



Module LLE FLEX G1 IP67 EXC

Modules LLE FLEX excite

Product description

- The protection class IP67 makes the flexible light strip resistant against water and dust. It is therefore ideal for usage in bathroom lighting or shelves.
- With the innovative airGAP technology Tridonic is able to provide high protection but still achieve a stable colour temperature and no colour shift. In this way, LLE FLEX IP67 EXC is a perfect fit where the light-colour and quality is important.

Features and benefits

- IP67: protected against water & dust
- Luminous flux range of 600, 1,200 and 1,800 lm/m
- Colour temperature 2,700, 3,000 and 4,000 with SDCM 3[®]
- Efficacy of the module up to 100 lm/W
- High design freedom due to 5 cm cut-options
- Pitch distance of 6 mm enables high light homogeneity
- Self-adhesive 3M tape at the backside for simple mounting on different surfaces
- All the accessories – from the Interconnector to the Input-terminal till End cap – has been specifically designed for the IP67 tape and allows intuitive and easy handling which still keeps the protection of IP67 active
- Self-cooling (no additional heat sink required)
- Long life-time up to 50,000 hours
- 5-year guarantee
- System solution in combination with Tridonic constant voltage LED Driver (fixed output and dimmable)



Standards, page 4

Colour temperatures and tolerances, page 6



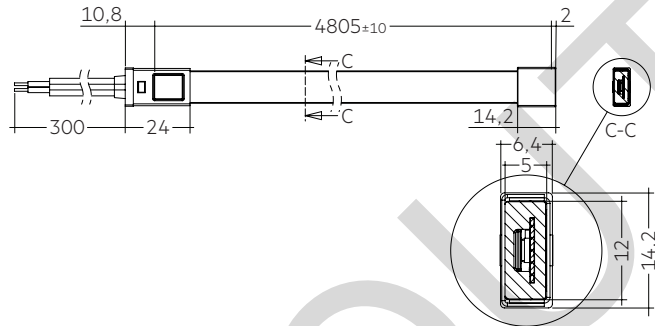


Module LLE FLEX G1 IP67 EXC

Modules LLE FLEX excite

Technical data

Beam characteristic	110°
Ambient temperature range	-35 ... +50 °C
tp rated	65 °C
tc for 600lm/m / 1200lm/m	65 °C
tc for 1800lm/m	75 °C
DC supply voltage	24 V
DC supply voltage range [®]	21.5 – 26.4 V
Insulation test voltage	0.5 kV
ESD classification	severity level 1
Risk group (EN 62471:2008)	RG0
Classification acc. to IEC 62031	Independent LED module
Type of protection	IP67



Ordering data

Type	Article number	Colour temperature	Packaging carton	Weight per roll
4,800 mm roll				
LLE FLEX G1 7W-600lm/m 927 IP67 EXC	28002171	2,700 K	15 pc(s).	0.54 kg
LLE FLEX G1 7W-600lm/m 930 IP67 EXC	28002172	3,000 K	15 pc(s).	0.54 kg
LLE FLEX G1 7W-600lm/m 940 IP67 EXC	28002173	4,000 K	15 pc(s).	0.54 kg
LLE FLEX G1 13W-1200lm/m 927 IP67 EXC	28002174	2,700 K	15 pc(s).	0.54 kg
LLE FLEX G1 13W-1200lm/m 930 IP67 EXC	28002175	3,000 K	15 pc(s).	0.54 kg
LLE FLEX G1 13W-1200lm/m 940 IP67 EXC	28002176	4,000 K	15 pc(s).	0.54 kg
LLE FLEX G1 20W-1800lm/m 927 IP67 EXC	28002177	2,700 K	15 pc(s).	0.54 kg
LLE FLEX G1 20W-1800lm/m 930 IP67 EXC	28002178	3,000 K	15 pc(s).	0.54 kg
LLE FLEX G1 19W-1800lm/m 940 IP67 EXC	28002179	4,000 K	15 pc(s).	0.54 kg

