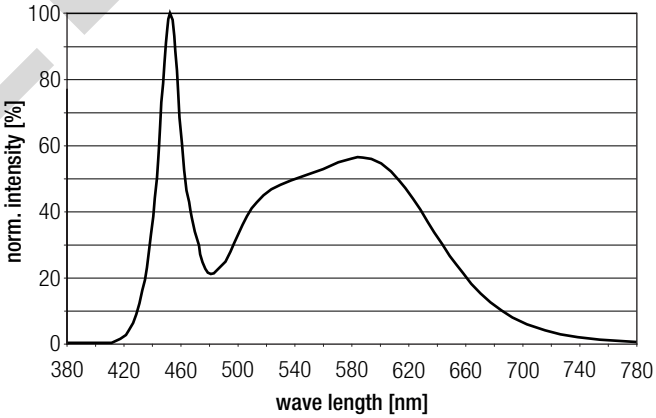


5,000 K

	x0	y0
Centre	0.3447	0.3553

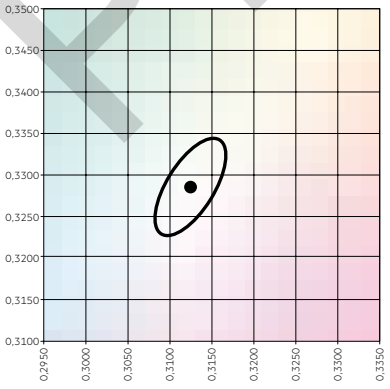


MacAdam Ellipse: 3SDCM

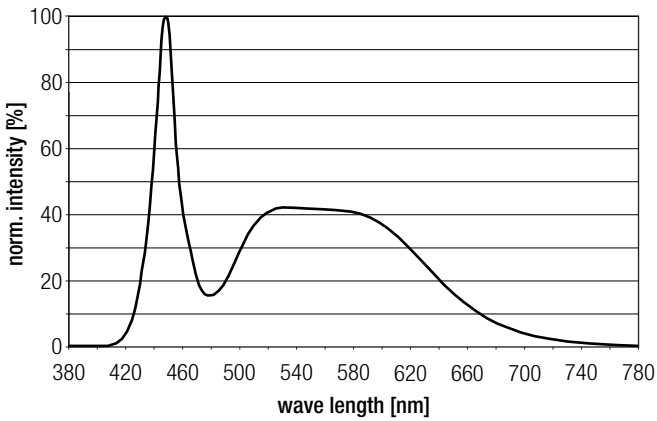


6,500 K

	x0	y0
Centre	0.3123	0.3282

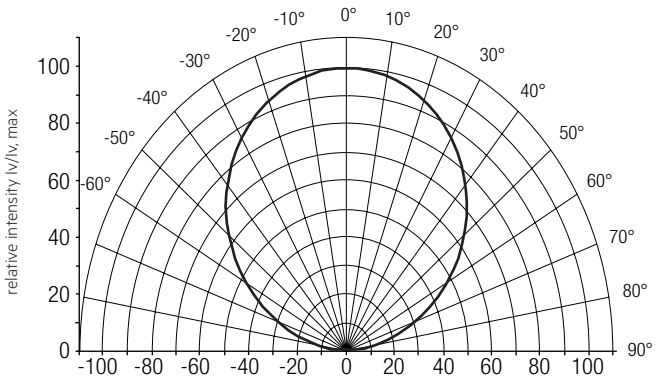


MacAdam Ellipse: 3SDCM



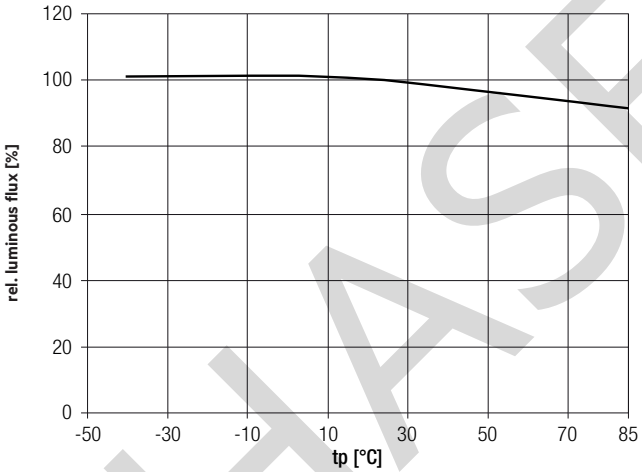
6.2 Light distribution

The optical design of the CLE product line ensures optimum homogenity for the light distribution.

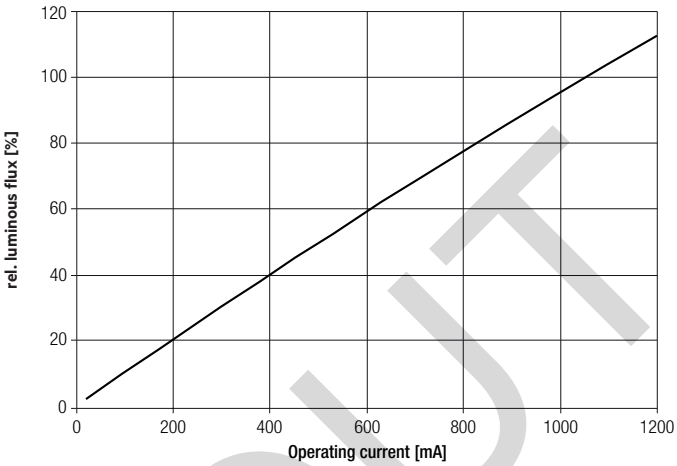


The colour temperature is measured integral over the complete module. The single LED light points can have deviations in the colour coordinates within MacAdam 3.
To ensure an ideal mixture of colours and a homogenious light distribution a suitable optic (e. g. PMMA diffuser) and a sufficient spacing between module and optic (typ. 6 cm) should be used.

6.3 Relative luminous flux vs. tc temperature



6.4 Relative luminous flux vs. operating current



7. Miscellaneous

7.1 Additional information

Additional technical information at www.tridonic.com → Technical Data

Guarantee conditions at www.tridonic.com → Services

Life-time declarations are informative and represent no warranty claim.