



Module LLE G2 24mm 2000lm SNC

Modules LLE essence

Product description

- Optimal solution for linear and panel lights where cost is main priority, together with the new LC Ip SNC and ADV LED Driver provides best system efficiency
- Typ. luminous flux 2,000 and 4,000 lm
- Efficiency of the module up to 171 lm/W
- High colour rendering index CRI > 80
- Small colour tolerance MacAdam 4^①
- Colour temperatures 3,000, 4,000 and 6,500 K
- Module dimension 24 x 280 mm and 24 x 560 mm (ZHAGA compliant)
- Perfectly uniform light, even if several LED modules are used together in a line
- Push terminals for quick and simple wiring of LED module to LED module
- Broad portfolio from extruded lenses and covers available
- Simple installation (e.g. clips or screws)
- Long life-time up to 50,000 hours
- 5-year guarantee

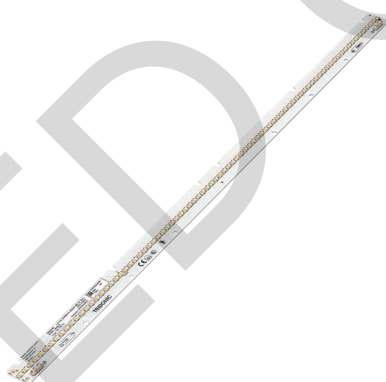


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LLE G2 24x280mm 2000lm SNC



LLE G2 24x560mm 4000lm SNC

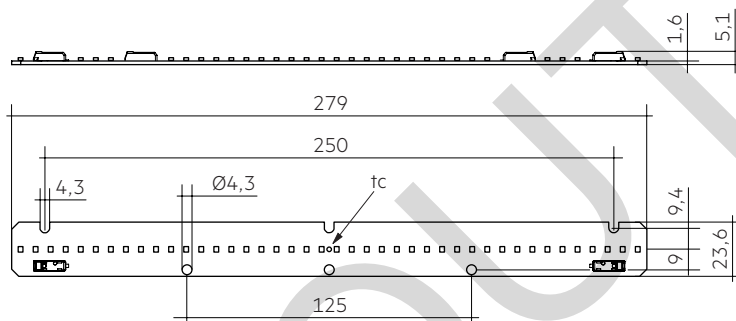


Module LLE G2 24mm 2000lm SNC

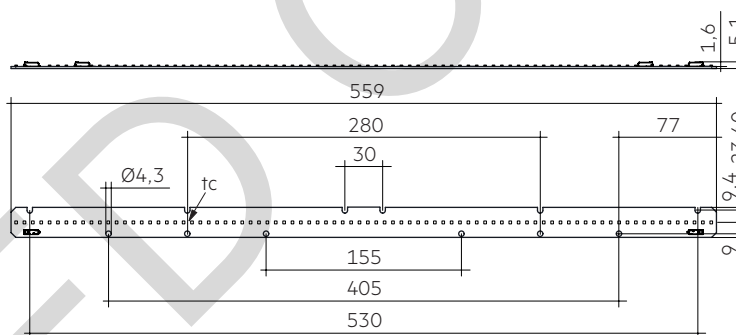
Modules LLE essence

Technical data

Beam characteristic	120°
Ambient temperature range	-40 ... +60 °C
tp rated	65 °C
tc	85 °C
Irated	325 mA
I _{max}	540 mA
Max. permissible LF current ripple	540 mA
Max. permissible peak current	1,200 mA / max. 10 ms
Max. working voltage for insulation®	335 V
Insulation test voltage	1.67 kV
CTI of the printed circuit board	≥ 600
ESD classification	severity level 4
Risk group (IEC 62471:2008) at I _{max}	RG2 (E _{th} = 546 lx, RG1 at d ≥ 20 cm)
Risk group (IEC 62471:2008) at I = 490 mA	RG1
Classification acc. to IEC 62031	Built-in
Type of protection	IP00



