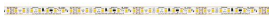


Module LLE FLEX 8mm 48V EXC3

Modules LLE FLEX excite

**Product description**

- _ Dimmable 48 V constant voltage LED flextape (SELV)
- _ Ideal for applications on aluminium extrusions but also for various decorative and ambient lighting solutions
- _ 1 reel = 10 m
- _ Made in Europe
- _ 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 and 4,000 K
- _ Useful luminous flux up to 4,730 lm/m
- _ Efficacy of the LED module up to 161 lm/W
- _ High colour rendering index CRI > 90
- _ Low colour temperature tolerances (MacAdam 3)
- _ Outstanding homogeneity due to IC current control

Mechanical properties

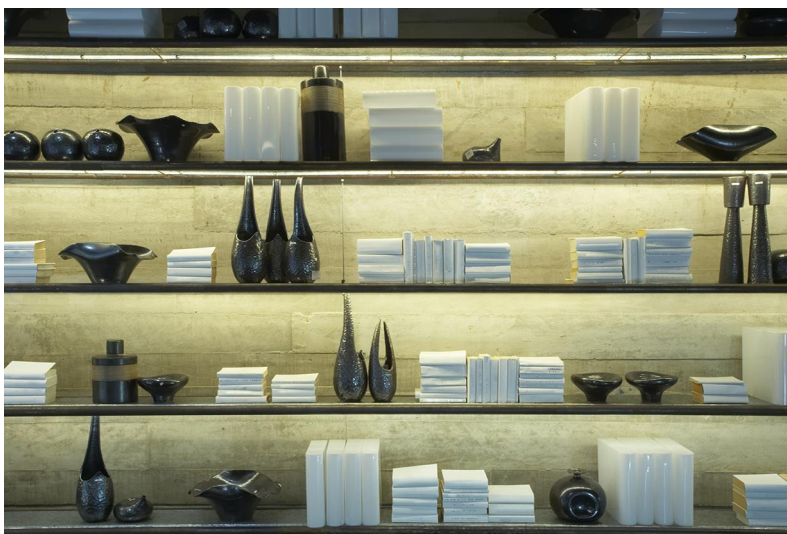
- _ High design freedom due to 6.25 cm cut-options and 128 LED light points per meter
- _ Self-adhesive 3M tape at the backside for simple mounting on different surfaces
- _ Available PCB to PCB and wire to PCB connectors for toolless handling and connection
- _ reel2reel – No solder joints on the tape, easy to separate and low length tolerances

System solution

- _ System solution in combination with Tridonic constant voltage LED driver (fixed output and dimmable)

