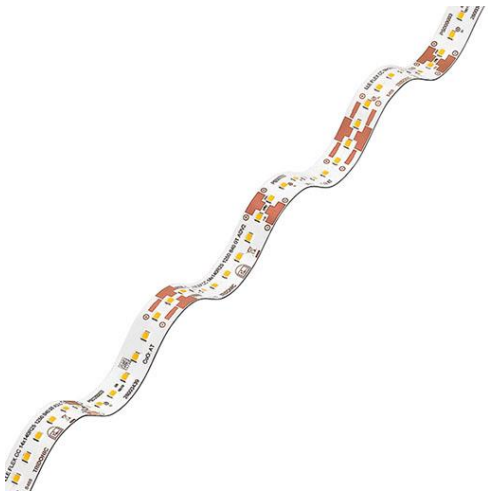
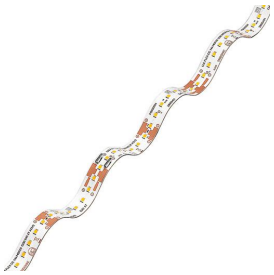
TRIDONIC

Module LLE FLEX CC 14mm 1250lm EXC

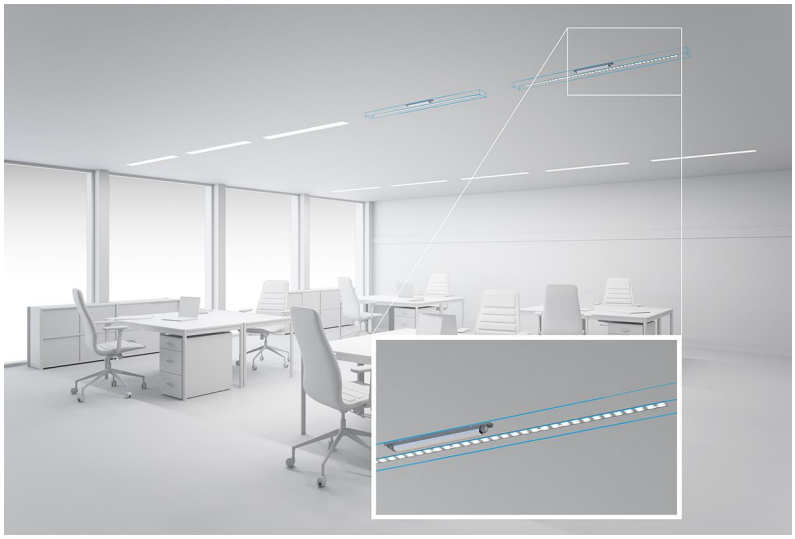
Modules LLE FLEX CC excite (constant current)



Without terminals



With terminals



Product description

_ Ideal for profile and linear luminaires made of extruded aluminium or sheet steel
_ Simplified logistic through flexible cut option – every 140 mm cuttable
_ 16 LEDs per 140 mm segment provide a very homogeneous light image, which remains uniform with a total length of 3 m when fed in from both sides
_ Two wiring options available – for soldering only and with pre-mounted low-profile terminals for easy and shadow-free wiring every 280 mm
_ Long lifetime up to 102,000 hours
_ 5 years guarantee (conditions at https://www.tridonic.com/en/int/services/manufacturer-guarantee-conditions)

Optical properties

_ Colour temperatures 2,700, 3,000, 3,500, 4,000 and 5,000 K
_ Useful luminous flux 1,303 lm/ft at Irated and tp = 25 °C
_ Efficacy of the LED module 199 lm/W at Irated and tp = 25 °C
_ High colour rendering index CRI > 80 and CRI > 90
_ Small colour tolerance (MacAdam 3)
_ Small luminous flux tolerances

Mechanical properties

_ The LLE FLEX CC is 14 mm wide, one tape is up to 25 m long and can be divided every 140 mm
_ The 3M 93015LE adhesive tape ensures simple installation and optimum heat dissipation, it is long-term stable and weatherproof

System solution

_ Combine Tridonic's LED modules and dimmable drivers to achieve an outstanding system efficacy (configuration possible via https://setbuilder.tridonic.com/)

Website

http://www.tridonic.com/28006059

Linear | High bay | Decorative | Downlights | Spotlights | Free-standing | Area | Floor | Wall | Street

Module LLE FLEX CC 14mm 1250lm EXC

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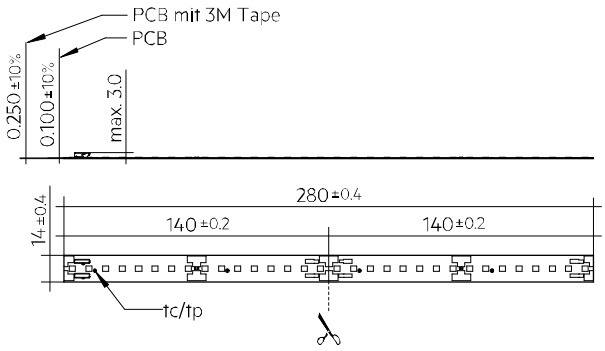


Ordering data

Type	Article number	Colour temperature	Roll length	Packaging, carton	Weight per pc.
Without terminals					
LLE FLEX CC 14x140R5 1250 827 0T EXC	**28006059**	2,700 K	5.04 m	1 pc(s).	0.286 kg
LLE FLEX CC 14x140R25 1250 830 0T EXC	**28006060**	3,000 K	25.20 m	1 pc(s).	0.501 kg
LLE FLEX CC 14x140R5 1250 835 0T EXC	**28006061**	3,500 K	5.04 m	1 pc(s).	0.286 kg
LLE FLEX CC 14x140R25 1250 840 0T EXC	**28006062**	4,000 K	25.20 m	1 pc(s).	0.501 kg
LLE FLEX CC 14x140R5 1250 927 0T EXC	**28006063**	2,700 K	5.04 m	1 pc(s).	0.286 kg
LLE FLEX CC 14x140R25 1250 930 0T EXC	**28006064**	3,000 K	25.20 m	1 pc(s).	0.501 kg
LLE FLEX CC 14x140R5 1250 935 0T EXC	**28006065**	3,500 K	5.04 m	1 pc(s).	0.286 kg
LLE FLEX CC 14x140R25 1250 940 0T EXC	**28006066**	4,000 K	25.20 m	1 pc(s).	0.501 kg
With terminals					
LLE FLEX CC 14x140R5 1250 827 2T EXC	**28006067**	2,700 K	5.04 m	1 pc(s).	0.296 kg
LLE FLEX CC 14x140R25 1250 830 2T EXC	**28006068**	3,000 K	25.20 m	1 pc(s).	0.526 kg
LLE FLEX CC 14x140R5 1250 835 2T EXC	**28006069**	3,500 K	5.04 m	1 pc(s).	0.296 kg
LLE FLEX CC 14x140R25 1250 840 2T EXC	**28006070**	4,000 K	25.20 m	1 pc(s).	0.526 kg
LLE FLEX CC 14x140R25 1250 850 2T EXC	**28006075**	5,000 K	25.20 m	1 pc(s).	0.526 kg
LLE FLEX CC 14x140R5 1250 927 2T EXC	**28006071**	2,700 K	5.04 m	1 pc(s).	0.296 kg
LLE FLEX CC 14x140R25 1250 930 2T EXC	**28006072**	3,000 K	25.20 m	1 pc(s).	0.526 kg
LLE FLEX CC 14x140R5 1250 935 2T EXC	**28006073**	3,500 K	5.04 m	1 pc(s).	0.296 kg
LLE FLEX CC 14x140R25 1250 940 2T EXC	**28006074**	4,000 K	25.20 m	1 pc(s).	0.526 kg