LLE G2 24x280mm 2000lm SNC



LLE G2 24x560mm 4000lm SNC

Ordering data

Type	Article number	Colour temperature	Packaging carton	Weight per pc.
LLE G2 24x280mm 2000lm 830 2T SNC	28002289	3,000 K	300 pc(s).	0.022 kg
LLE G2 24x280mm 2000lm 840 2T SNC	28002290	4,000 K	300 pc(s).	0.022 kg
LLE G2 24x280mm 2000lm 865 2T SNC	28002291	6,500 K	300 pc(s).	0.022 kg
LLE G2 24x560mm 4000lm 830 2T SNC	28002292	3,000 K	200 pc(s).	0.043 kg
LLE G2 24x560mm 4000lm 840 2T SNC	28002293	4,000 K	200 pc(s).	0.042 kg
LLE G2 24x560mm 4000lm 865 2T SNC	28002294	6,500 K	200 pc(s).	0.042 kg

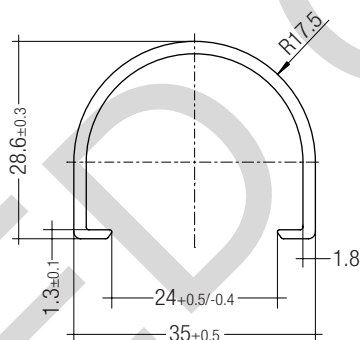
Specific technical data

Type [®]	Photo-metric code	Typ. luminous flux at tp = 25 °C [®]	Typ. luminous flux at tp = 65 °C [®]	Typ. forward current	Min. forward voltage at tp = 65 °C	Max. forward voltage at tp = 25 °C	Typ. power consumption at tp = 65 °C [®]	Efficacy of the module at tp = 25 °C	Efficacy of the module at tp = 65 °C	Efficacy of the system at tp = 65 °C	Colour rendering index CRI
Operating mode HE at 200 mA											
LLE G2 24x280mm 2000lm 830 SNC	830/469	1,290 lm	1,200 lm	200 mA	36.4 V	451 V	79 W	159 lm/W	151 lm/W	136 lm/W	> 80
LLE G2 24x280mm 2000lm 840 SNC	840/469	1,370 lm	1,290 lm	200 mA	36.4 V	451 V	79 W	171 lm/W	163 lm/W	147 lm/W	> 80
LLE G2 24x280mm 2000lm 865 SNC	865/469	1,370 lm	1,290 lm	200 mA	36.4 V	451 V	79 W	171 lm/W	163 lm/W	147 lm/W	> 80
LLE G2 24x560mm 4000lm 830 SNC	830/469	2,570 lm	2,390 lm	200 mA	72.8 V	90.2 V	159 W	159 lm/W	151 lm/W	136 lm/W	> 80
LLE G2 24x560mm 4000lm 840 SNC	840/469	2,750 lm	2,560 lm	200 mA	72.8 V	90.2 V	159 W	171 lm/W	163 lm/W	147 lm/W	> 80
LLE G2 24x560mm 4000lm 865 SNC	865/469	2,750 lm	2,560 lm	200 mA	72.8 V	90.2 V	159 W	171 lm/W	163 lm/W	147 lm/W	> 80
Operating mode HE at 250 mA											
LLE G2 24x280mm 2000lm 830 SNC	830/469	1,580 lm	1,470 lm	250 mA	37.2 V	461 V	101 W	153 lm/W	145 lm/W	131 lm/W	> 80
LLE G2 24x280mm 2000lm 840 SNC	840/469	1,690 lm	1,570 lm	250 mA	37.2 V	461 V	101 W	164 lm/W	156 lm/W	140 lm/W	> 80
LLE G2 24x280mm 2000lm 865 SNC	865/469	1,690 lm	1,570 lm	250 mA	37.2 V	461 V	101 W	164 lm/W	156 lm/W	140 lm/W	> 80
LLE G2 24x560mm 4000lm 830 SNC	830/469	3,160 lm	2,930 lm	250 mA	74.4 V	92.2 V	20.3 W	153 lm/W	145 lm/W	131 lm/W	> 80
LLE G2 24x560mm 4000lm 840 SNC	840/469	3,370 lm	3,140 lm	250 mA	74.4 V	92.2 V	20.3 W	164 lm/W	156 lm/W	140 lm/W	> 80
LLE G2 24x560mm 4000lm 865 SNC	865/469	3,370 lm	3,140 lm	250 mA	74.4 V	92.2 V	20.3 W	164 lm/W	156 lm/W	140 lm/W	> 80