Specific technical data

Type [®]	Photometric code	Typ. luminous flux at tp = 25 °C ^①	Typ. luminous flux at tp = 65 °C ^①	Typ. current consumption at tp = 65 °C ^①	Typ. power consumption at tp = 65 °C ^①	Efficacy of the module at tp = 25 °C	Efficacy of the module at tp = 65 °C	Colour rendering index CRI
LLE FLEX G1 7W-600lm/m 927 IP67 EXC	927/359	660 lm/m	580 lm/m	290 mA/m	6.9 W/m	90 lm/W	84 lm/W	> 90
LLE FLEX G1 7W-600lm/m 930 IP67 EXC	930/359	695 lm/m	600 lm/m	290 mA/m	6.9 W/m	94 lm/W	87 lm/W	> 90
LLE FLEX G1 7W-600lm/m 940 IP67 EXC	940/359	705 lm/m	610 lm/m	260 mA/m	6.4 W/m	101 lm/W	95 lm/W	> 90
LLE FLEX G1 13W-1200lm/m 927 IP67 EXC	927/359	1,200 lm/m	1,045 lm/m	540 mA/m	12.9 W/m	87 lm/W	81 lm/W	> 90
LLE FLEX G1 13W-1200lm/m 930 IP67 EXC	930/359	1,260 lm/m	1,100 lm/m	540 mA/m	12.9 W/m	92 lm/W	85 lm/W	> 90
LLE FLEX G1 13W-1200lm/m 940 IP67 EXC	940/359	1,300 lm/m	1,110 lm/m	515 mA/m	12.3 W/m	100 lm/W	90 lm/W	> 90
LLE FLEX G1 20W-1800lm/m 927 IP67 EXC	927/359	1,770 lm/m	1,520 lm/m	830 mA/m	19.8 W/m	84 lm/W	77 lm/W	> 90
LLE FLEX G1 20W-1800lm/m 930 IP67 EXC	930/359	1,860 lm/m	1,610 lm/m	830 mA/m	19.8 W/m	89 lm/W	81 lm/W	> 90
LLE FLEX G1 19W-1800lm/m 940 IP67 EXC	940/359	1,900 lm/m	1,635 lm/m	775 mA/m	18.3 W/m	98 lm/W	89 lm/W	> 90

^① Tolerance range for optical and electrical data: ±15 %. Values given for 1 m LLE FLEX.

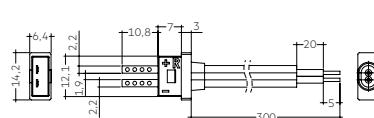
^② Exceeding the max. operating voltage leads to an overload on the LLE FLEX. This may in turn result in a reduction in life-time or even in destruction.

^③ Integral measurement over the complete module.

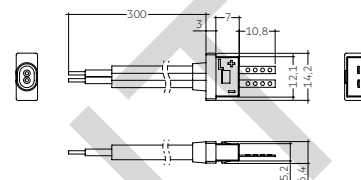
Connector for LLE FLEX IP67

Product description

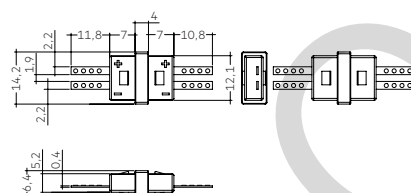
- For connection of LLE FLEX modules
- Irated = 4.4 A
- Wire cross section AWG 18



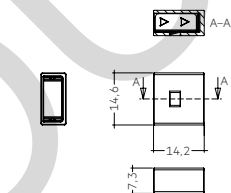
ACL plug connector Wire-PCB IP67 right



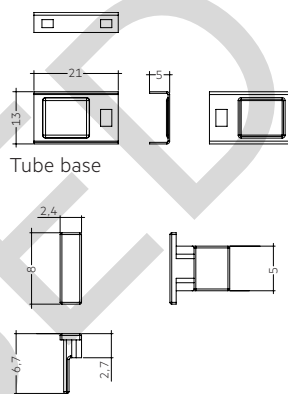
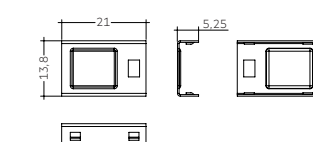
ACL plug connector Wire-PCB IP67 left



ACL plug interconnector IP67



ACL plug end cap IP67

Tube base
Plug

Tube cover

Ordering data

Type	Article number	Delivery content per piece	Packaging carton	Weight per pc.
ACL plug connector Wire-PCB IP67 right	28002257	10 power feeder cable right, 10 tube sets, 25 plugs, 10 end caps, 1 silicon tube	10 pc(s).	0,270 kg
ACL plug connector Wire-PCB IP67 left	28002258	10 power feeder cable left, 10 tube sets, 25 plugs, 10 end caps, 1 silicon tube	10 pc(s).	0,270 kg
ACL plug interconnector IP67	28002259	10 interconnectors, 20 tube sets, 25 plugs, 1 silicon tube	10 pc(s).	0,200 kg
ACL plug end cap IP67	28002260	20 end caps, 25 plugs, 1 silicon tube	10 pc(s).	0,150 kg