Technical data

Beam characteristic	120°
Ambient temperature ta	-35 … +50 °C
tp rated	55 °C
tc	80 °C
Irated ①	75 mA
Imax ①	180 mA
Max. permissible LF current ripple ①	220 mA
Max. permissible peak current ①	300 mA / max. 10 ms
Max. working voltage for insulation SELV	< 60 V
Insulation test voltage	0.5 kV
CTI of the printed circuit board	< 600
Colour tolerance	3 SDCM
ESD classification	Severity level 2
Risk group (IEC 62471) ②	RG1 (≤ 180 mA (Imax))
Classification acc. to IEC 62031	Built-in
Type of protection	IP00
Lumen maintenance L70B50	102,000 h
Guarantee (conditions at www.tridonic.com)	5 Year(s)

Approval marks

Standards

IEC 62031, IEC 62471, IEC 61000-4-2, IEC 62778, IEC 61547, UL 8750

Specific technical data

Type[3]	Article number	Photometric code	Useful luminous flux at tp = 25 °C[4][5]	Expected luminous flux at tp rated[4][6]	Typ. forward current[4]	Min. forward voltage at tp rated[4]	Max. forward voltage at tp = 25 °C[4]	Power consumption Pon at tp = 25 °C[4][7]	Efficacy of the module at tp = 25 °C	Expected efficacy of the module at tp rated	Colour rendering index CRI
Operating mode HE at 100 mA – values per foot (280 mm)											
LLE FLEX CC 14x140R5 1250 827 0T EXC	**28006059**	827/359	–	737 lm	100 mA	41.9 V	44.0 V	–	–	176 lm/W	>80
LLE FLEX CC 14x140R25 1250 830 0T EXC	**28006060**	830/359	–	789 lm	100 mA	41.9 V	44.0 V	–	–	188 lm/W	>80
LLE FLEX CC 14x140R5 1250 835 0T EXC	**28006061**	835/359	–	795 lm	100 mA	41.9 V	44.0 V	–	–	189 lm/W	>80
LLE FLEX CC 14x140R25 1250 840 0T EXC	**28006062**	840/359	–	838 lm	100 mA	41.9 V	44.0 V	–	–	199 lm/W	>80
LLE FLEX CC 14x140R5 1250 827 2T EXC	**28006067**	827/359	–	737 lm	100 mA	41.9 V	44.0 V	–	–	176 lm/W	>80
LLE FLEX CC 14x140R25 1250 830 2T EXC	**28006068**	830/359	–	789 lm	100 mA	41.9 V	44.0 V	–	–	188 lm/W	>80
LLE FLEX CC 14x140R5 1250 835 2T EXC	**28006069**	835/359	–	795 lm	100 mA	41.9 V	44.0 V	–	–	189 lm/W	>80
LLE FLEX CC 14x140R25 1250 840 2T EXC	**28006070**	840/359	–	838 lm	100 mA	41.9 V	44.0 V	–	–	199 lm/W	>80
LLE FLEX CC 14x140R25 1250 850 2T EXC	**28006075**	850/359	–	838 lm	100 mA	41.9 V	44.0 V	–	–	199 lm/W	>80
LLE FLEX CC 14x140R5 1250 927 0T EXC	**28006063**	927/359	–	624 lm	100 mA	41.9 V	44.0 V	–	–	149 lm/W	>90
LLE FLEX CC 14x140R25 1250 930 0T EXC	**28006064**	930/359	–	651 lm	100 mA	41.9 V	44.0 V	–	–	155 lm/W	>90
LLE FLEX CC 14x140R5 1250 935 0T EXC	**28006065**	935/359	–	681 lm	100 mA	41.9 V	44.0 V	–	–	167 lm/W	>90
LLE FLEX CC 14x140R25 1250 940 0T EXC	**28006066**	940/359	–	720 lm	100 mA	41.9 V	44.0 V	–	–	171 lm/W	>90
LLE FLEX CC 14x140R5 1250 927 2T EXC	**28006071**	927/359	–	624 lm	100 mA	41.9 V	44.0 V	–	–	149 lm/W	>90
LLE FLEX CC 14x140R25 1250 930 2T EXC	**28006072**	930/359	–	651 lm	100 mA	41.9 V	44.0 V	–	–	155 lm/W	>90
LLE FLEX CC 14x140R5 1250 935 2T EXC	**28006073**	935/359	–	681 lm	100 mA	41.9 V	44.8 V	–	–	167 lm/W	>90
LLE FLEX CC 14x140R25 1250 940 2T EXC	**28006074**	940/359	–	720 lm	100 mA	41.9 V	44.0 V	–	–	171 lm/W	>90
Operating mode NM at 150 mA – values per foot (280 mm)											
LLE FLEX CC 14x140R5 1250 827 0T EXC	**28006059**	827/359	1,147 lm	1,090 lm	150 mA	42.9 V	45.1 V	6.54 W	175 lm/W	169 lm/W	>80
LLE FLEX CC 14x140R25 1250 830 0T EXC	**28006060**	830/359	1,268 lm	1,167 lm	150 mA	43.0 V	45.1 V	6.54 W	186 lm/W	180 lm/W	>80
LLE FLEX CC 14x140R5 1250 835 0T EXC	**28006061**	835/359	1,236 lm	1,175 lm	150 mA	42.9 V	45.1 V	6.54 W	189 lm/W	182 lm/W	>80
LLE FLEX CC 14x140R25 1250 840 0T EXC	**28006062**	840/359	1,300 lm	1,239 lm	150 mA	42.9 V	45.1 V	6.54 W	199 lm/W	192 lm/W	>80
LLE FLEX CC 14x140R5 1250 827 2T EXC	**28006067**	827/359	1,147 lm	1,090 lm	150 mA	42.9 V	45.1 V	6.54 W	175 lm/W	169 lm/W	>80
LLE FLEX CC 14x140R25 1250 830 2T EXC	**28006068**	830/359	1,268 lm	1,167 lm	150 mA	43.0 V	45.1 V	6.54 W	186 lm/W	180 lm/W	>80
