



Module LLE FLEX 8mm 24V EXC4

Modules LLE FLEX essence

Product description

- Dimmable 24 V constant voltage LED flextape (SELV)
- Ideal for various lighting applications:
indirect, accent and decorative lighting, ceiling integration, cove lighting and aluminium extrusions
- 1 reel = 5 m (50 m on demand)
- Made in Europe
- Long lifetime: 60,000 hours
- 5 years guarantee (conditions at www.tridonic.com)

Optical properties

- Colour temperature 2,700, 3,000, 4,000 K (6,500 K on demand)
- Useful luminous flux up to 2,777 lm/m at $t_p = 25^\circ\text{C}$
- Efficacy of the LED module up to 148 lm/W at $t_p = 25^\circ\text{C}$
- High colour rendering index CRI > 80 and CRI > 90
- Small colour tolerance (MacAdam 3)
- Outstanding homogeneity due to IC current control

Mechanical properties

- High design freedom due to 5 cm cut-options and 140 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)



Standards, page 6

Colour temperatures and tolerances, page 8





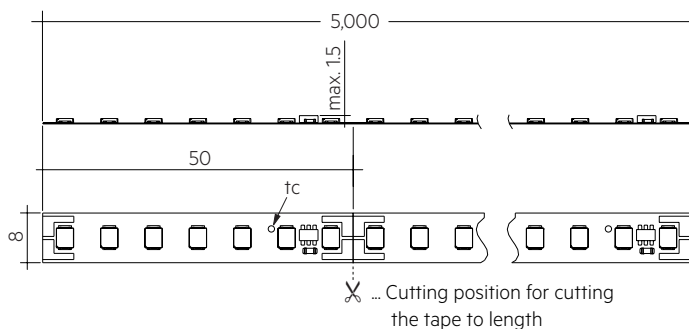
Module LLE FLEX 8mm 24V EXC4

Modules LLE FLEX essence

Technical data

Colour consistency [®]	3 SDCM
ESD classification	severity level 1
Classification acc. to IEC 62031	Built-in
Type of protection	IP00
Lumen maintenance L70B50	60,000 h
Guarantee (conditions at www.tridonic.com)	5 years

[®] Integral measurement over the complete module.



Ordering data

Type	Article number	Packaging carton	Weight per pc.
LLE FLEX 8mm 24V 10W 1200lm 830 EXC4 R05	28005245	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 10W 1200lm 840 EXC4 R05	28005246	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 14W 1800lm 830 EXC4 R05	28005249	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 14W 1800lm 840 EXC4 R05	28005250	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 20W 2500lm 830 EXC4 R05	28005253	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 20W 2500lm 840 EXC4 R05	28005254	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 6W 600lm 927 EXC4 R05	28005256	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 6W 600lm 930 EXC4 R05	28005257	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 6W 600lm 940 EXC4 R05	28005258	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 12W 1200lm 927 EXC4 R05	28005260	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 12W 1200lm 930 EXC4 R05	28005261	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 12W 1200lm 940 EXC4 R05	28005262	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 12W 1200lm 965 EXC4 R05	28005263	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 18W 1800lm 927 EXC4 R05	28005264	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 18W 1800lm 930 EXC4 R05	28005265	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 18W 1800lm 940 EXC4 R05	28005266	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 18W 1800lm 965 EXC4 R05	28005267	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 23W 2500lm 927 EXC4 R05	28005268	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 23W 2500lm 930 EXC4 R05	28005269	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 23W 2500lm 940 EXC4 R05	28005270	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 23W 2500lm 965 EXC4 R05	28005271	1 pc(s).	0.084 kg
LLE FLEX 8mm 24V 12W 1200lm 930 EXC4 R50	28005352	1 pc(s).	0.490 kg
LLE FLEX 8mm 24V 18W 1800lm 930 EXC4 R50	28005353	1 pc(s).	0.490 kg
LLE FLEX 8mm 24V 18W 1800lm 940 EXC4 R50	28005354	1 pc(s).	0.490 kg
LLE FLEX 8mm 24V 23W 2500lm 930 EXC4 R50	28005355	1 pc(s).	0.490 kg
LLE FLEX 8mm 24V 23W 2500lm 940 EXC4 R50	28005356	1 pc(s).	0.490 kg