1. Standards

IEC 62031
IEC 62471
IEC 62717
IEC 61000-4-2
IEC 60529
UL 2108

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	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)
7	70 – 79			Code
8	80 – 89			Luminous flux
9	≥90			7
				8
				9

1.2 Energy classification

Type	Energy classification
LLE FLEX G1 7W-600lm/m 927 IP67 EXC	A+
LLE FLEX G1 7W-600lm/m 930 IP67 EXC	A+
LLE FLEX G1 7W-600lm/m 940 IP67 EXC	A+
LLE FLEX G1 13W-1200lm/m 927 IP67 EXC	A
LLE FLEX G1 13W-1200lm/m 930 IP67 EXC	A
LLE FLEX G1 13W-1200lm/m 940 IP67 EXC	A+
LLE FLEX G1 20W-1800lm/m 927 IP67 EXC	A
LLE FLEX G1 20W-1800lm/m 930 IP67 EXC	A
LLE FLEX G1 19W-1800lm/m 940 IP67 EXC	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 LLE 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	-35 ... +80 °C
---------------------	----------------

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 LLE will be greatly reduced or the LLE may be destroyed.

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 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 50 mm with the full function of each segment.

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 5 cm.

For more details see mounting instructions.



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 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 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 for LLE FLEX

Supply voltage	tp temperature	L90 / F10	L90 / F50	L80 / F10	L80 / F50	L70 / F10	L70 / F50
24 V	45 °C	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
24 V	55 °C	46,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
24 V	65 °C	18,000 h	25,000 h	33,000 h	47,000 h	49,000 h	>50,000 h

6. Photometric characteristics

6.1 Coordinates and tolerances according to CIE 1931

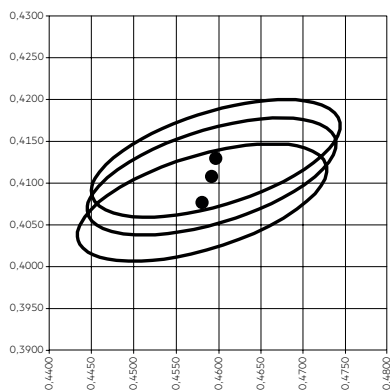
The specified colour coordinates are measured integral by a current impulse with typical values of module and a duration of ≤ 120 ms.

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

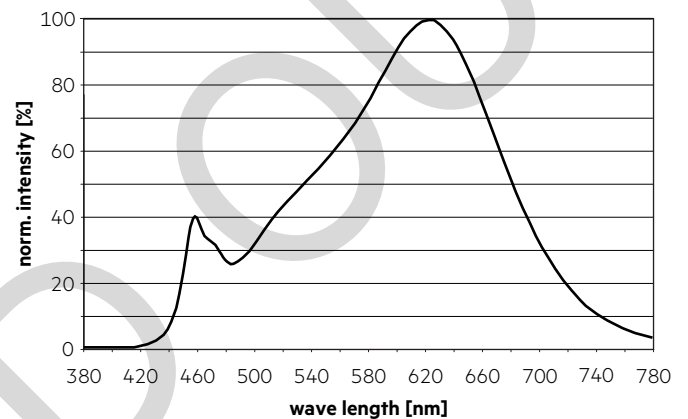
The measurement tolerance of the colour coordinates are ± 0.01 .

2,700 K

	x0	y0
Centre 600 lm/m	0.4580	0.4077
Centre 1,200 lm/m	0.4591	0.4109
Centre 1,800 lm/m	0.4596	0.4130