LLE FLEX CC 14x140R5 1250 835 2T EXC	**28006069**	835/359	1,236 lm	1,175 lm	150 mA	42.9 V	45.1 V	6.54 W	189 lm/W	182 lm/W	>80
LLE FLEX CC 14x140R25 1250 840 2T EXC	**28006070**	840/359	1,300 lm	1,239 lm	150 mA	42.9 V	45.1 V	6.54 W	199 lm/W	192 lm/W	>80
LLE FLEX CC 14x140R25 1250 850 2T EXC	**28006075**	850/359	1,303 lm	1,239 lm	150 mA	42.9 V	45.1 V	6.54 W	199 lm/W	192 lm/W	>80
LLE FLEX CC 14x140R5 1250 927 0T EXC	**28006063**	927/359	972 lm	924 lm	150 mA	42.9 V	45.1 V	6.54 W	149 lm/W	143 lm/W	>90
LLE FLEX CC 14x140R25 1250 930 0T EXC	**28006064**	930/359	1,013 lm	963 lm	150 mA	42.9 V	45.1 V	6.54 W	155 lm/W	149 lm/W	>90
LLE FLEX CC 14x140R5 1250 935 0T EXC	**28006065**	935/359	1,060 lm	1,008 lm	150 mA	42.9 V	45.1 V	6.54 W	162 lm/W	156 lm/W	>90
LLE FLEX CC 14x140R25 1250 940 0T EXC	**28006066**	940/359	1,100 lm	1,065 lm	150 mA	42.9 V	45.1 V	6.54 W	171 lm/W	165 lm/W	>90
LLE FLEX CC 14x140R5 1250 927 2T EXC	**28006071**	927/359	972 lm	924 lm	150 mA	42.9 V	45.1 V	6.54 W	149 lm/W	143 lm/W	>90
LLE FLEX CC 14x140R25 1250 930 2T EXC	**28006072**	930/359	1,013 lm	963 lm	150 mA	42.9 V	45.1 V	6.54 W	155 lm/W	149 lm/W	>90
LLE FLEX CC 14x140R5 1250 935 2T EXC	**28006073**	935/359	1,060 lm	1,008 lm	150 mA	42.9 V	45.1 V	6.54 W	162 lm/W	156 lm/W	>90
LLE FLEX CC 14x140R25 1250 940 2T EXC	**28006074**	940/359	1,120 lm	1,065 lm	150 mA	42.9 V	45.1 V	6.54 W	171 lm/W	165 lm/W	>90
Operating mode HO at 300 mA – values per foot (280 mm)											
LLE FLEX CC 14x140R5 1250 827 0T EXC	**28006059**	827/359	–	2,093 lm	300 mA	45.9 V	48.0 V	–	–	152 lm/W	>80
LLE FLEX CC 14x140R25 1250 830 0T EXC	**28006060**	830/359	–	2,242 lm	300 mA	45.9 V	48.0 V	–	–	162 lm/W	>80
LLE FLEX CC 14x140R5 1250 835 0T EXC	**28006061**	835/359	–	2,257 lm	300 mA	45.9 V	48.0 V	–	–	163 lm/W	>80
LLE FLEX CC 14x140R25 1250 840 0T EXC	**28006062**	840/359	–	2,379 lm	300 mA	45.9 V	48.0 V	–	–	172 lm/W	>80
LLE FLEX CC 14x140R5 1250 827 2T EXC	**28006067**	827/359	–	2,093 lm	300 mA	45.9 V	48.0 V	–	–	152 lm/W	>80
LLE FLEX CC 14x140R25 1250 830 2T EXC	**28006068**	830/359	–	2,242 lm	300 mA	45.9 V	48.0 V	–	–	162 lm/W	>80
LLE FLEX CC 14x140R5 1250 835 2T EXC	**28006069**	835/359	–	2,257 lm	300 mA	45.9 V	48.0 V	–	–	163 lm/W	>80
LLE FLEX CC 14x140R25 1250 840 2T EXC	**28006070**	840/359	–	2,379 lm	300 mA	45.9 V	48.0 V	–	–	172 lm/W	>80
LLE FLEX CC 14x140R25 1250 850 2T EXC	**28006075**	850/359	–	2,379 lm	300 mA	45.9 V	48.0 V	–	–	172 lm/W	>80
LLE FLEX CC 14x140R5 1250 927 0T EXC	**28006063**	927/359	–	1,774 lm	300 mA	45.9 V	48.0 V	–	–	128 lm/W	>90
LLE FLEX CC 14x140R25 1250 930 0T EXC	**28006064**	930/359	–	1,850 lm	300 mA	45.9 V	48.0 V	–	–	134 lm/W	>90
LLE FLEX CC 14x140R5 1250 935 0T EXC	**28006065**	935/359	–	1,935 lm	300 mA	45.9 V	48.0 V	–	–	140 lm/W	>90
LLE FLEX CC 14x140R25 1250 940 0T EXC	**28006066**	940/359	–	2,044 lm	300 mA	45.9 V	48.0 V	–	–	148 lm/W	>90
LLE FLEX CC 14x140R5 1250 927 2T EXC	**28006071**	927/359	–	1,774 lm	300 mA	45.9 V	48.0 V	–	–	128 lm/W	>90
LLE FLEX CC 14x140R25 1250 930 2T EXC	**28006072**	930/359	–	1,850 lm	300 mA	45.9 V	48.0 V	–	–	134 lm/W	>90
LLE FLEX CC 14x140R5 1250 935 2T EXC	**28006073**	935/359	–	1,935 lm	300 mA	45.9 V	48.0 V	–	–	140 lm/W	>90
LLE FLEX CC 14x140R25 1250 940 2T EXC	**28006074**	940/359	–	2,044 lm	300 mA	45.9 V	48.0 V	–	–	148 lm/W	>90

① Value for 1 segment (140 mm).
② Measured at Imax.
③ HE ... High Efficiency, NM ... Nominal Mode, HO ... High Output.
④ Values per foot (280 mm).
⑤ Tolerance of useful light flux - 0 % / + 15 %. Measurement uncertainty ± 10 %.
⑥ Tolerance of expected light flux - 0 % / + 15 %. Measurement uncertainty ± 10 %. Based on calculation.
⑦ Tolerance of power consumption Pon ± 10 %. Measurement uncertainty ± 5 %.