Website

<http://www.tridonic.com/28006403>



Linear



High bay



Decorative



Downlights



Spotlights



Free-standing



Area



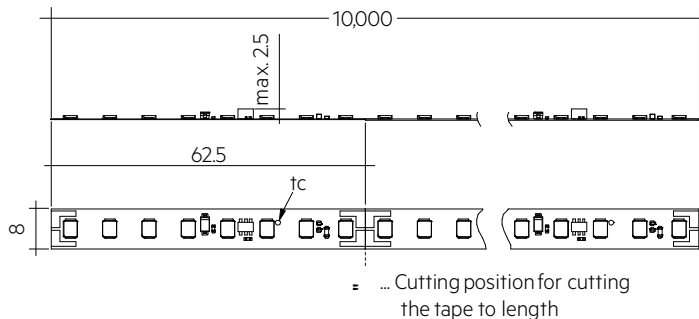
Floor | Wall



Street

Module LLE FLEX 8mm 48V EXC3

Modules LLE FLEX excite



Ordering data

Type	Article number	Colour temperature	Packaging, carton	Weight per pc.
LLE FLEX 8mm 48V 10W 1200lm 927 EXC3 R10	28006403	2,700 K	1 pc(s).	0.153 kg
LLE FLEX 8mm 48V 10W 1200lm 930 EXC3 R10	28006404	3,000 K	1 pc(s).	0.153 kg
LLE FLEX 8mm 48V 10W 1200lm 940 EXC3 R10	28006405	4,000 K	1 pc(s).	0.153 kg
LLE FLEX 8mm 48V 15W 1800lm 927 EXC3 R10	28006411	2,700 K	1 pc(s).	0.153 kg
LLE FLEX 8mm 48V 15W 1800lm 930 EXC3 R10	28006412	3,000 K	1 pc(s).	0.153 kg
LLE FLEX 8mm 48V 15W 1800lm 940 EXC3 R10	28006413	4,000 K	1 pc(s).	0.153 kg
LLE FLEX 8mm 48V 20W 2500lm 927 EXC3 R10	28006419	2,700 K	1 pc(s).	0.153 kg
LLE FLEX 8mm 48V 20W 2500lm 930 EXC3 R10	28006420	3,000 K	1 pc(s).	0.153 kg
LLE FLEX 8mm 48V 20W 2500lm 940 EXC3 R10	28006421	4,000 K	1 pc(s).	0.153 kg
LLE FLEX 8mm 48V 24W 3000lm 927 EXC3 R10	28006427	2,700 K	1 pc(s).	0.153 kg
LLE FLEX 8mm 48V 24W 3000lm 930 EXC3 R10	28006428	3,000 K	1 pc(s).	0.153 kg
LLE FLEX 8mm 48V 24W 3000lm 940 EXC3 R10	28006429	4,000 K	1 pc(s).	0.153 kg
LLE FLEX 8mm 48V 32W 4000lm 927 EXC3 R10	28006435	2,700 K	1 pc(s).	0.153 kg
LLE FLEX 8mm 48V 32W 4000lm 930 EXC3 R10	28006436	3,000 K	1 pc(s).	0.153 kg
LLE FLEX 8mm 48V 32W 4000lm 940 EXC3 R10	28006437	4,000 K	1 pc(s).	0.153 kg

Technical data

Beam characteristic	120°
Ambient temperature t_a	-25 ... +50 °C
t_p rated	65 °C
t_c	75 °C
Supply voltage DC	48 V
Supply voltage range DC ^①	46 – 51 V
Max. working voltage for insulation SELV	60 V
Insulation test voltage	0.5 kV
Colour tolerance	3 SDCM
ESD classification	Severity level 1
Risk group (IEC 62471)	RG0
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 61547, IEC 62778, UL 8750

Specific technical data

Type	Article number	Photometric code	Useful luminous flux at $t_p = 25^\circ\text{C}$ ^②	Expected luminous flux at t_p rated ^③	Typ. current consumption at t_p rated	Power consumption P_{on} at $t_p = 25^\circ\text{C}$ ^④	Efficacy of the module at $t_p = 25^\circ\text{C}$	Expected efficacy of the module at t_p rated	Colour rendering index: CRI
LLE FLEX 8mm 48V 10W 1200lm 927 EXC3 R10	28006403	927/359	1,320 lm/m	1,220 lm/m	194 mA/m	9.3 W/m	142 lm/W	131 lm/W	>90
LLE FLEX 8mm 48V 10W 1200lm 930 EXC3 R10	28006404	930/359	1,360 lm/m	1,250 lm/m	194 mA/m	9.3 W/m	146 lm/W	135 lm/W	>90
LLE FLEX 8mm 48V 10W 1200lm 940 EXC3 R10	28006405	940/359	1,480 lm/m	1,360 lm/m	194 mA/m	9.3 W/m	159 lm/W	146 lm/W	>90
LLE FLEX 8mm 48V 15W 1800lm 927 EXC3 R10	28006411	927/359	1,920 lm/m	1,780 lm/m	280 mA/m	13.5 W/m	143 lm/W	132 lm/W	>90
LLE FLEX 8mm 48V 15W 1800lm 930 EXC3 R10	28006412	930/359	1,980 lm/m	1,830 lm/m	280 mA/m	13.5 W/m	147 lm/W	136 lm/W	>90
LLE FLEX 8mm 48V 15W 1800lm 940 EXC3 R10	28006413	940/359	2,150 lm/m	1,990 lm/m	280 mA/m	13.5 W/m	160 lm/W	148 lm/W	>90
LLE FLEX 8mm 48V 20W 2500lm 927 EXC3 R10	28006419	927/359	2,620 lm/m	2,420 lm/m	381 mA/m	18.3 W/m	143 lm/W	132 lm/W	>90
LLE FLEX 8mm 48V 20W 2500lm 930 EXC3 R10	28006420	930/359	2,700 lm/m	2,490 lm/m	381 mA/m	18.3 W/m	148 lm/W	136 lm/W	>90
LLE FLEX 8mm 48V 20W 2500lm 940 EXC3 R10	28006421	940/359	2,940 lm/m	2,710 lm/m	381 mA/m	18.3 W/m	161 lm/W	148 lm/W	>90
LLE FLEX 8mm 48V 24W 3000lm 927 EXC3 R10	28006427	927/359	3,180 lm/m	2,940 lm/m	467 mA/m	22.5 W/m	142 lm/W	131 lm/W	>90
LLE FLEX 8mm 48V 24W 3000lm 930 EXC3 R10	28006428	930/359	3,280 lm/m	3,030 lm/m	467 mA/m	22.5 W/m	146 lm/W	135 lm/W	>90
LLE FLEX 8mm 48V 24W 3000lm 940 EXC3 R10	28006429	940/359	3,570 lm/m	3,300 lm/m	467 mA/m	22.5 W/m	159 lm/W	147 lm/W	>90
LLE FLEX 8mm 48V 32W 4000lm 927 EXC3 R10	28006435	927/359	4,220 lm/m	3,890 lm/m	622 mA/m	29.9 W/m	141 lm/W	130 lm/W	>90
LLE FLEX 8mm 48V 32W 4000lm 930 EXC3 R10	28006436	930/359	4,340 lm/m	4,010 lm/m	622 mA/m	29.9 W/m	145 lm/W	134 lm/W	>90
LLE FLEX 8mm 48V 32W 4000lm 940 EXC3 R10	28006437	940/359	4,730 lm/m	4,360 lm/m	622 mA/m	29.9 W/m	158 lm/W	146 lm/W	>90