Photometric data

Type	Colour temperature	Photometric code	Useful luminous flux at tp = 25 °C [®]	Luminous flux at tp rated [®]			Efficacy of the module at tp = 25 °C	Expected efficacy of the module at tp rated	Beam characteristic	Colour rendering index CRI
				Min.	Typ.	Max.				
LLE FLEX 8mm 24V 10W 1200lm 830 EXC4 R05	3,000 K	830/359	1,426 lm/m	1,125 lm/m	1,324 lm/m	1,523 lm/m	143 lm/W	133 lm/W	120°	> 80
LLE FLEX 8mm 24V 10W 1200lm 840 EXC4 R05	4,000 K	840/359	1,482 lm/m	1,170 lm/m	1,376 lm/m	1,514 lm/m	148 lm/W	138 lm/W	120°	> 80
LLE FLEX 8mm 24V 14W 1800lm 830 EXC4 R05	3,000 K	830/359	1,874 lm/m	1,479 lm/m	1,740 lm/m	1,914 lm/m	142 lm/W	132 lm/W	120°	> 80
LLE FLEX 8mm 24V 14W 1800lm 840 EXC4 R05	4,000 K	840/359	1,947 lm/m	1,537 lm/m	1,808 lm/m	1,989 lm/m	148 lm/W	137 lm/W	120°	> 80
LLE FLEX 8mm 24V 20W 2500lm 830 EXC4 R05	3,000 K	830/359	2,673 lm/m	2,109 lm/m	2,481 lm/m	2,729 lm/m	143 lm/W	133 lm/W	120°	> 80
LLE FLEX 8mm 24V 20W 2500lm 840 EXC4 R05	4,000 K	840/359	2,777 lm/m	2,191 lm/m	2,578 lm/m	2,836 lm/m	148 lm/W	138 lm/W	120°	> 80
LLE FLEX 8mm 24V 6W 600lm 927 EXC4 R05	2,700 K	927/359	577 lm/m	456 lm/m	536 lm/m	590 lm/m	111 lm/W	103 lm/W	120°	> 90
LLE FLEX 8mm 24V 6W 600lm 930 EXC4 R05	3,000 K	930/359	605 lm/m	478 lm/m	562 lm/m	618 lm/m	117 lm/W	108 lm/W	120°	> 90
LLE FLEX 8mm 24V 6W 600lm 940 EXC4 R05	4,000 K	940/359	626 lm/m	495 lm/m	582 lm/m	640 lm/m	121 lm/W	112 lm/W	120°	> 90
LLE FLEX 8mm 24V 12W 1200lm 927 EXC4 R05	2,700 K	927/359	1,297 lm/m	1,023 lm/m	1,204 lm/m	1,324 lm/m	114 lm/W	106 lm/W	120°	> 90
LLE FLEX 8mm 24V 12W 1200lm 930 EXC4 R05	3,000 K	930/359	1,360 lm/m	1,074 lm/m	1,263 lm/m	1,389 lm/m	120 lm/W	111 lm/W	120°	> 90
LLE FLEX 8mm 24V 12W 1200lm 940 EXC4 R05	4,000 K	940/359	1,408 lm/m	1,111 lm/m	1,307 lm/m	1,438 lm/m	124 lm/W	115 lm/W	120°	> 90
LLE FLEX 8mm 24V 12W 1200lm 965 EXC4 R05	6,500 K	965/359	1,441 lm/m	1,136 lm/m	1,337 lm/m	1,471 lm/m	127 lm/W	118 lm/W	120°	> 90
LLE FLEX 8mm 24V 18W 1800lm 927 EXC4 R05	2,700 K	927/359	1,937 lm/m	1,528 lm/m	1,798 lm/m	1,978 lm/m	112 lm/W	104 lm/W	120°	> 90
LLE FLEX 8mm 24V 18W 1800lm 930 EXC4 R05	3,000 K	930/359	2,032 lm/m	1,603 lm/m	1,886 lm/m	2,075 lm/m	118 lm/W	109 lm/W	120°	> 90
LLE FLEX 8mm 24V 18W 1800lm 940 EXC4 R05	4,000 K	940/359	2,103 lm/m	1,659 lm/m	1,952 lm/m	2,147 lm/m	122 lm/W	113 lm/W	120°	> 90
LLE FLEX 8mm 24V 18W 1800lm 965 EXC4 R05	6,500 K	965/359	2,152 lm/m	1,697 lm/m	1,997 lm/m	2,197 lm/m	125 lm/W	116 lm/W	120°	> 90
LLE FLEX 8mm 24V 23W 2500lm 927 EXC4 R05	2,700 K	927/359	2,500 lm/m	1,973 lm/m	2,321 lm/m	2,553 lm/m	111 lm/W	103 lm/W	120°	> 90
LLE FLEX 8mm 24V 23W 2500lm 930 EXC4 R05	3,000 K	930/359	2,620 lm/m	2,069 lm/m	2,434 lm/m	2,677 lm/m	116 lm/W	108 lm/W	120°	> 90
LLE FLEX 8mm 24V 23W 2500lm 940 EXC4 R05	4,000 K	940/359	2,715 lm/m	2,142 lm/m	2,520 lm/m	2,772 lm/m	120 lm/W	112 lm/W	120°	> 90
LLE FLEX 8mm 24V 23W 2500lm 965 EXC4 R05	6,500 K	965/359	2,776 lm/m	2,191 lm/m	2,578 lm/m	2,836 lm/m	123 lm/W	114 lm/W	120°	> 90
LLE FLEX 8mm 24V 12W 1200lm 930 EXC4 R50	3,000 K	930/359	1,360 lm/m	1,074 lm/m	1,263 lm/m	1,389 lm/m	124 lm/W	115 lm/W	120°	> 90
LLE FLEX 8mm 24V 18W 1800lm 930 EXC4 R50	3,000 K	930/359	2,032 lm/m	1,603 lm/m	1,886 lm/m	2,075 lm/m	118 lm/W	109 lm/W	120°	> 90
LLE FLEX 8mm 24V 18W 1800lm 940 EXC4 R50	4,000 K	940/359	2,103 lm/m	1,659 lm/m	1,952 lm/m	2,147 lm/m	122 lm/W	116 lm/W	120°	> 90
LLE FLEX 8mm 24V 23W 2500lm 930 EXC4 R50	3,000 K	930/359	2,620 lm/m	2,069 lm/m	2,434 lm/m	2,677 lm/m	119 lm/W	110 lm/W	120°	> 90
LLE FLEX 8mm 24V 23W 2500lm 940 EXC4 R50	4,000 K	940/359	2,715 lm/m	2,142 lm/m	2,520 lm/m	2,772 lm/m	123 lm/W	114 lm/W	120°	> 90

[®] Integral measurement over the complete module.

[®] For 5 m reel max. 2 solder joints.

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

[®] Measurement uncertainty ± 10 %. Values given for 1 m LLE FLEX. Based on calculation.

Electrical data

Type	Typ. current consumption at tp rated	Supply voltage DC ^①	Supply voltage range DC	Power consumption Pon at tp = 25 °C ^②	Energy classification	Energy consumption	Type of light source
LLE FLEX 8mm 24V 10W 1200lm 830 EXC4 R05	416 mA/m	24.0 V	21.6 - 26.4 V	10.0 W	E	10 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 10W 1200lm 840 EXC4 R05	416 mA/m	24.0 V	21.6 - 26.4 V	10.0 W	D	10 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 14W 1800lm 830 EXC4 R05	548 mA/m	24.0 V	21.6 - 26.4 V	13.2 W	E	14 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 14W 1800lm 840 EXC4 R05	548 mA/m	24.0 V	21.6 - 26.4 V	13.2 W	D	14 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 20W 2500lm 830 EXC4 R05	780 mA/m	24.0 V	21.6 - 26.4 V	18.8 W	E	19 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 20W 2500lm 840 EXC4 R05	780 mA/m	24.0 V	21.6 - 26.4 V	18.8 W	D	19 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 6W 600lm 927 EXC4 R05	216 mA/m	24.0 V	21.6 - 26.4 V	5.2 W	F	6 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 6W 600lm 930 EXC4 R05	216 mA/m	24.0 V	21.6 - 26.4 V	5.2 W	F	6 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 6W 600lm 940 EXC4 R05	216 mA/m	24.0 V	21.6 - 26.4 V	5.2 W	E	6 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 12W 1200lm 927 EXC4 R05	472 mA/m	24.0 V	21.6 - 26.4 V	11.4 W	F	12 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 12W 1200lm 930 EXC4 R05	472 mA/m	24.0 V	21.6 - 26.4 V	11.4 W	E	12 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 12W 1200lm 940 EXC4 R05	472 mA/m	24.0 V	21.6 - 26.4 V	11.4 W	E	12 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 12W 1200lm 965 EXC4 R05	472 mA/m	24.0 V	21.6 - 26.4 V	11.4 W	E	12 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 18W 1800lm 927 EXC4 R05	720 mA/m	24.0 V	21.6 - 26.4 V	17.3 W	F	18 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 18W 1800lm 930 EXC4 R05	720 mA/m	24.0 V	21.6 - 26.4 V	17.3 W	F	18 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 18W 1800lm 940 EXC4 R05	720 mA/m	24.0 V	21.6 - 26.4 V	17.3 W	E	18 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 18W 1800lm 965 EXC4 R05	720 mA/m	24.0 V	21.6 - 26.4 V	17.3 W	E	18 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 23W 2500lm 927 EXC4 R05	940 mA/m	24.0 V	21.6 - 26.4 V	22.6 W	F	23 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 23W 2500lm 930 EXC4 R05	940 mA/m	24.0 V	21.6 - 26.4 V	22.6 W	F	23 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 23W 2500lm 940 EXC4 R05	940 mA/m	24.0 V	21.6 - 26.4 V	22.6 W	E	23 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 23W 2500lm 965 EXC4 R05	940 mA/m	24.0 V	21.6 - 26.4 V	22.6 W	E	23 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 12W 1200lm 930 EXC4 R50	472 mA/m	24.0 V	21.6 - 26.4 V	11.0 W	E	11 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 18W 1800lm 930 EXC4 R50	720 mA/m	24.0 V	21.6 - 26.4 V	17.3 W	F	18 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 18W 1800lm 940 EXC4 R50	720 mA/m	24.0 V	21.6 - 26.4 V	16.8 W	E	17 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 23W 2500lm 930 EXC4 R50	940 mA/m	24.0 V	21.6 - 26.4 V	22.1 W	F	23 kWh / 1,000 h	Non-directional
LLE FLEX 8mm 24V 23W 2500lm 940 EXC4 R50	940 mA/m	24.0 V	21.6 - 26.4 V	22.1 W	E	23 kWh / 1,000 h	Non-directional