1. Standards

IEC 62031
IEC 62471
IEC 61000-4-2
IEC 62778
IEC 61547
UL 8750 (for CLASS2 circuits and dry locations)

1.1 Photometric code

Key for photometric code, e. g. 830 / 349

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 lifetime (max.6000h)	Luminous flux after 25% of the lifetime (max.6000h)	
					Code	Luminous flux
7	70 – 79				7	≥ 70 %
8	80 – 89				8	≥ 80 %
9	≥90				9	≥ 90 %

1.2 Energy classification

Type	Colour temperature	Forward current	Energy classification	Energy consumption
LLE FLEX CC 14x140 1250 827 EXC	2,700 K	150 mA	C	7 kWh / 1,000 h
LLE FLEX CC 14x140 1250 830 EXC	3,000 K	150 mA	C	7 kWh / 1,000 h
LLE FLEX CC 14x140 1250 835 EXC	3,500 K	150 mA	C	7 kWh / 1,000 h
LLE FLEX CC 14x140 1250 840 EXC	4,000 K	150 mA	C	7 kWh / 1,000 h
LLE FLEX CC 14x140 1250 850 EXC	5,000 K	150 mA	C	7 kWh / 1,000 h
LLE FLEX CC 14x140 1250 927 EXC	2,700 K	150 mA	D	7 kWh / 1,000 h
LLE FLEX CC 14x140 1250 930 EXC	3,000 K	150 mA	D	7 kWh / 1,000 h
LLE FLEX CC 14x140 1250 935 EXC	3,500 K	150 mA	D	7 kWh / 1,000 h
LLE FLEX CC 14x140 1250 940 EXC	4,000 K	150 mA	D	7 kWh / 1,000 h

* Values for each foot (280 mm).

Energy label and further information at www.tridonic.com in the certificates tab of the corresponding product page and at the EPREL data base https://eprel.ec.europa.eu/

2. Thermal details

2.1 tc point, ambient temperature and lifetime

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

For LLE a tp temperature of 55 °C has to be complied in order to achieve an optimum between heat sink requirements, light output and lifetime.

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	-35 … +80 °C

Operation only in non condensing environment.
Humidity during processing of the module should be between 30 to 70 %.

2.3 Heat sink values

LLE FLEX CC EXC

ta	tp	Forward current	$R_{th, hs-a}$*	Cooling area*
25 °C	55 °C	50 mA	30.25 K/W	self cooling
35 °C	55 °C	50 mA	20.18 K/W	self cooling
40 °C	55 °C	50 mA	15.13 K/W	44 cm²
45 °C	55 °C	50 mA	10.08 K/W	66 cm²
50 °C	55 °C	50 mA	5.03 K/W	132 cm²
25 °C	55 °C	100 mA	13.59 K/W	49 cm²
35 °C	55 °C	100 mA	9.06 K/W	74 cm²
40 °C	55 °C	100 mA	6.79 K/W	98 cm²
45 °C	55 °C	100 mA	4.52 K/W	147 cm²
50 °C	55 °C	100 mA	2.25 K/W	296 cm²
25 °C	55 °C	150 mA	8.53 K/W	78 cm²
35 °C	55 °C	150 mA	5.68 K/W	117 cm²
40 °C	55 °C	150 mA	4.26 K/W	157 cm²
45 °C	55 °C	150 mA	2.83 K/W	235 cm²
50 °C	55 °C	150 mA	1.41 K/W	473 cm²
25 °C	55 °C	200 mA	6.05 K/W	110 cm²
35 °C	55 °C	200 mA	4.03 K/W	165 cm²
40 °C	55 °C	200 mA	3.02 K/W	221 cm²
45 °C	55 °C	200 mA	2.01 K/W	332 cm²
50 °C	55 °C	200 mA	1.00 K/W	668 cm²
25 °C	55 °C	250 mA	4.62 K/W	144 cm²
35 °C	55 °C	250 mA	3.08 K/W	217 cm²
40 °C	55 °C	250 mA	2.30 K/W	289 cm²
45 °C	55 °C	250 mA	1.53 K/W	435 cm²
50 °C	55 °C	250 mA	0.76 K/W	878 cm²
25 °C	55 °C	300 mA	3.66 K/W	182 cm²
35 °C	55 °C	300 mA	2.43 K/W	274 cm²
40 °C	55 °C	300 mA	1.82 K/W	366 cm²
45 °C	55 °C	300 mA	1.21 K/W	551 cm²
50 °C	55 °C	300 mA	0.60 K/W	1,114 cm²
25 °C	55 °C	350 mA	2.99 K/W	223 cm²
35 °C	55 °C	350 mA	1.99 K/W	335 cm²
40 °C	55 °C	350 mA	1.49 K/W	448 cm²
45 °C	55 °C	350 mA	0.99 K/W	676 cm²
50 °C	55 °C	350 mA	0.49 K/W	1,370 cm²

* Values for each foot (280 mm).

Notes
The actual cooling surface can differ because of the material, the structural shape, outside influences and the installation situation.

3. Installation / wiring

3.1 Electrical supply/choice of LED driver

LLE 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 LLE 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

LLE 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 LLE.

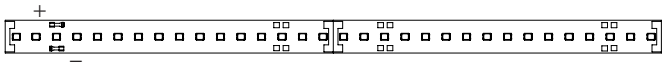
With parallel wiring tolerance-related differences in output are possible (thermal stress of the module) and can cause differences in brightness.

The max. permissible output current of the LED driver for parallel wiring is 1,900 mA.

LLE have to be operated with SELV LED drivers.

LLE are basic insulated up to 60 V SELV against ground and can be mounted directly on earthed metal parts of the luminaire. Insulation must be ensured at both ends of the applied LLE FLEX (> 500 V AC). If the max. output voltage of the LED driver (also against earth) is above 60 V SELV, an additional insulation between LED module and heat sink is required (for example by insulated thermal pads) or by a suitable luminaire construction.