① Exceeding the max. operating voltage leads to an overload on the LLE FLEX. This may in turn result in a significant reduction in lifetime or even in destruction.

② Tolerance of useful light flux - 0 / + 15 %. Measurement uncertainty 10 %. Values given for 1 m LLE FLEX.

③ Measurement uncertainty 10 %. Values given for 1 m LLE FLEX. Based on calculation.

④ Tolerance of power consumption $P_{on} \pm 15$ %. Measurement uncertainty ± 5 %. Values given for 1 m LLE FLEX.

1. Standards

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

1.1 Photometric code

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

1 st digit	2 nd + 3 rd digit	4 th digit	5 th digit	6 th 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)
7 70 – 79				Code Luminous flux
8 80 – 89				7 ≥ 70 %
9 ≥90				8 ≥ 80 % 9 ≥ 90 %

1.2 Risk group

Type	Risk group
LLE FLEX 8mm 48V EXC3	RGO

1.3 Energy classification

Type	Colour temperature	Energy classification	Energy consumption
LLE FLEX 8mm 48V 10W 1200lm 927 EXC3 R10	2,700 K	E	10 kWh / 1,000 h
LLE FLEX 8mm 48V 10W 1200lm 930 EXC3 R10	3,000 K	D	10 kWh / 1,000 h
LLE FLEX 8mm 48V 10W 1200lm 940 EXC3 R10	4,000 K	D	10 kWh / 1,000 h
LLE FLEX 8mm 48V 15W 1800lm 927 EXC3 R10	2,700 K	E	14 kWh / 1,000 h
LLE FLEX 8mm 48V 15W 1800lm 930 EXC3 R10	3,000 K	D	14 kWh / 1,000 h
LLE FLEX 8mm 48V 15W 1800lm 940 EXC3 R10	4,000 K	D	14 kWh / 1,000 h
LLE FLEX 8mm 48V 20W 2500lm 927 EXC3 R10	2,700 K	E	19 kWh / 1,000 h
LLE FLEX 8mm 48V 20W 2500lm 930 EXC3 R10	3,000 K	D	19 kWh / 1,000 h
LLE FLEX 8mm 48V 20W 2500lm 940 EXC3 R10	4,000 K	D	19 kWh / 1,000 h
LLE FLEX 8mm 48V 24W 3000lm 927 EXC3 R10	2,700 K	E	23 kWh / 1,000 h
LLE FLEX 8mm 48V 24W 3000lm 930 EXC3 R10	3,000 K	E	23 kWh / 1,000 h
LLE FLEX 8mm 48V 24W 3000lm 940 EXC3 R10	4,000 K	D	23 kWh / 1,000 h
LLE FLEX 8mm 48V 32W 4000lm 927 EXC3 R10	2,700 K	E	30 kWh / 1,000 h
LLE FLEX 8mm 48V 32W 4000lm 930 EXC3 R10	3,000 K	E	30 kWh / 1,000 h
LLE FLEX 8mm 48V 32W 4000lm 940 EXC3 R10	4,000 K	D	30 kWh / 1,000 h

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 65°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	-25...+75 °C
---------------------	--------------

Operation only in non condensing environment.