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

^② Tolerance of power consumption Pon ± 15 %. Measurement uncertainty ± 5 %. Values given for 1 m LLE FLEX.

Specific technical data

Type	Max. working voltage for insulation SELV	Electrical strength	ta	tp rated	tc
LLE FLEX 8mm 24V 10W 1200lm 830 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 10W 1200lm 840 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 14W 1800lm 830 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 14W 1800lm 840 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 20W 2500lm 830 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 20W 2500lm 840 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 6W 600lm 927 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 6W 600lm 930 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 6W 600lm 940 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 12W 1200lm 927 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 12W 1200lm 930 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 12W 1200lm 940 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 12W 1200lm 965 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 18W 1800lm 927 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 18W 1800lm 930 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 18W 1800lm 940 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 18W 1800lm 965 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 23W 2500lm 927 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 23W 2500lm 930 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 23W 2500lm 940 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 23W 2500lm 965 EXC4 R05	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 12W 1200lm 930 EXC4 R50	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 18W 1800lm 930 EXC4 R50	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 18W 1800lm 940 EXC4 R50	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 23W 2500lm 930 EXC4 R50	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C
LLE FLEX 8mm 24V 23W 2500lm 940 EXC4 R50	60 V	0.5 kV	-25 ... +50 °C	65 °C	75 °C

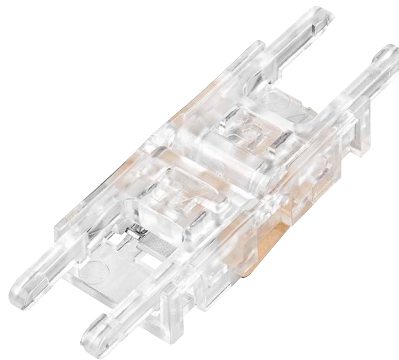
Connector for LLE FLEX

Product description

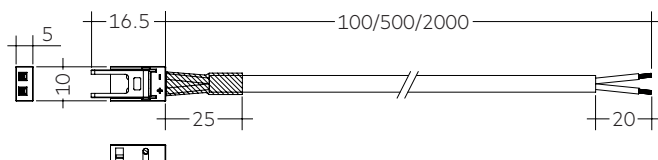
- For connection of LLE FLEX modules
- For internal wiring only (no strain relief functionality)
- Connector can be closed and re-opened easily:
For assembly instructions see application note available at www.tridonic.com
- Glow wire test according to IEC 60695-2-11
- Max. 5 A in connection with LLE FLEX
- Urated = 24 – 48 V
- Wire cross section AWG 18



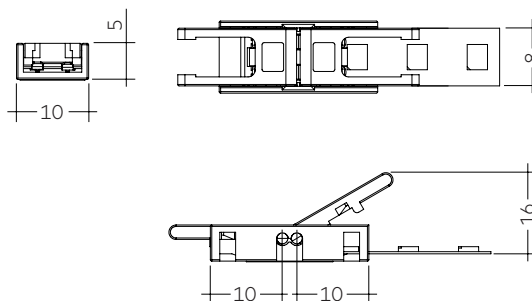
ACL connector Wire-PCB



ACL connector PCB-PCB



ACL connector Wire-PCB



ACL connector PCB-PCB

Ordering data

Type	Article number	Packaging carton	Weight per pc.
ACL FLEX CONNECTOR WIRE - PCB 100MM	28004985	20 pc(s).	0.004 kg
ACL FLEX CONNECTOR WIRE - PCB 500MM	28004986	20 pc(s).	0.020 kg
ACL FLEX CONNECTOR WIRE - PCB 2000MM	28004987	10 pc(s).	0.072 kg
ACL FLEX CONNECTOR PCB - PCB	28004988	25 pc(s).	0.001 kg

1. Standards

IEC 62031
IEC 62471
IEC 62778
IEC 61000-4-2
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 after 25% of the lifetime (max.6000h)	Luminous flux after 25% of the lifetime (max.6000h)
7	70 – 79			Code
8	80 – 89			Luminous flux
9	≥90			