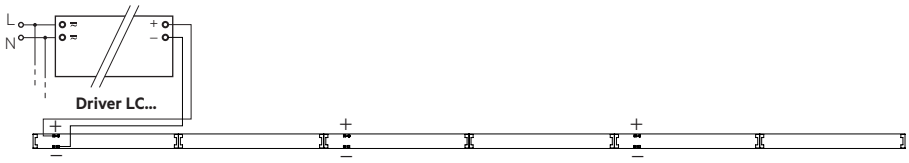
3.2 Wiring



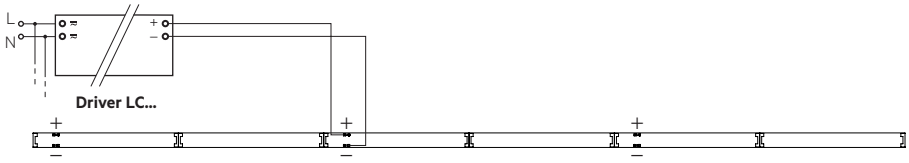
Terminal at each 2nd segement. Only valid for 2T variants.

Wiring examples

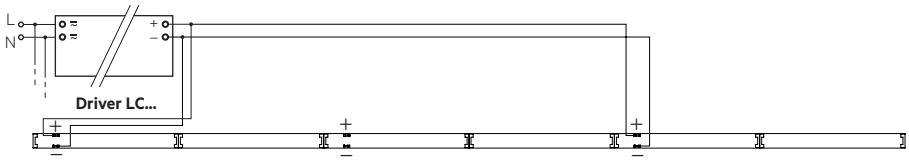
Connection at one side



Connection at middle



Connection at both sides



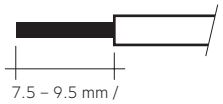
Current per segment	Connection at one side	Connection at middle	Connection at both sides
Max. number of segments to keep the reduction of luminous flux below 5 %.			
25 mA	11 segments	22 segments	22 segments
50 mA	10 segments	20 segments	20 segments
75 mA	10 segments	20 segments	20 segments
100 mA	9 segments	18 segments	18 segments
125 mA	9 segments	18 segments	18 segments
150 mA	9 segments	18 segments	18 segments
Max. number of segments to keep the reduction of luminous flux below 15 %.			
25 mA	25 segments	50 segments	50 segments
50 mA	25 segments	38 segments	38 segments
75 mA	20 segments	25 segments	25 segments
100 mA	19 segments	19 segments	19 segments
125 mA	18 segments	–	–
150 mA	17 segments	–	–

The max. permissible output current of the LED driver is 1,900 mA.

3.3 Wiring type and cross section

For wiring use solid wire from 0.2 – 0.75 mm² (AWG24–18).
For the push-wire connection you have to strip the insulation (7.5–9.5 mm).

wire preparation:
0.2 – 0.75 mm² (AWG24–18)



7.5 – 9.5 mm /
0.3 – 0.37 inch

Remove the wires through twist and pull.

3.4 Mounting instruction

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

The LLE FLEX is separable each 140 mm with the full function of each segment.

Insulation must be ensured at both ends of the applied LLE FLEX (> 500 V AC).

The fixing/cooling surface must be cleaned before installing the LLE FLEX modules to remove all dirt, dust and grease.

Prevent shear- or peel forces

Min. bending radius of the LLE FLEX is 50 mm.

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. Lifetime

4.1 Lifetime, lumen maintenance and failure rate

The light output of an LED module decreases over the lifetime, 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 lifetime of an LED module.

As the L value is a statistical value and the lumen maintenance 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 initial luminous flux, respectively 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

LLE FLEX CC EXC CRI80 + CRI90

Forward current*	tp temperature	L90 / B10	L90 / B50	L80 / B10	L80 / B50	L70 / B10	L70 / B50
50 mA	45 °C	40k h	47k h	82k h	100k h	>102k h	>102k h
	55 °C	40k h	47k h	82k h	100k h	>102k h	>102k h
	65 °C	35k h	39k h	69k h	85k h	>102k h	>102k h
	75 °C	35k h	39k h	69k h	85k h	>102k h	>102k h
100 mA	45 °C	40k h	47k h	82k h	100k h	>102k h	>102k h
	55 °C	40k h	47k h	82k h	100k h	>102k h	>102k h
	65 °C	35k h	39k h	69k h	85k h	>102k h	>102k h
	75 °C	35k h	39k h	69k h	85k h	>102k h	>102k h
150 mA.	45 °C	40k h	47k h	82k h	100k h	>102k h	>102k h
	55 °C	40k h	47k h	82k h	100k h	>102k h	>102k h
	65 °C	35k h	39k h	69k h	85k h	>102k h	>102k h
	75 °C	35k h	39k h	69k h	85k h	>102k h	>102k h
200 mA	45 °C	40k h	47k h	82k h	100k h	>102k h	>102k h
	55 °C	40k h	47k h	82k h	100k h	>102k h	>102k h
	65 °C	35k h	39k h	69k h	85k h	>102k h	>102k h
	75 °C	35k h	39k h	69k h	85k h	>102k h	>102k h
250 mA	45 °C	40k h	47k h	82k h	100k h	>102k h	>102k h
	55 °C	40k h	47k h	82k h	100k h	>102k h	>102k h
	65 °C	35k h	39k h	69k h	85k h	>102k h	>102k h
	75 °C	35k h	39k h	69k h	85k h	>102k h	>102k h
300 mA	45 °C	40k h	47k h	82k h	100k h	>102k h	>102k h
	55 °C	40k h	47k h	82k h	100k h	>102k h	>102k h
	65 °C	35k h	39k h	69k h	85k h	>102k h	>102k h
	75 °C	35k h	39k h	69k h	85k h	>102k h	>102k h
350 mA	45 °C	40k h	47k h	82k h	100k h	>102k h	>102k h
	55 °C	40k h	47k h	82k h	100k h	>102k h	>102k h
	65 °C	35k h	39k h	69k h	85k h	>102k h	>102k h
	75 °C	35k h	39k h	69k h	85k h	>102k h	>102k h

* Values for each foot (280 mm).
* LC03 >102k h. At tp rated, based on 10 swichting cycles per day.