Humidity during processing of the module should be between 30 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 LLE will be greatly reduced or the LLE may be destroyed.

2.4 Heat sink values

LLE FLEX 8mm 1200lm 48V EXC3

ta	tp	R _{th, hs-a} ^①	Cooling area ^①
25°C	65°C	122.82 K/W	5 cm ²
35°C	65°C	92.08 K/W	7 cm ²
40°C	65°C	76.71 K/W	9 cm ²
45°C	65°C	61.34 K/W	11 cm ²
50°C	65°C	45.97 K/W	15 cm ²

LLE FLEX 8mm 1800lm 48V EXC3

ta	tp	R _{th, hs-a} ^①	Cooling area ^①
25°C	65°C	83.21 K/W	8 cm ²
35°C	65°C	62.37 K/W	11 cm ²
40°C	65°C	51.95 K/W	13 cm ²
45°C	65°C	41.54 K/W	16 cm ²
50°C	65°C	31.12 K/W	21 cm ²

LLE FLEX 8mm 2500lm 48V EXC3

ta	tp	R _{th, hs-a} ^①	Cooling area ^①
25°C	65°C	56.99 K/W	12 cm ²
35°C	65°C	42.71 K/W	16 cm ²
40°C	65°C	35.56 K/W	19 cm ²
45°C	65°C	28.42 K/W	23 cm ²
50°C	65°C	21.28 K/W	31 cm ²

LLE FLEX 8mm 3000lm 48V EXC3

ta	tp	R _{th, hs-a} ^①	Cooling area ^①
25°C	65°C	50.64 K/W	13 cm ²
35°C	65°C	37.95 K/W	18 cm ²
40°C	65°C	31.60 K/W	21 cm ²
45°C	65°C	25.25 K/W	26 cm ²
50°C	65°C	18.90 K/W	35 cm ²

LLE FLEX 8mm 4000lm 48V EXC3

ta	tp	R _{th, hs-a} ^①	Cooling area ^①
25 °C	65 °C	37.82 K/W	18 cm ²
35 °C	65 °C	28.34 K/W	24 cm ²
40 °C	65 °C	23.60 K/W	28 cm ²
45 °C	65 °C	18.86 K/W	35 cm ²
50 °C	65 °C	14.13 K/W	47 cm ²

^① Values for a single segment of the LLE FLEX (62.5 mm).

Notes

The module has to be mounted on a heat sink and operated within the specified temperature range.

The actual cooling surface can differ because of the material, the structural shape, outside influences and the installation situation.
A heat transfer coefficient of 0,0015 is used for the calculation.

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:

- SELV
- Short-circuit protection
- Overload protection
- Overtemperature protection



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

Wrong polarity can damage the LLE FLEX.

3.2 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 62.5 mm with the full function of each segment.

Insulation must be ensured at the contact area of the segments (e. g. by using additional insulation in the area of the solder connection).

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 2 cm.

For details see Application Note: www.tridonic.com



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.

3.3 Soldering guidelines

The modules are suitable only for manual soldering (max. 275 °C, 2 seconds).

3.3 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.

4.2 Lumen maintenance

LLE FLEX 8mm 48V 1200lm EXC3

LLE FLEX 8mm 48V 1800lm EXC3

LLE FLEX 8mm 48V 2500lm EXC3

LLE FLEX 8mm 48V 3000lm EXC3

LLE FLEX 8mm 48V 4000lm EXC3

Supply voltage	tp temperature	L90/B10	L90/B50	L80/B10	L80/B50	L70/B10	L70/B50
48 V	40 °C	41k h	47k h	82k h	100k h	> 102k h	> 102k h
	45 °C	41k h	47k h	82k h	100k h	> 102k h	> 102k h
	50 °C	41k h	47k h	82k h	100k h	> 102k h	> 102k h
	55 °C	41k h	47k h	82k h	100k h	> 102k h	> 102k h
	60 °C	35k h	40k h	70k h	85k h	> 102k h	> 102k h
	65 °C	35k h	40k h	70k h	85k h	> 102k h	> 102k h
	70 °C	35k h	40k h	70k h	85k h	> 102k h	> 102k h
	75 °C	35k h	40k h	70k h	85k h	> 102k h	> 102k h