1.2 Risk group

Type	Risk group
LLE FLEX 8mm 24V EXC4	RGO

1.3 Energy classification

Type	Colour temperature	Energy classification	Energy consumption
LLE FLEX 8mm 24V 10W 1200lm 830 EXC4 R05	3,000 K	D	10 kWh / 1,000 h
LLE FLEX 8mm 24V 10W 1200lm 840 EXC4 R05	4,000 K	D	10 kWh / 1,000 h
LLE FLEX 8mm 24V 14W 1800lm 830 EXC4 R05	3,000 K	D	13 kWh / 1,000 h
LLE FLEX 8mm 24V 14W 1800lm 840 EXC4 R05	4,000 K	D	13 kWh / 1,000 h
LLE FLEX 8mm 24V 20W 2500lm 830 EXC4 R05	3,000 K	E	19 kWh / 1,000 h
LLE FLEX 8mm 24V 20W 2500lm 840 EXC4 R05	4,000 K	D	19 kWh / 1,000 h
LLE FLEX 8mm 24V 6W 600lm 927 EXC4 R05	2,700 K	E	5 kWh / 1,000 h
LLE FLEX 8mm 24V 6W 600lm 930 EXC4 R05	3,000 K	E	5 kWh / 1,000 h
LLE FLEX 8mm 24V 6W 600lm 940 EXC4 R05	4,000 K	E	5 kWh / 1,000 h
LLE FLEX 8mm 24V 12W 1200lm 927 EXC4 R05	2,700 K	F	11 kWh / 1,000 h
LLE FLEX 8mm 24V 12W 1200lm 930 EXC4 R05	3,000 K	E	11 kWh / 1,000 h
LLE FLEX 8mm 24V 12W 1200lm 940 EXC4 R05	4,000 K	E	11 kWh / 1,000 h
LLE FLEX 8mm 24V 12W 1200lm 965 EXC4 R05	6,500 K	E	11 kWh / 1,000 h
LLE FLEX 8mm 24V 18W 1800lm 927 EXC4 R05	2,700 K	F	17 kWh / 1,000 h
LLE FLEX 8mm 24V 18W 1800lm 930 EXC4 R05	3,000 K	E	17 kWh / 1,000 h
LLE FLEX 8mm 24V 18W 1800lm 940 EXC4 R05	4,000 K	E	17 kWh / 1,000 h
LLE FLEX 8mm 24V 18W 1800lm 965 EXC4 R05	6,500 K	E	17 kWh / 1,000 h
LLE FLEX 8mm 24V 23W 2500lm 927 EXC4 R05	2,700 K	F	23 kWh / 1,000 h
LLE FLEX 8mm 24V 23W 2500lm 930 EXC4 R05	3,000 K	F	23 kWh / 1,000 h
LLE FLEX 8mm 24V 23W 2500lm 940 EXC4 R05	4,000 K	E	23 kWh / 1,000 h
LLE FLEX 8mm 24V 23W 2500lm 965 EXC4 R05	6,500 K	E	23 kWh / 1,000 h
LLE FLEX 8mm 24V 12W 1200lm 930 EXC4 R50	3,000 K	E	11 kWh / 1,000 h
LLE FLEX 8mm 24V 18W 1800lm 930 EXC4 R50	3,000 K	E	17 kWh / 1,000 h
LLE FLEX 8mm 24V 18W 1800lm 940 EXC4 R50	4,000 K	E	17 kWh / 1,000 h
LLE FLEX 8mm 24V 23W 2500lm 930 EXC4 R50	3,000 K	F	23 kWh / 1,000 h
LLE FLEX 8mm 24V 23W 2500lm 940 EXC4 R50	4,000 K	E	23 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
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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 LLE will be greatly reduced or the LLE may be destroyed.

2.4 Heat sink values

LLE FLEX 8mm 1200lm 24V 8xx EXC4

ta	tp	R _{th, hs-a} ①	Cooling area ①
25 °C	65 °C	194.93 K/W	self cooling
35 °C	65 °C	146.15 K/W	5 cm²
40 °C	65 °C	121.76 K/W	5 cm²
45 °C	65 °C	97.37 K/W	7 cm²
50 °C	65 °C	72.98 K/W	9 cm²

LLE FLEX 8mm 1800lm 24V 8xx EXC4

ta	tp	R _{th, hs-a} ①	Cooling area ①
25 °C	65 °C	171.86 K/W	self cooling
35 °C	65 °C	128.84 K/W	5 cm²
40 °C	65 °C	107.34 K/W	6 cm²
45 °C	65 °C	85.83 K/W	8 cm²
50 °C	65 °C	64.33 K/W	10 cm²

LLE FLEX 8mm 2500lm 24V 8xx EXC4

ta	tp	R _{th, hs-a} ①	Cooling area ①
25 °C	65 °C	107.56 K/W	6 cm²
35 °C	65 °C	80.62 K/W	8 cm²
40 °C	65 °C	67.15 K/W	10 cm²
45 °C	65 °C	53.68 K/W	12 cm²
50 °C	65 °C	40.22 K/W	17 cm²

LLE FLEX 8mm 600lm 24V 9xx EXC4

ta	tp	R _{th, hs-a} ^①	Cooling area ^①
25 °C	65 °C	340.24 K/W	self cooling
35 °C	65 °C	255.13 K/W	self cooling
40 °C	65 °C	212.58 K/W	self cooling
45 °C	65 °C	170.03 K/W	self cooling
50 °C	65 °C	127.47 K/W	5 cm²

LLE FLEX 8mm 1200lm 24V 9xx EXC4

ta	tp	R _{th, hs-a} ^①	Cooling area ^①
25 °C	65 °C	150.76 K/W	4 cm²
35 °C	65 °C	113.02 K/W	6 cm²
40 °C	65 °C	94.15 K/W	7 cm²
45 °C	65 °C	75.28 K/W	9 cm²
50 °C	65 °C	56.42 K/W	12 cm²

LLE FLEX 8mm 1800lm 24V 9xx EXC4

ta	tp	R _{th, hs-a} ^①	Cooling area ^①
25 °C	65 °C	94.49 K/W	7 cm²
35 °C	65 °C	70.82 K/W	9 cm²
40 °C	65 °C	58.98 K/W	11 cm²
45 °C	65 °C	47.15 K/W	14 cm²
50 °C	65 °C	35.32 K/W	19 cm²

LLE FLEX 8mm 2500lm 24V 9xx EXC4

ta	tp	R _{th, hs-a} ^①	Cooling area ^①
25 °C	65 °C	76.55 K/W	9 cm²
35 °C	65 °C	57.37 K/W	12 cm²
40 °C	65 °C	47.77 K/W	14 cm²
45 °C	65 °C	38.18 K/W	17 cm²
50 °C	65 °C	28.59 K/W	23 cm²

① Values for a single segment of the LLE FLEX (50 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 50 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>

4.3 Switching capability

100,000 cycles

Tridonic test according to IEC 62717 Cl 10.3.3
30 s on / 30 s off at I_{max}

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 8mm 24V 600lm EXC4

LLE FLEX 8mm 24V 1200lm EXC4

Supply voltage	tp temperature	L90/B10	L90/B50	L80/B10	L80/B50	L70/B10	L70/B50
24 V	40 °C	30k h	44k h	60k h	>60k h	>60k h	>60k h
	45 °C	29k h	43k h	59k h	>60k h	>60k h	>60k h
	50 °C	28k h	41k h	57k h	>60k h	>60k h	>60k h
	55 °C	28k h	41k h	56k h	>60k h	>60k h	>60k h
	60 °C	27k h	39k h	55k h	>60k h	>60k h	>60k h
	65 °C	26k h	38k h	54k h	>60k h	>60k h	>60k h
	70 °C	26k h	37k h	52k h	>60k h	>60k h	>60k h
	75 °C	25k h	36k h	51k h	>60k h	>60k h	>60k h

LLE FLEX 8mm 24V 1800lm EXC4

LLE FLEX 8mm 24V 2500lm EXC4

Supply voltage	tp temperature	L90/B10	L90/B50	L80/B10	L80/B50	L70/B10	L70/B50
24 V	40 °C	30k h	44k h	60k h	>60k h	>60k h	>60k h
	45 °C	29k h	43k h	59k h	>60k h	>60k h	>60k h
	50 °C	28k h	41k h	57k h	>60k h	>60k h	>60k h
	55 °C	28k h	40k h	56k h	>60k h	>60k h	>60k h
	60 °C	27k h	39k h	55k h	>60k h	>60k h	>60k h
	65 °C	26k h	37k h	53k h	>60k h	>60k h	>60k h
	70 °C	26k h	36k h	52k h	>60k h	>60k h	>60k h
	75 °C	25k h	35k h	50k h	>60k h	>60k h	>60k h

LOC10 >60 kh. At tp rated, based on 10 switching cycles per day.