4.3 Switching capability

100,000 cycles

Tridonic test according to IEC 62717 Cl 10.3.3
30 s on / 30 s off at Imax

5. Electrical values

5.1 Declaration of electrical parameters

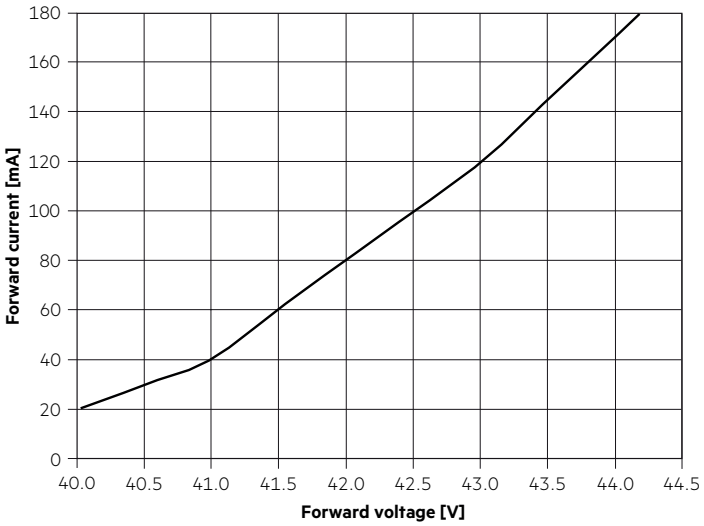
Irated … Nominal operating current the module is designed for.

Imax … Max. permissible continuous operating current incl. The tolerances of the LED driver.

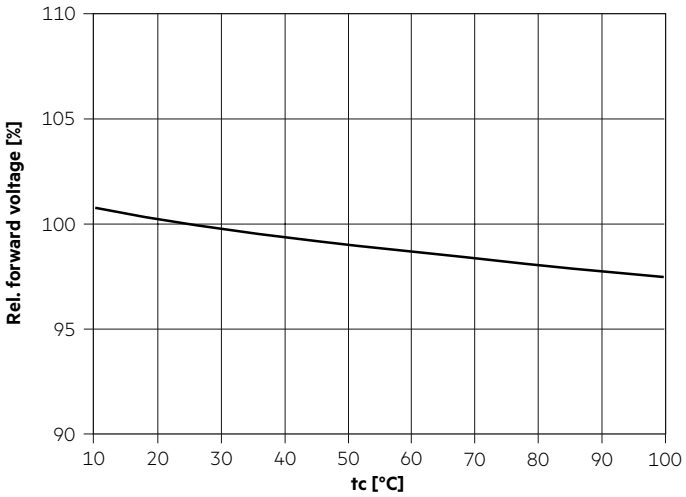
Max. permissible LF current ripple … Max. output current of the LED driver incl. Tolerances and LF current ripple must not exceed this value.

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 per foot (280 mm)



5.3 Forward voltage vs. tc temperature



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

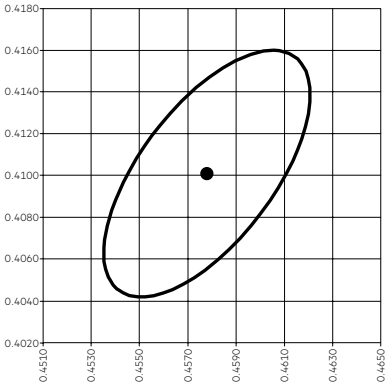
6. Photometric characteristics

6.1 Coordinates and tolerances according to CIE 1931

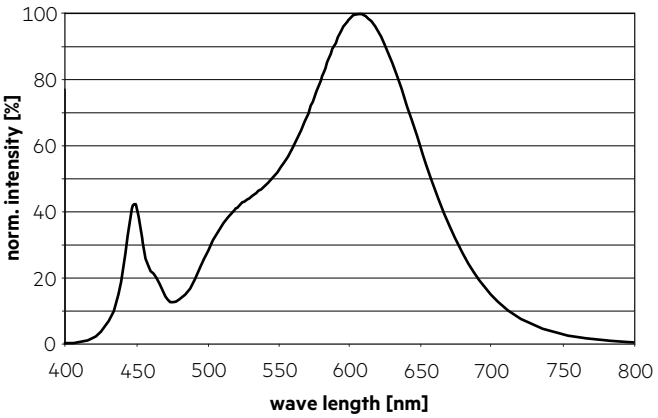
The specified colour coordinates are integral measured by current impulse of 150 mA and a duration of 100 ms.
The ambient temperature of the measurement is ta = 25 °C.
The measurement tolerance of the colour coordinates are ± 0.01.