Operating mode NM at 325 mA											
LLE G2 24x280mm 2000lm 830 SNC	830/469	2,000 lm	1,860 lm	325 mA	38.4 V	476 V	13.5 W	144 lm/W	137 lm/W	123 lm/W	> 80
LLE G2 24x280mm 2000lm 840 SNC	840/469	2,140 lm	1,990 lm	325 mA	38.4 V	476 V	13.5 W	154 lm/W	146 lm/W	131 lm/W	> 80
LLE G2 24x280mm 2000lm 865 SNC	865/469	2,140 lm	1,990 lm	325 mA	38.4 V	476 V	13.5 W	154 lm/W	146 lm/W	131 lm/W	> 80
LLE G2 24x560mm 4000lm 830 SNC	830/469	4,000 lm	3,720 lm	325 mA	76.8 V	95.2 V	27.2 W	144 lm/W	137 lm/W	123 lm/W	> 80
LLE G2 24x560mm 4000lm 840 SNC	840/469	4,270 lm	3,980 lm	325 mA	76.8 V	95.2 V	27.2 W	154 lm/W	146 lm/W	131 lm/W	> 80
LLE G2 24x560mm 4000lm 865 SNC	865/469	4,270 lm	3,980 lm	325 mA	76.8 V	95.2 V	27.2 W	154 lm/W	146 lm/W	131 lm/W	> 80
Operating mode HO at 400 mA											
LLE G2 24x280mm 2000lm 830 SNC	830/469	2,390 lm	2,230 lm	400 mA	39.5 V	49.0 V	17.2 W	136 lm/W	129 lm/W	116 lm/W	> 80
LLE G2 24x280mm 2000lm 840 SNC	840/469	2,560 lm	2,380 lm	400 mA	39.5 V	49.0 V	17.2 W	146 lm/W	138 lm/W	124 lm/W	> 80
LLE G2 24x280mm 2000lm 865 SNC	865/469	2,560 lm	2,380 lm	400 mA	39.5 V	49.0 V	17.2 W	146 lm/W	138 lm/W	124 lm/W	> 80
LLE G2 24x560mm 4000lm 830 SNC	830/469	4,790 lm	4,450 lm	400 mA	79.1 V	98.0 V	34.5 W	136 lm/W	129 lm/W	116 lm/W	> 80
LLE G2 24x560mm 4000lm 840 SNC	840/469	5,130 lm	4,770 lm	400 mA	79.1 V	98.0 V	34.5 W	146 lm/W	138 lm/W	124 lm/W	> 80
LLE G2 24x560mm 4000lm 865 SNC	865/469	5,130 lm	4,770 lm	400 mA	79.1 V	98.0 V	34.5 W	146 lm/W	138 lm/W	124 lm/W	> 80
Operating mode HO at 450 mA											
LLE G2 24x280mm 2000lm 830 SNC	830/469	2,650 lm	2,460 lm	450 mA	40.3 V	49.9 V	19.7 W	131 lm/W	125 lm/W	113 lm/W	> 80
LLE G2 24x280mm 2000lm 840 SNC	840/469	2,840 lm	2,640 lm	450 mA	40.3 V	49.9 V	19.7 W	141 lm/W	134 lm/W	121 lm/W	> 80
LLE G2 24x280mm 2000lm 865 SNC	865/469	2,840 lm	2,640 lm	450 mA	40.3 V	49.9 V	19.7 W	141 lm/W	134 lm/W	121 lm/W	> 80
LLE G2 24x560mm 4000lm 830 SNC	830/469	5,290 lm	4,920 lm	450 mA	80.6 V	99.8 V	39.5 W	131 lm/W	125 lm/W	113 lm/W	> 80
LLE G2 24x560mm 4000lm 840 SNC	840/469	5,670 lm	5,270 lm	450 mA	80.6 V	99.8 V	39.5 W	141 lm/W	134 lm/W	121 lm/W	> 80
LLE G2 24x560mm 4000lm 865 SNC	865/469	5,670 lm	5,270 lm	450 mA	80.6 V	99.8 V	39.5 W	141 lm/W	134 lm/W	121 lm/W	> 80

[®] Integral measurement over the complete module.[®] If mounted with M4 screws and plastic washers.[®] HE ... high efficiency, NM ... nominal mode, HO ... high output.[®] Tolerance range for optical and electrical data: ±10 %.