6. Photometric characteristics

6.1 Coordinates and tolerances according to CIE 1931

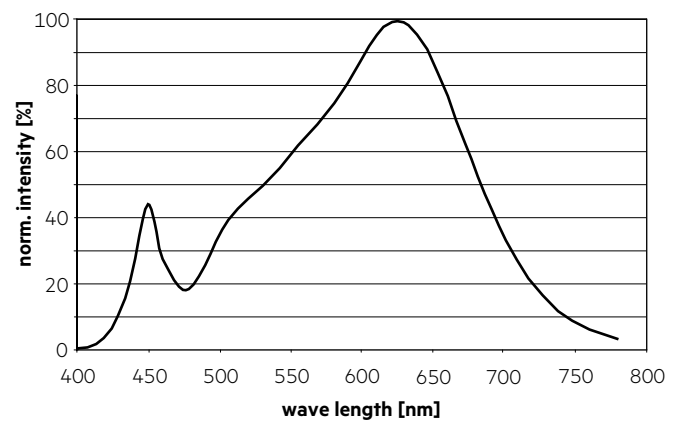
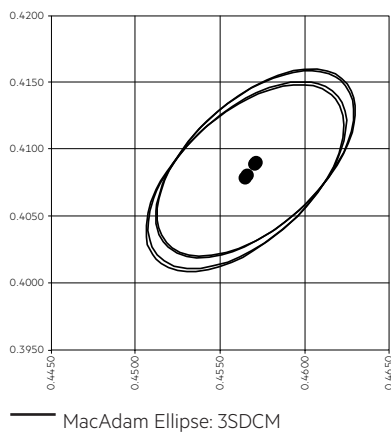
The specified colour coordinates are measured integral by a current impulse with typical values of module and a duration of 100 ms.

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

The measurement tolerance of the colour coordinates are ± 0.01 .

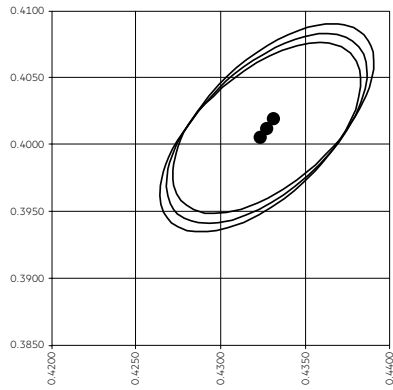
2.700 K – CRI90

	x0	y0
Centre 600 lm/m	0.4553	0.4058
Centre 1.200 lm/m	0.4565	0.4079
Centre 1.800 lm/m	0.4570	0.4089
Centre 2.500 lm/m	0.4574	0.4095

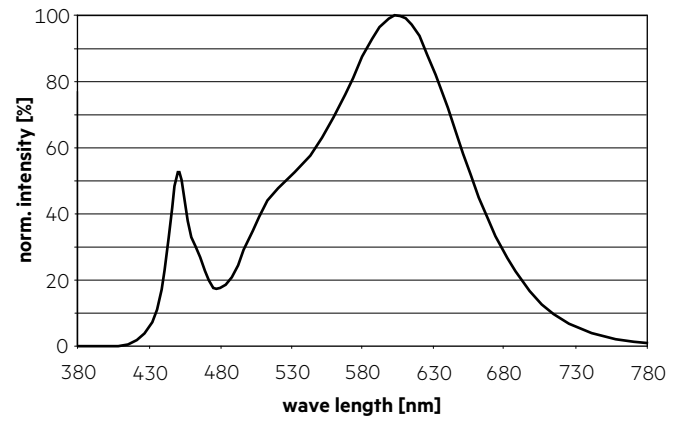


3,000 K – CRI80

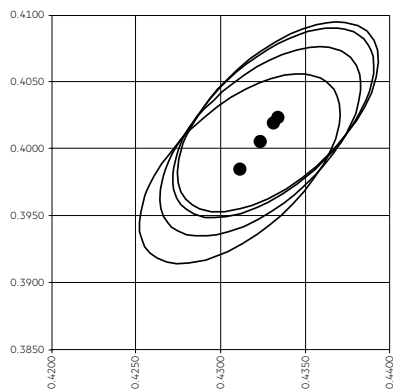
	x0	y0
Centre 1,200 lm/m	0.4323	0.4005
Centre 1,800 lm/m	0.4327	0.4012
Centre 2,500 lm/m	0.4331	0.4019



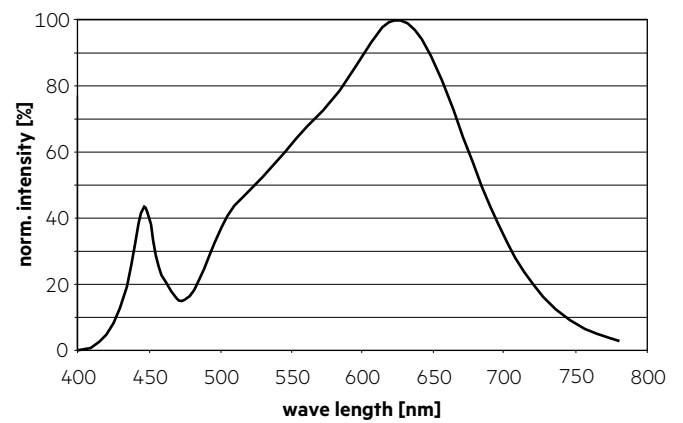
MacAdam Ellipse: 3SDCM

**3,000 K – CRI90**

	x0	y0
Centre 600 lm/m	0.4311	0.3985
Centre 1,200 lm/m	0.4323	0.4005
Centre 1,800 lm/m	0.4331	0.4019
Centre 2,500 lm/m	0.4334	0.4024