L00C03 >102 kh. At tp rated, based on 10 swiching 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 lmax

5. Photometric characteristics

5.1 Coordinates and tolerances according to CIE 1931

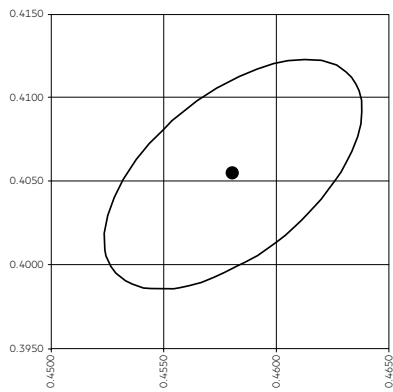
The specified colour coordinates are measured integral by a current impulse with typical values of module and a duration of 100 ms.

The ambient temperature of the measurement is $t_a = 25^\circ\text{C}$.

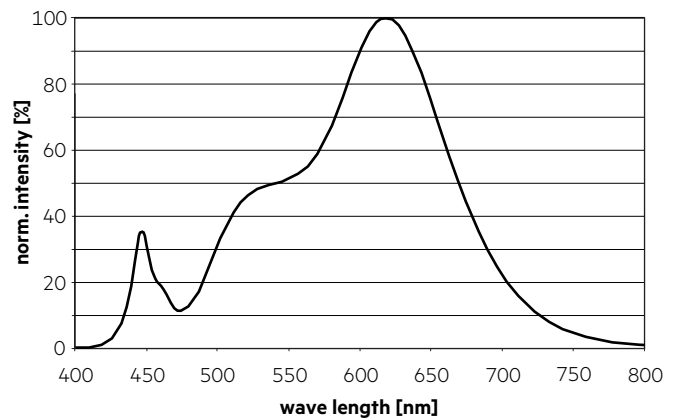
The measurement tolerance of the colour coordinates are ± 0.01 .