Product description

- LINEAR COVER for LLE 24
- Protection against direct touch for non-SELV applications
(recommendation: use all fixing points)
- Fast snap on mounting on to LLE 24 with clips or plastic washers
- High transmission: transparent 94 %, semi-transparent 87 %, diffuse 76 %
- Made of PMMA
- Tolerances: ± 1 mm for 597 mm length (ends finished),
+ 20 mm for 1,200 / 1,500 / 1,600 / 1,800 mm length (ends raw)



Ordering data

Type	Article number	Colour	Length	Packaging carton	Weight per pc.
LINEAR COVER SY Transparent 1600mm	28000338	Transparent	1,600 mm	12 pc(s).	0.272 kg
LINEAR COVER SY Frosted 1800mm	28000437	Semi-transparent	1,800 mm	12 pc(s).	0.308 kg
LINEAR COVER SY Frosted 1600mm	28000339	Semi-transparent	1,600 mm	12 pc(s).	0.272 kg
LINEAR COVER SY Frosted 1500mm	28000435	Semi-transparent	1,500 mm	12 pc(s).	0.244 kg
LINEAR COVER SY Frosted 1200mm	28000422	Semi-transparent	1,200 mm	12 pc(s).	0.205 kg
LINEAR COVER SY Frosted 597mm	28000340	Semi-transparent	597 mm	12 pc(s).	0.102 kg
LINEAR COVER SY Diffuse 1800mm	28000438	Diffuse	1,800 mm	12 pc(s).	0.308 kg
LINEAR COVER SY Diffuse 1600mm	28000341	Diffuse	1,600 mm	12 pc(s).	0.272 kg
LINEAR COVER SY Diffuse 1500mm	28000436	Diffuse	1,500 mm	12 pc(s).	0.257 kg
LINEAR COVER SY Diffuse 1200mm	28000434	Diffuse	1,200 mm	12 pc(s).	0.205 kg
LINEAR COVER SY Diffuse 597mm	28000342	Diffuse	597 mm	12 pc(s).	0.102 kg

Product description

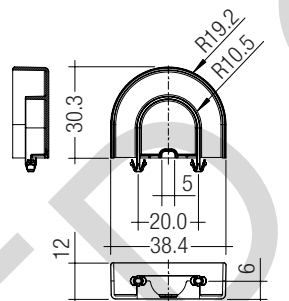
- ENDCAP for LLE 24
- PUSH-FIX: Fast snap on mounting (sheet thickness 0.5 – 1.0 mm), for drilling hole 4 mm
- SCREW-FIX: Screw mounting with EJOT Delta PT WN 5451 30x8, tightening torque 0.7 Nm
- Made of Polycarbonat



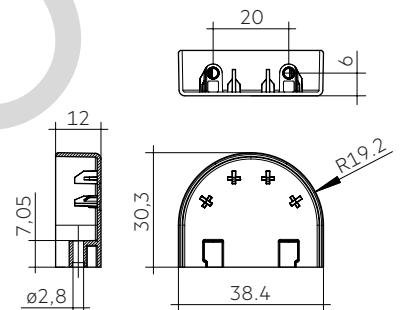
ACL ENDCAP LLE24 PUSH-FIX



ACL ENDCAP LLE24 SCREW-FIX



ACL ENDCAP LLE24 PUSH-FIX



ACL ENDCAP LLE24 SCREW-FIX

Ordering data

Type	Article number	Colour	Packaging carton	Weight per pc.
ACL ENDCAP LLE24 PUSH-FIX	28001037	White	480 pc(s).	0.003 kg
ACL ENDCAP LLE24 SCREW-FIX	28002315	White	480 pc(s).	0.003 kg

Product description LINEAR LENS

- Linear lens for LLE 24
- Available with different beam characteristics
- Protection against direct touch for non-SELV applications (recommendation: use all fixing points)
- Fast snap on mounting on to LLE 24 with clips or plastic washers
- Linear lense made of PMMA
- Available lengths: 1,200, 1,500, 1,600 and 1,800 mm, Tolerance: + 10 mm, at 1,600 mm length ± 20 mm tolerance and raw ends
- Max. permissible temperature 80 °C
- Photometric data available on website

Product description Endcap

- ENDCAP for LINEAR LENS 24mm INTENSE, ASY and DASY
- Mounting by clipping in and screwing from below using screw EJOT Delta PT WN 5451 20x4, tightening torque 0.7 Nm
- Made of Polyamide UL94 V0