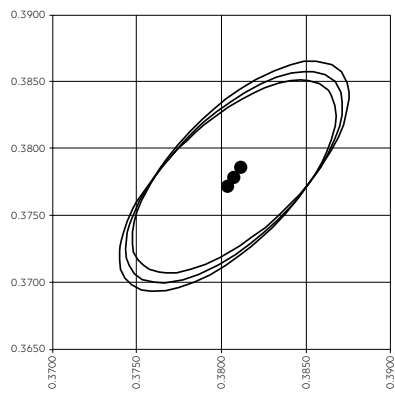


MacAdam Ellipse: 3SDCM

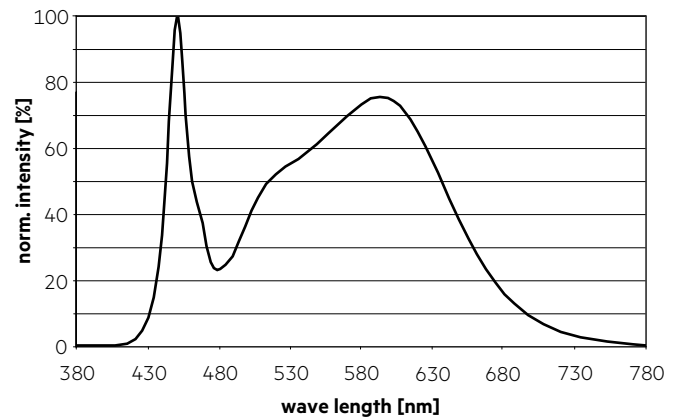


4,000 K – CRI80

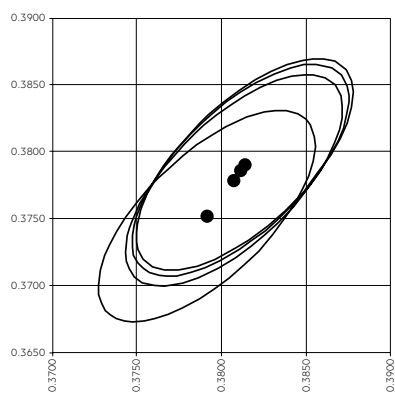
	x0	y0
Centre 1,200 lm/m	0.3803	0.3772
Centre 1,800 lm/m	0.3807	0.3779
Centre 2,500 lm/m	0.3811	0.3786



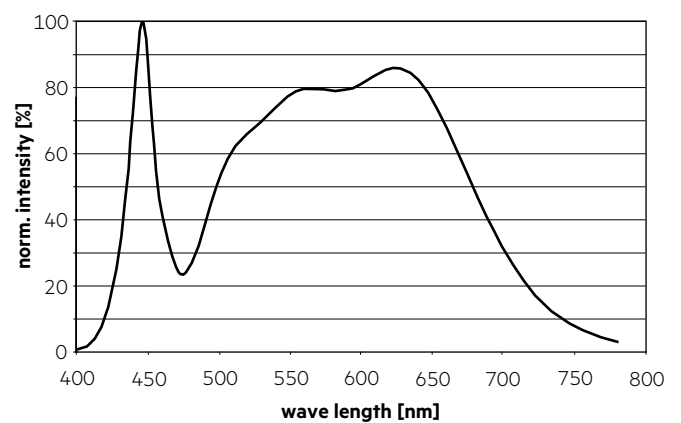
MacAdam Ellipse: 3SDCM

**4,000 K – CRI90**

	x0	y0
Centre 600 lm/m	0.3791	0.3752
Centre 1,200 lm/m	0.3803	0.3772
Centre 1,800 lm/m	0.3811	0.3786
Centre 2,500 lm/m	0.3814	0.3791

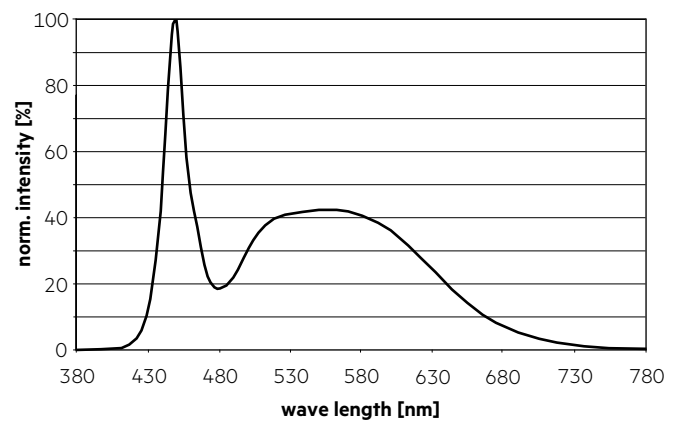
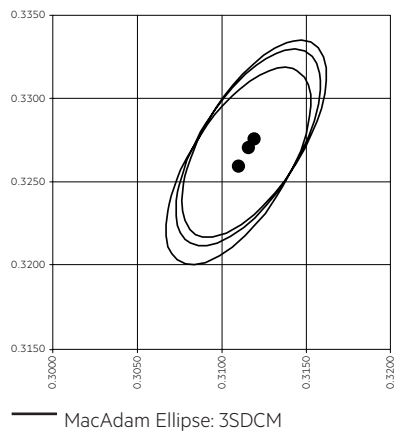


MacAdam Ellipse: 3SDCM



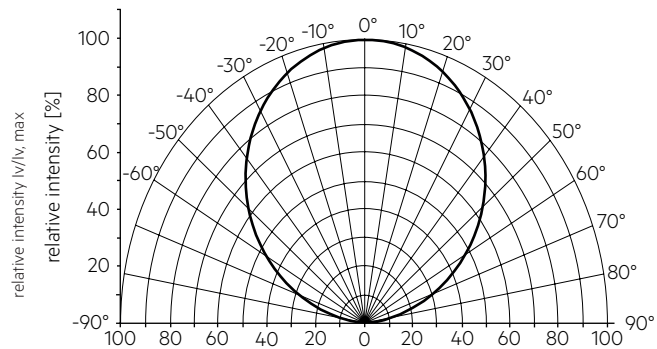
6,500 K – CRI90

	x0	y0
Centre 1,200 lm/m	0.3110	0.3260
Centre 1,800 lm/m	0.3116	0.3271
Centre 2,500 lm/m	0.3119	0.3276