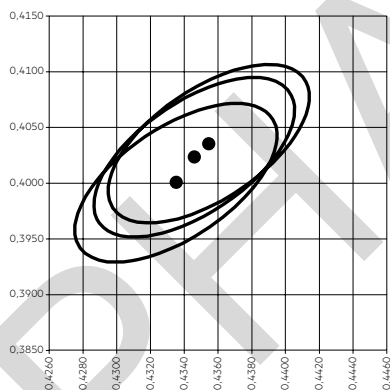


— MacAdam Ellipse: 3SDCM

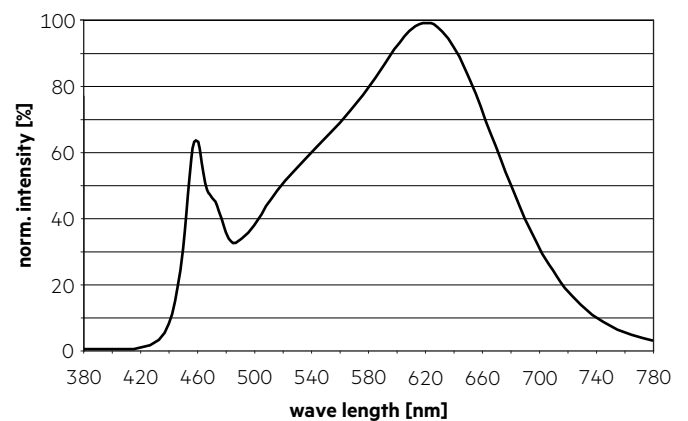


3,000 K

	x0	y0
Mittelpunkt 600 lm/m	0.4335	0.4001
Mittelpunkt 1,200 lm/m	0.4346	0.4033
Mittelpunkt 1,800 lm/m	0.4354	0.4056

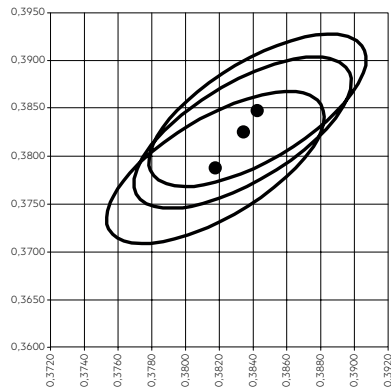


— MacAdam Ellipse: 3SDCM

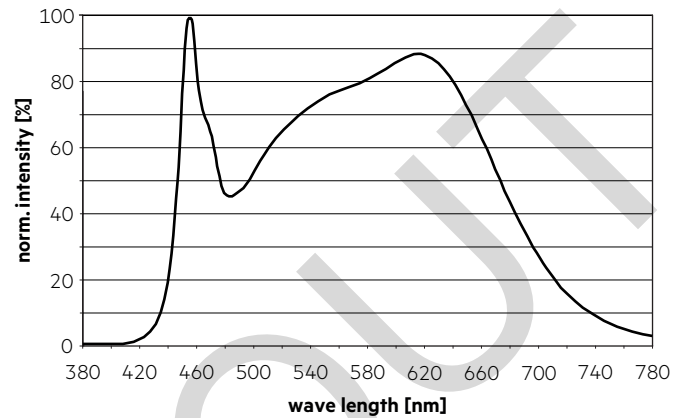


4,000 K

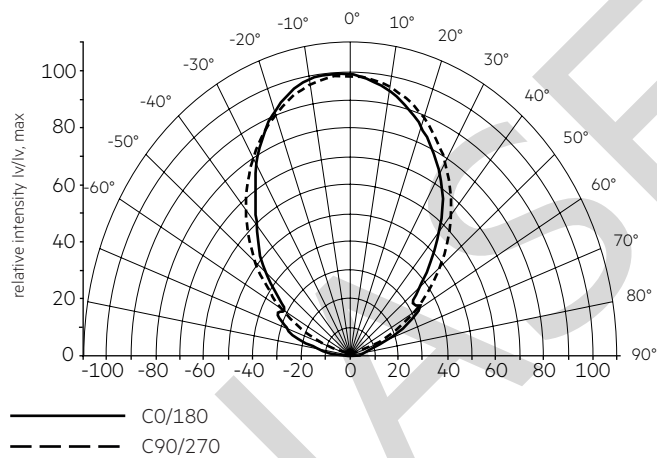
	x0	y0
Centre 600 lm/m	0.3818	0.3788
Centre 1,200 lm/m	0.3833	0.3825
Centre 1,800 lm/m	0.3842	0.3848