ACL LINEAR LENS 24mm 60°



ACL LINEAR LENS 24mm 90°



ACL LINEAR LENS 24mm INTENSE



ACL LINEAR LENS 24mm BATWING



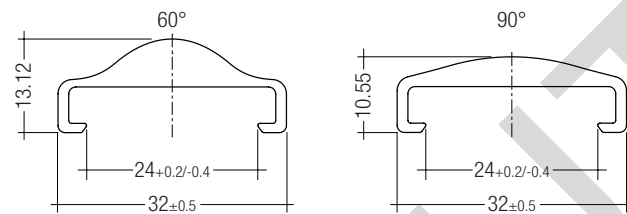
ACL LINEAR LENS 24mm ASY



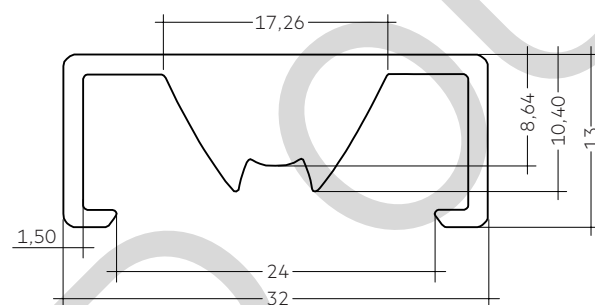
ACL LINEAR LENS 24mm DASY



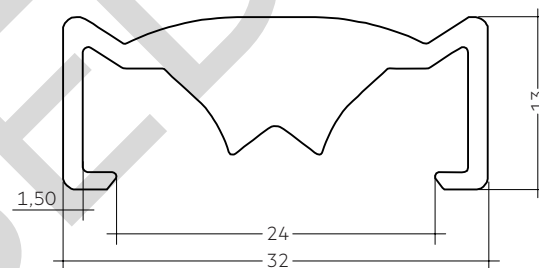
ACL Endcap LENS 24mm PSF



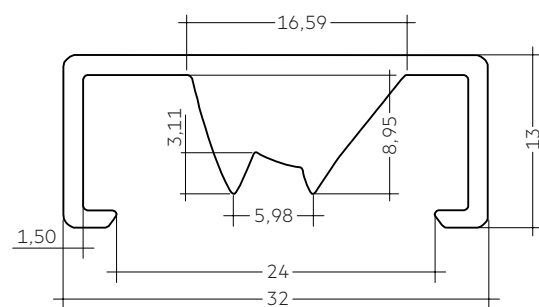
ACL LINEAR LENS 24mm 60° and 90°



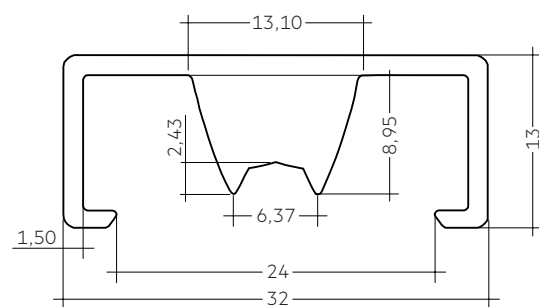
ACL LINEAR LENS 24mm INTENSE



ACL LINEAR LENS 24mm BATWING



ACL LINEAR LENS 24mm ASY



ACL LINEAR LENS 24mm DASY



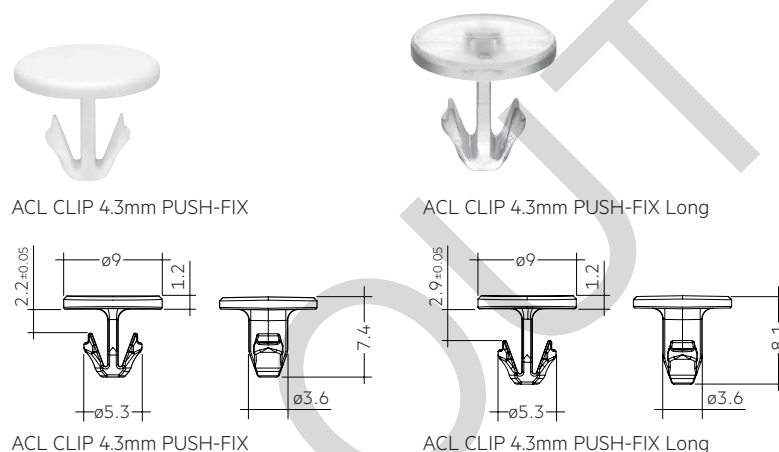
Type	Article number	Beam characteristic	Efficiency	Packaging carton	Weight per pc.
ACL LINEAR LENS 24x1200mm 60°	28001428	60°	97 %	21 pc(s).	0.196 kg
ACL LINEAR LENS 24x1200mm 90°	28001429	90°	97 %	21 pc(s).	0.165 kg
ACL LINEAR LENS 24x1600mm 60°	28000953	60°	97 %	21 pc(s).	0.261 kg
ACL LINEAR LENS 24x1600mm 90°	28000955	90°	97 %	21 pc(s).	0.221 kg
ACL LINEAR LENS 24x1200mm INTENSE	28002024	40°	95 %	18 pc(s).	0.261 kg
ACL LINEAR LENS 24x1500mm INTENSE	28002025	40°	95 %	18 pc(s).	0.326 kg
ACL LINEAR LENS 24x1800mm INTENSE	28002026	40°	95 %	18 pc(s).	0.392 kg
ACL LINEAR LENS 24x1200mm BATWING	28002027	batwing	95 %	18 pc(s).	0.275 kg
ACL LINEAR LENS 24x1500mm BATWING	28002028	batwing	95 %	18 pc(s).	0.344 kg