2,700 K – CRI80

	x0	y0
Centre	0.4577	0.4098

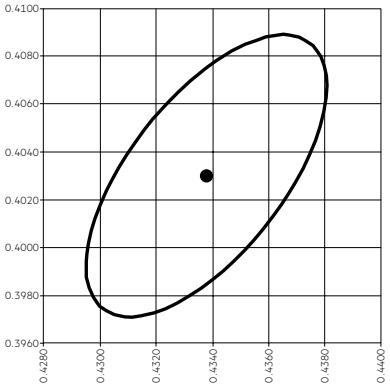


MacAdam Ellipse: 3SDCM

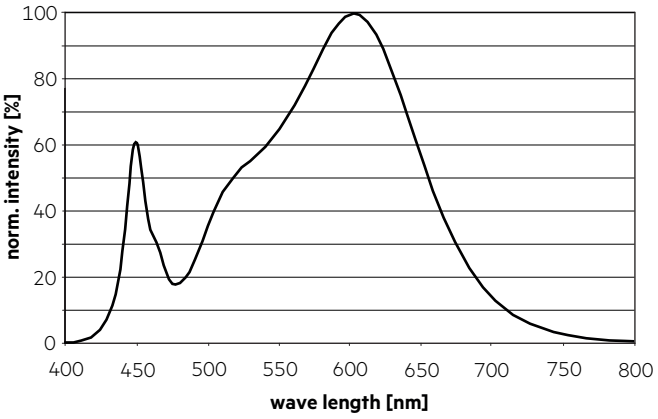


3,000 K – CRI80

	x0	y0
Centre	0.4339	0.4032

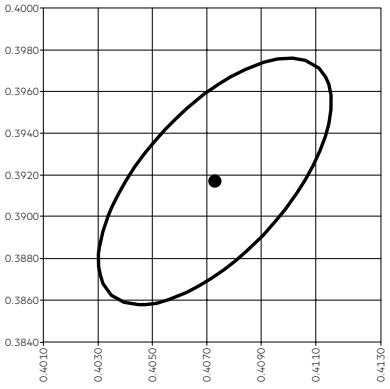


MacAdam Ellipse: 3SDCM

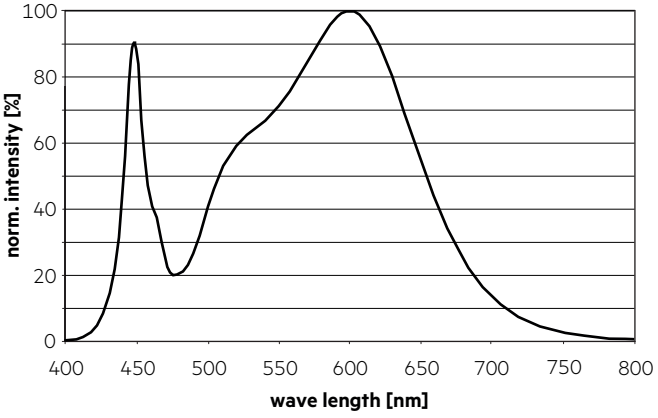


3,500 K – CRI80

	x0	y0
Centre	0.4077	0.3929

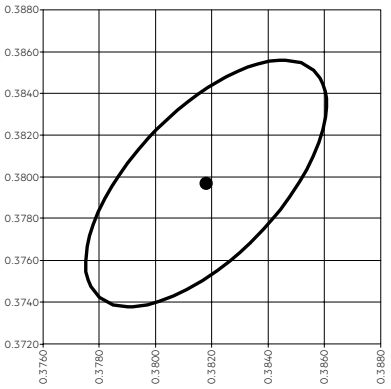


MacAdam Ellipse: 3SDCM

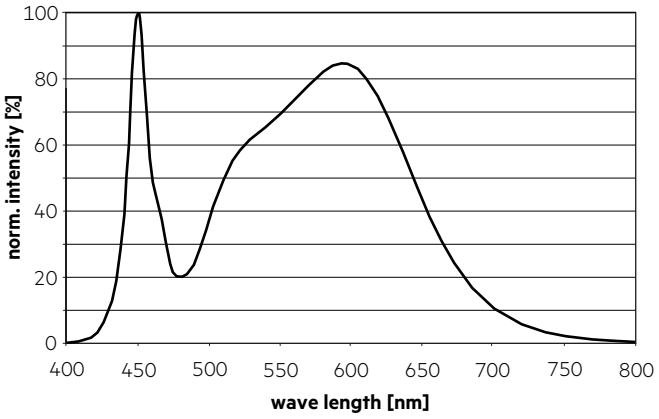


4,000 K – CRI80

	x0	y0
Center	0.3818	0.3796

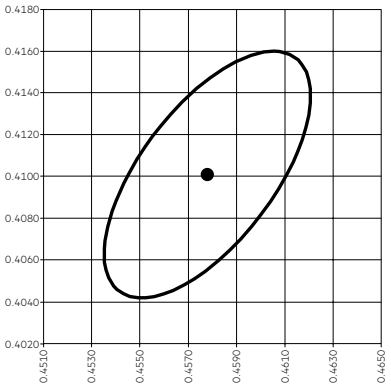


MacAdam Ellipse: 3SDCM

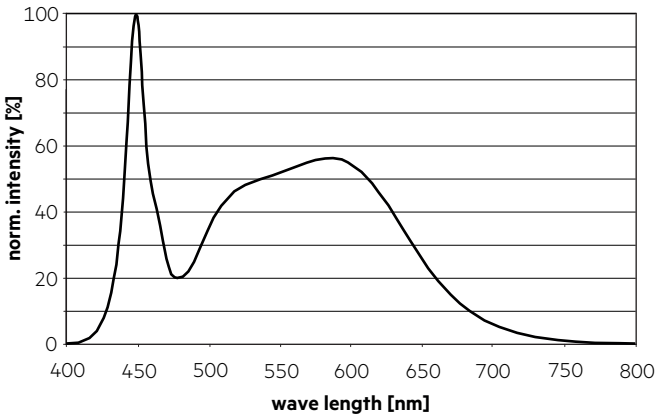


5,000 K – CRI80

	x0	y0
Centre	0.3446	0.3551

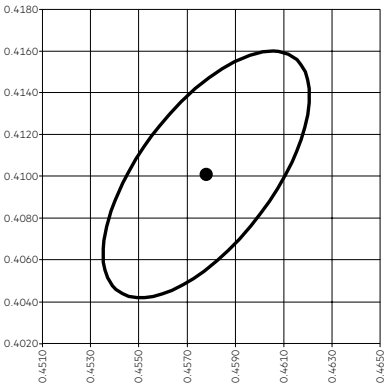


MacAdam Ellipse: 3SDCM

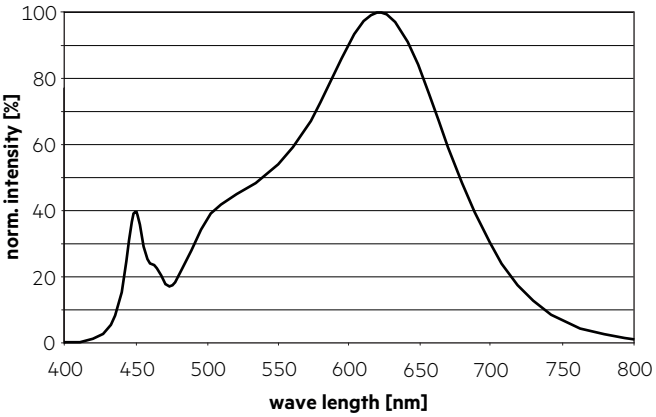


2,700 K – CRI90

	x0	y0
Centre	0.4577	0.4098

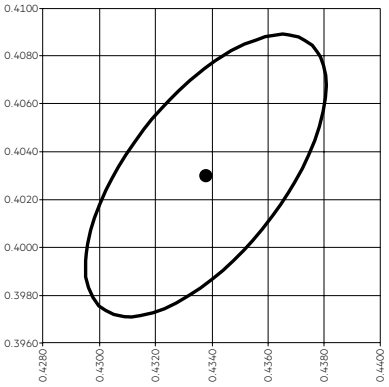


MacAdam Ellipse: 3SDCM

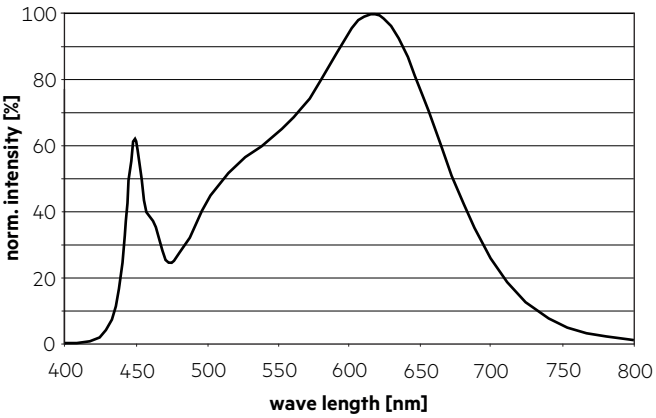


3,000 K – CRI90

	x0	y0
Centre	0.4339	0.4032

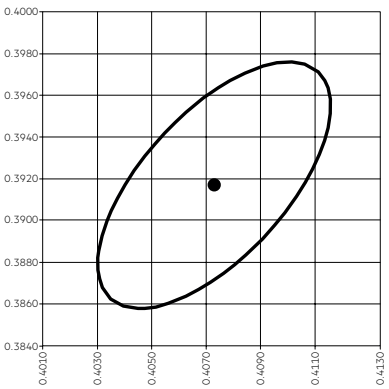


MacAdam Ellipse: 3SDCM

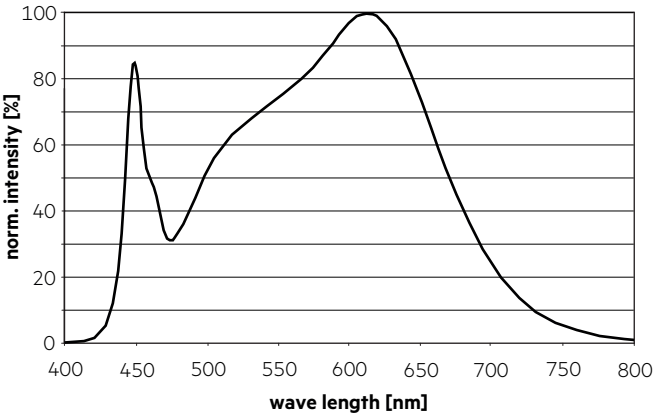


3,500 K – CRI90

	x0	y0