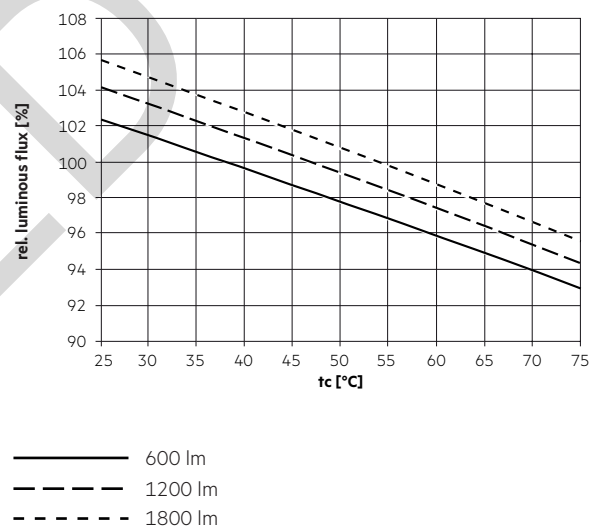
— MacAdam Ellipse: 3SDCM

**6.2 Light distribution**

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

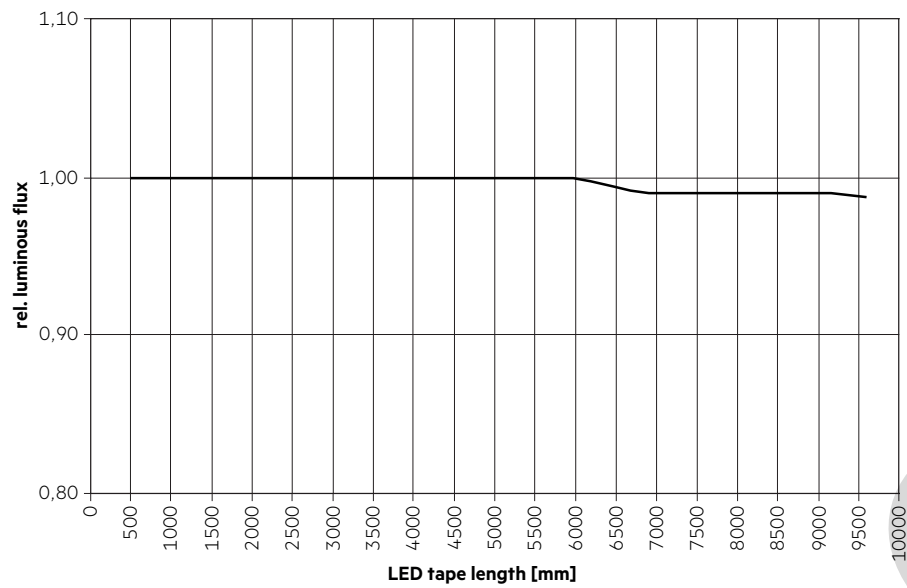


The colour temperature is measured over the complete module.
The single LED light points are inside of 3SDCM.
To ensure an ideal mixture of colours and a homogeneous light distribution a suitable optic (e. g. PMMA diffuser) and a sufficient spacing between module and optic (typ. 5 cm) should be used.

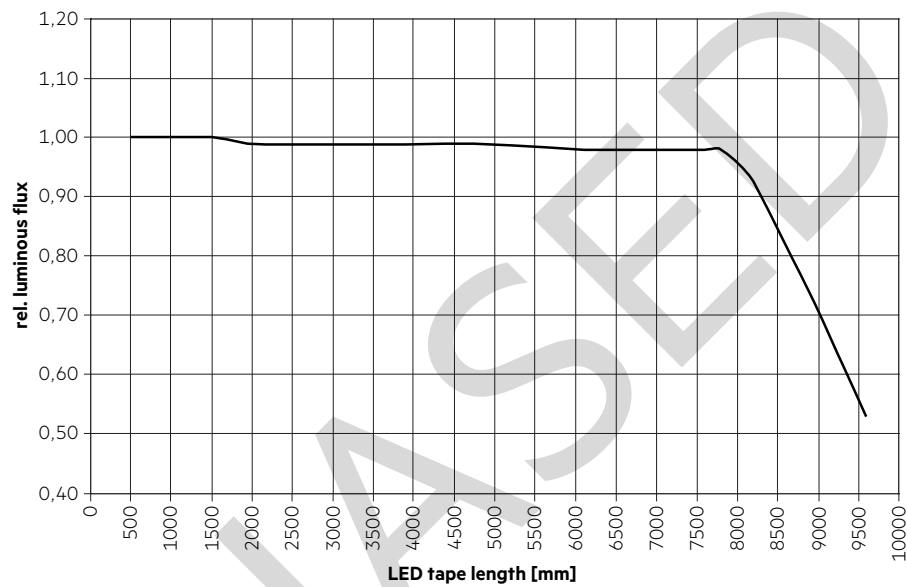
6.3 Relative luminous flux vs. tc temperature

6.4 Relative luminous flux vs. LED tape length

LLE FLEX G1 600lm IP67 EXC:



LLE FLEX G1 1200lm IP67 EXC:



LLE FLEX G1 1800lm IP67 EXC:



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.