2,700 K – CRI90

	x0	y0
Centre	0.4581	0.4054

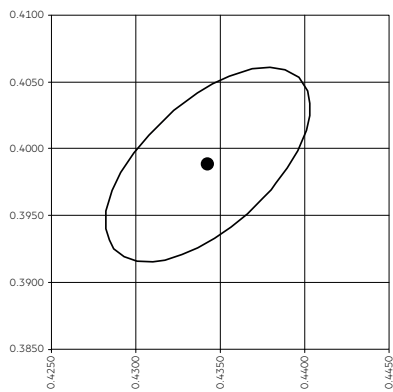


— MacAdam Ellipse: 3SDCM

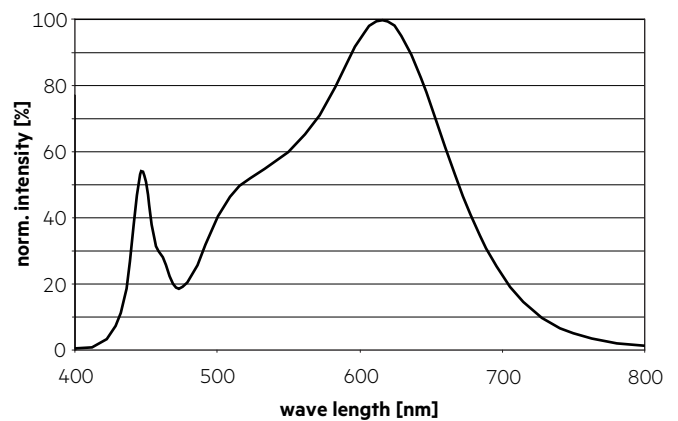


3,000 K – CRI90

	x0	y0
Centre	0.4343	0.3988

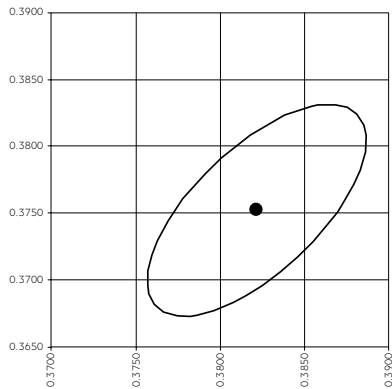


— MacAdam Ellipse: 3SDCM

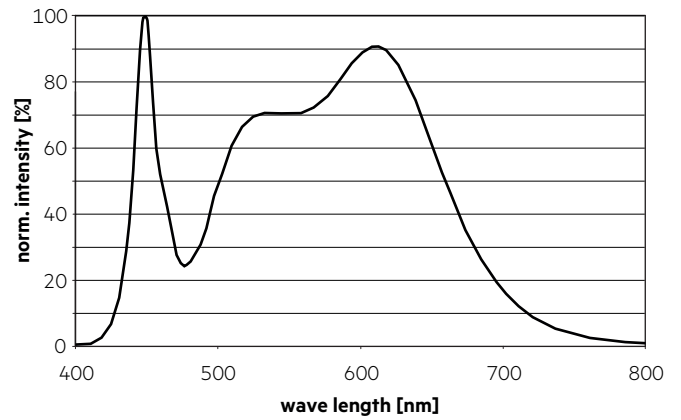


4,000 K – CRI90

	x0	y0
Centre	0.3822	0.3752

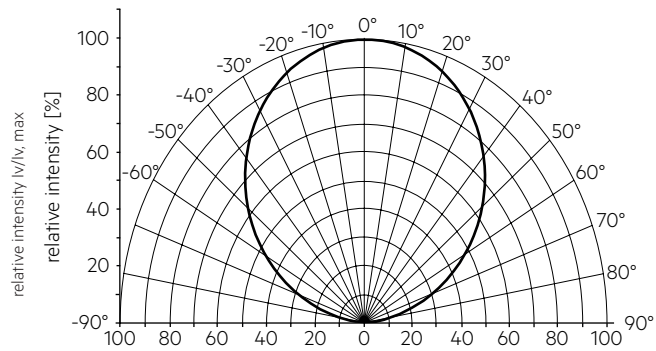


— MacAdam Ellipse: 3SDCM



5.2 Light distribution

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



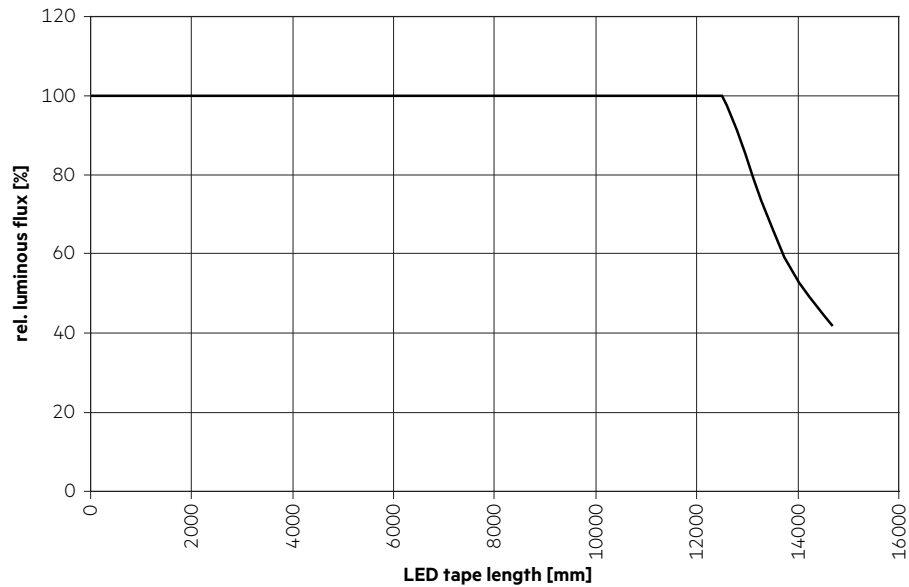
! The colour temperature is measured over the complete module. To ensure an ideal mixture of colours and a homogeneous light distribution a suitable optic (e. g. PMMA diffuser) and a sufficient spacing between module and optic (typ. 1.5 cm) should be used.