6.2 Light distribution

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

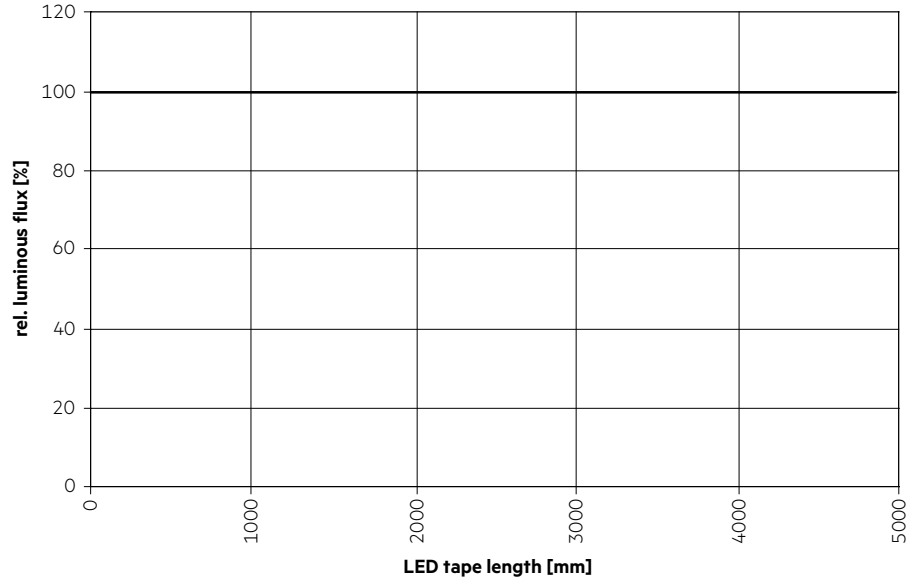


The colour temperature is measured over the complete module. To ensure an ideal mixture of colours and a homogeneous light distribution a suitable optic (e. g. PMMA diffuser) and a sufficient spacing between module and optic (typ. 1.5 cm) should be used.

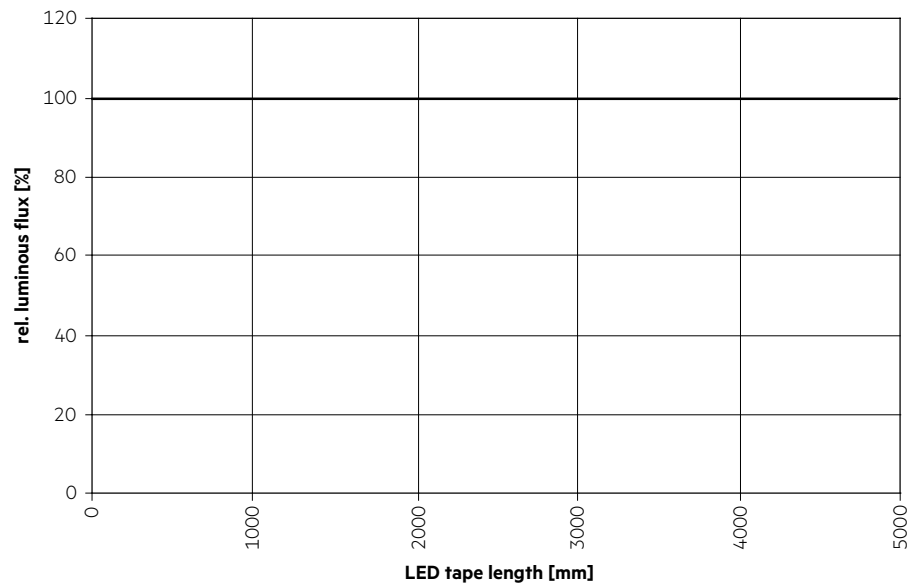
6.4 Relative luminous flux vs. LED tape length