Centre	0.4077	0.3929

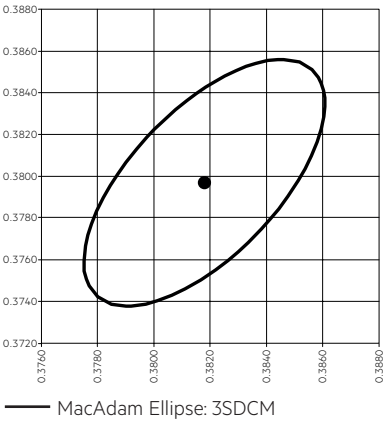


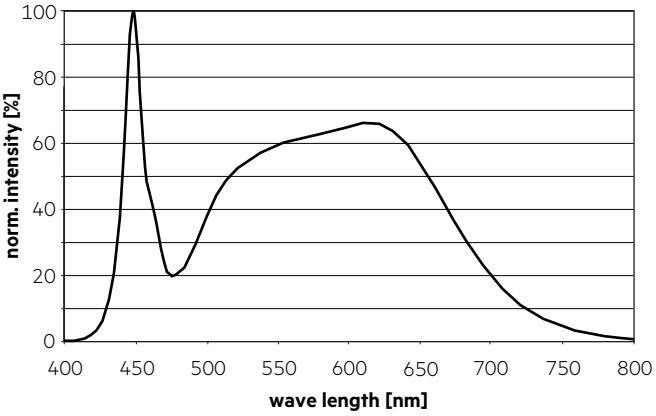
MacAdam Ellipse: 3SDCM



4,000 K – CRI90

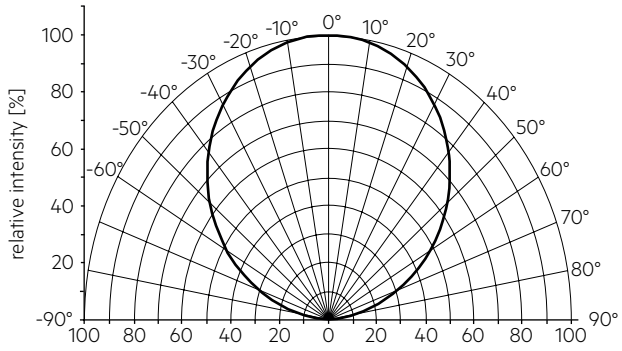
	x0	y0
Center	0.3818	0.3796





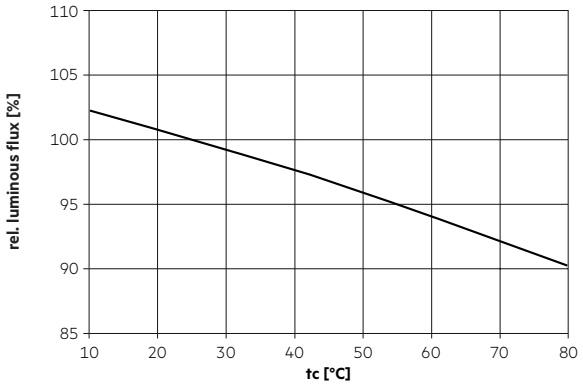
6.2 Light distribution

The optical design of the LLE product line ensures optimum homogeneity for the light distribution.

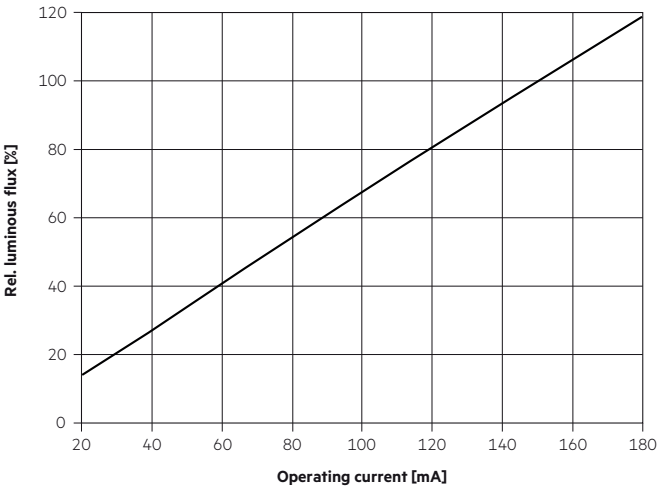


The colour temperature is measured integral over the complete module. The single LED light points can have deviations in the colour coordinates within MacAdam 3.
To ensure an ideal mixture of colours and a homogeneous light distribution a suitable optic (e. g. PMMA diffuser) and a sufficient spacing between module and optic (typ. 4 cm) should be used.

6.3 Relative luminous flux vs. tc temperature



6.4 Relative luminous flux vs. operating current per foot (280 mm)



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

7. Miscellaneous

7.1 Additional information

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

Lifetime declarations are informative and represent no warranty claim.