5.3 Relative luminous flux vs. LED tape length

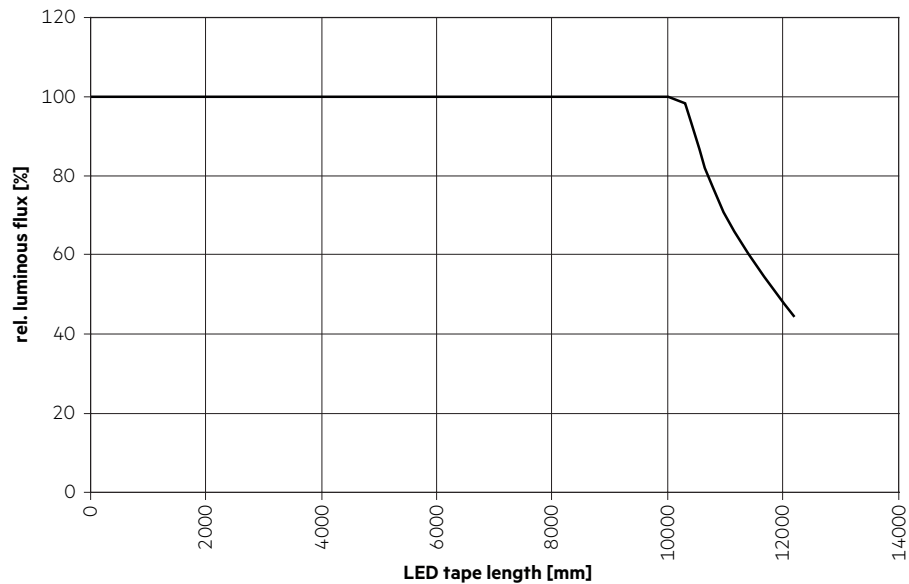
The graphs show the luminous flux drop of the first compare to the last segment over the used tape length.

Statistical values based on nominal supply voltage and tp rated.