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

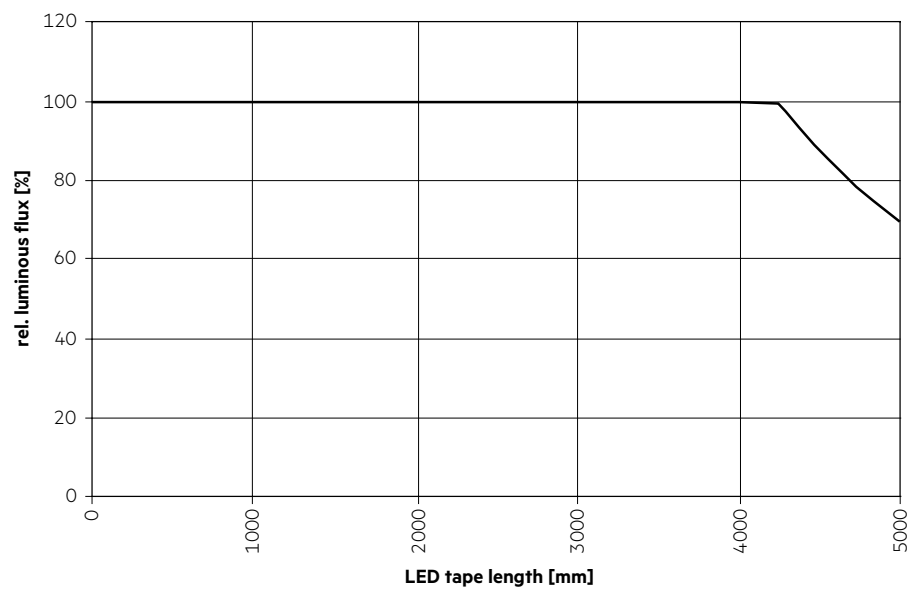
LLE FLEX 8mm 24V 1200lm 8xx EXC4



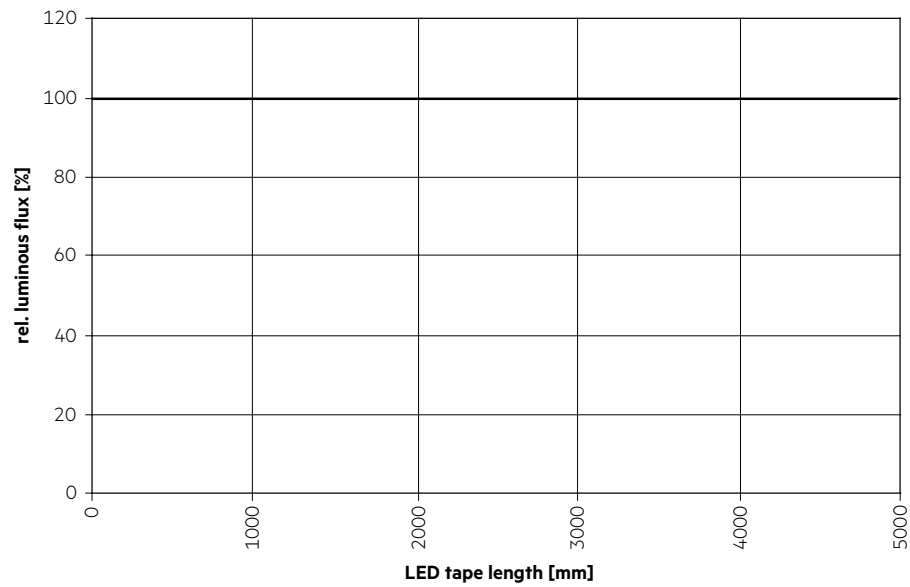
LLE FLEX 8mm 24V 1800lm 8xx EXC4



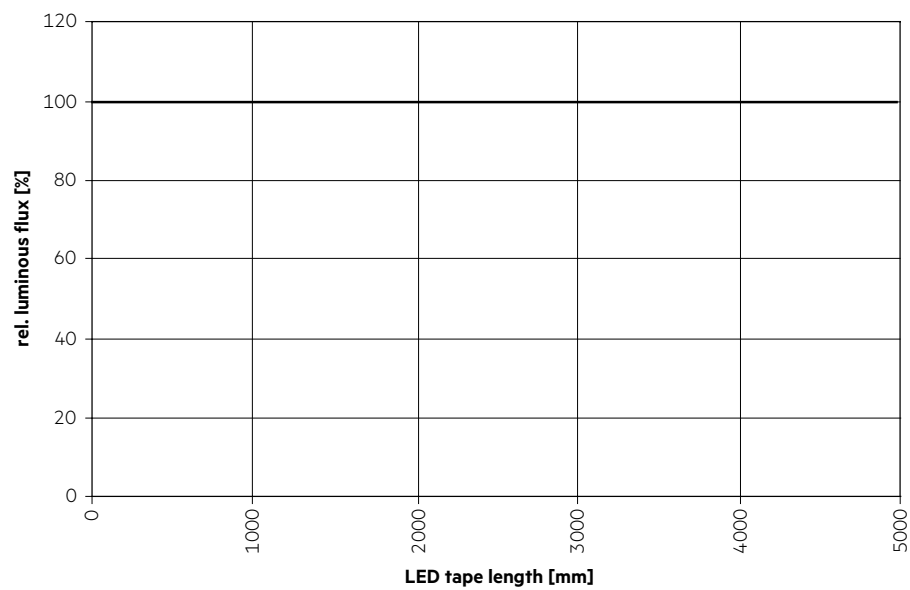
LLE FLEX 8mm 24V 2500lm 8xx EXC4



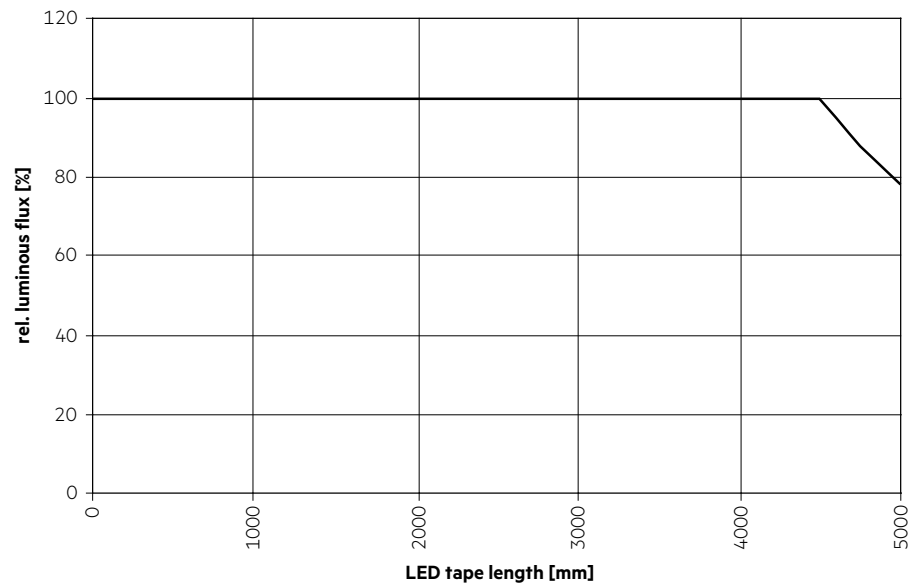
LLE FLEX 8mm 24V 600lm 9xx EXC4



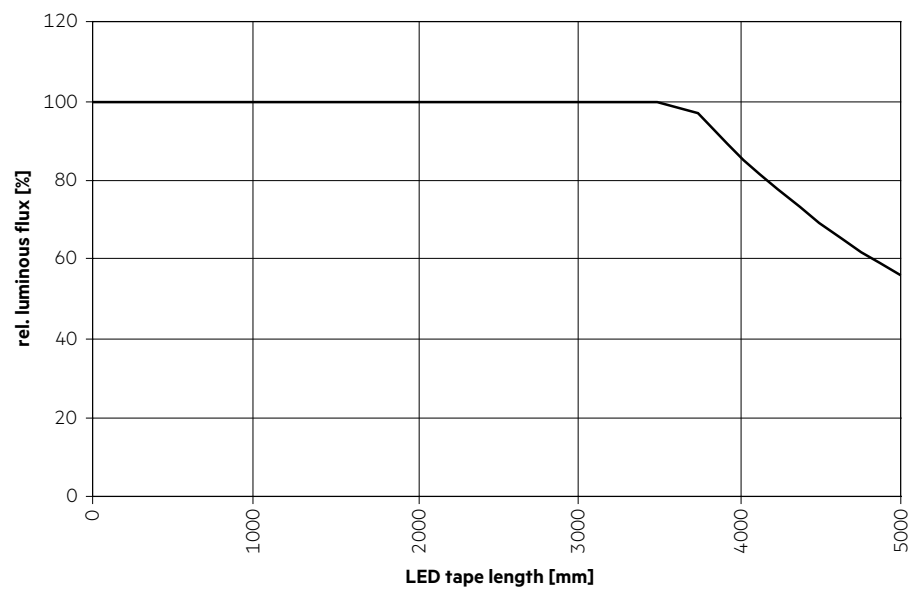
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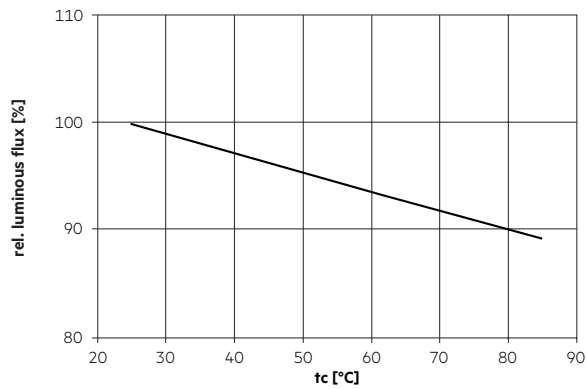
LLE FLEX 8mm 24V 1800lm 9xx EXC4



LLE FLEX 8mm 24V 2500lm 9xx EXC4



6.3 Relative luminous flux vs. t_c temperature



7. Miscellaneous

7.1 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.