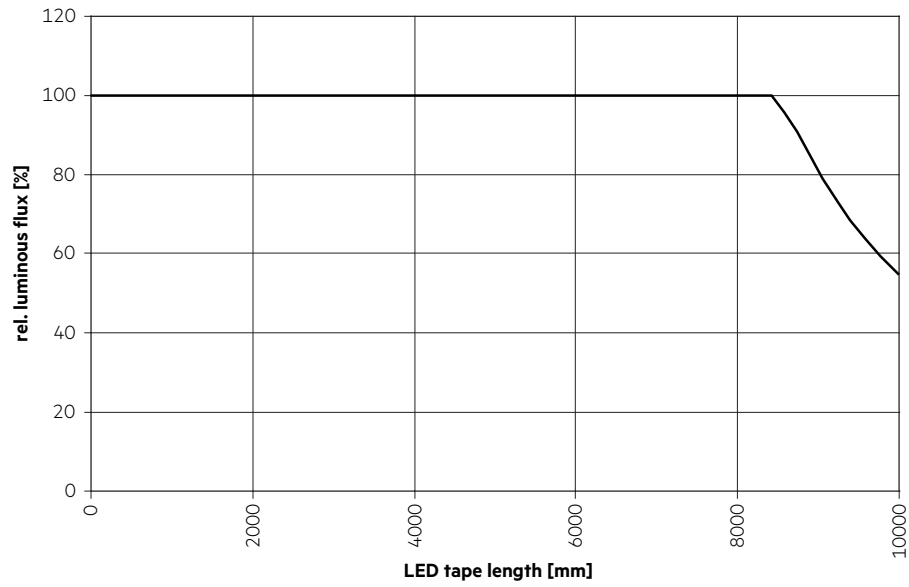
LLE FLEX 8mm 48V 1200lm EXC3



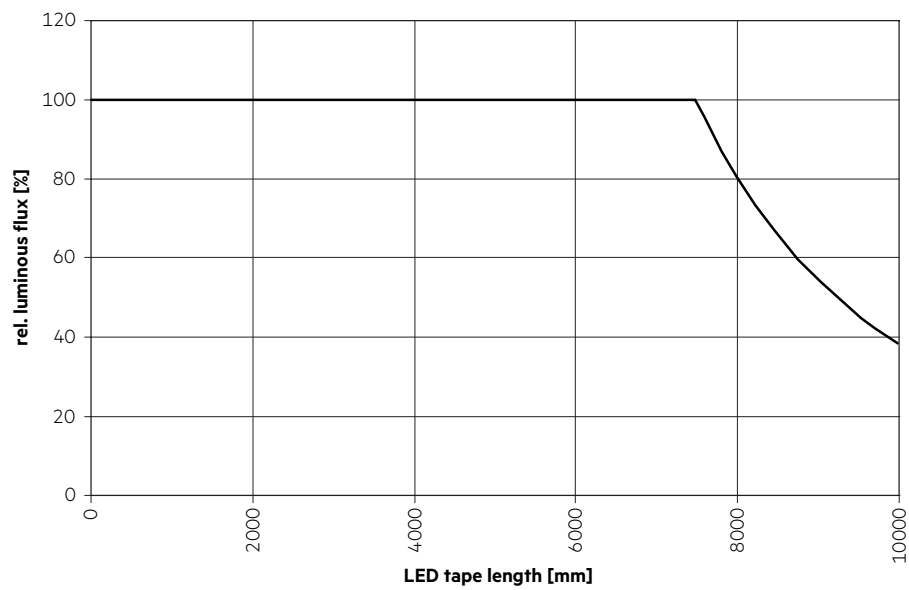
LLE FLEX 8mm 48V 1800lm EXC3



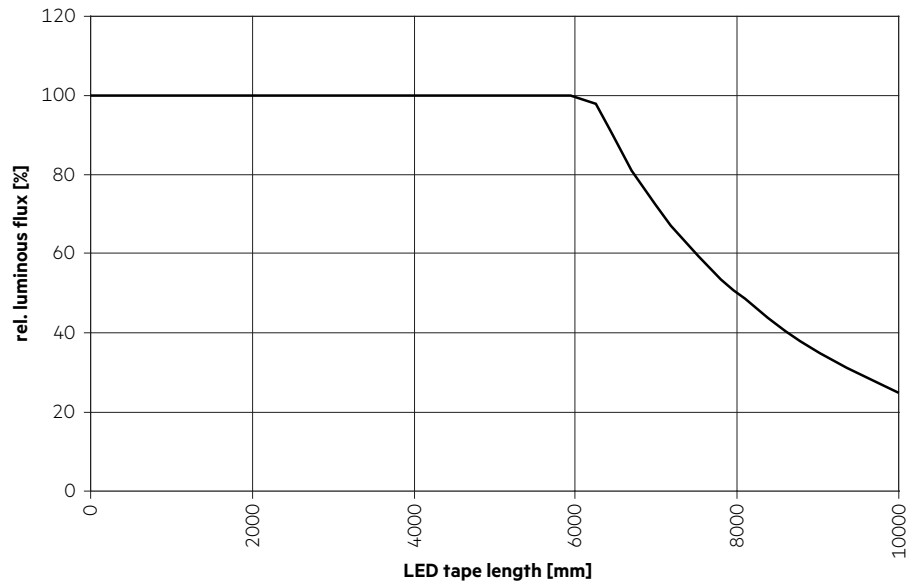
LLE FLEX 8mm 48V 2500lm EXC3



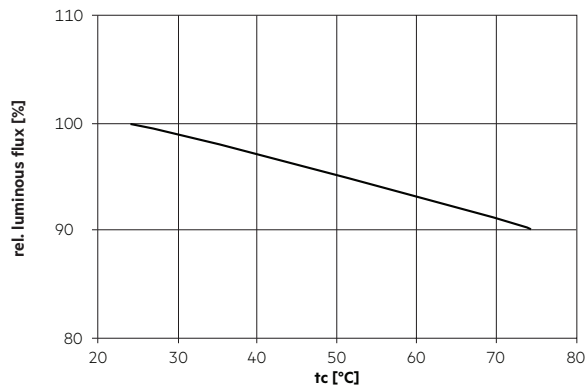
LLE FLEX 8mm 48V 3000lm EXC3



LLE FLEX 8mm 48V 4000lm EXC3



5.4 Relative luminous flux vs. tc temperature



6. Miscellaneous

6.1 Additional information

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

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/>

Lifetime declarations are informative and represent no warranty claim.