ACL LINEAR LENS 24x1800mm BATWING	28002029	batwing	95 %	18 pc(s).	0.412 kg
ACL LINEAR LENS 24x1200mm ASY	28002030	asymmetric	95 %	18 pc(s).	0.250 kg
ACL LINEAR LENS 24x1500mm ASY	28002031	asymmetric	95 %	18 pc(s).	0.312 kg
ACL LINEAR LENS 24x1800mm ASY	28002032	asymmetric	95 %	18 pc(s).	0.375 kg
ACL LINEAR LENS 24x1200mm DASY	28002033	double asymmetric	92 %	18 pc(s).	0.249 kg
ACL LINEAR LENS 24x1500mm DASY	28002034	double asymmetric	92 %	18 pc(s).	0.311 kg
ACL LINEAR LENS 24x1800mm DASY	28002035	double asymmetric	92 %	18 pc(s).	0.373 kg
ACL Endcap LENS 24mm PSF	28002669	–	–	720 pc(s).	0.003 kg

**ACCES-
SORIES**

CLIP 4.3mm

Product description

- Clip for fixation of LED modules with 4.3 mm holes
- Fast snap on mounting (sheet thickness 0.5 – 1.0 mm for PUSH-FIX and 1 – 2 mm for PUSH-FIX Long)
- For drilling hole 4 mm
- Clip made of Polycarbonat



Ordering data

Type	Article number	Colour	Packaging bag ^①	Weight per pc.
ACL CLIP 4.3mm PUSH-FIX	28001036	White	500 pc(s).	0.001 kg
ACL CLIP 4.3mm PUSH-FIX Long	28002314	Transparent	500 pc(s).	0.001 kg

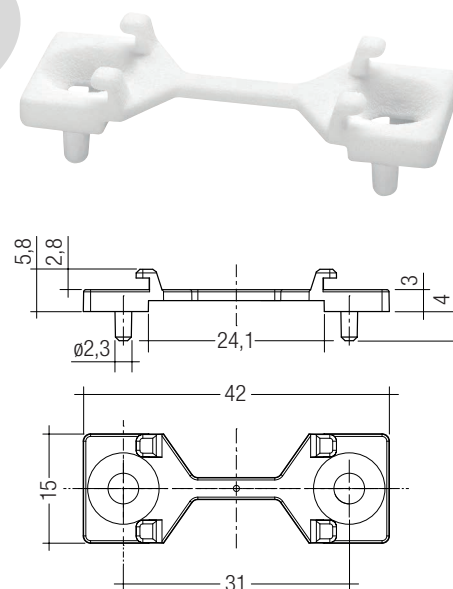
^① Minimum sales quantity 500 pcs.

**ACCES-
SORIES**

BRIDGE LLE24/40

Product description

- Enables the fixation of 24 mm wide Tridonic LED modules to fixtures made for 40 mm wide modules
- Ideal for extruded aluminium gear trays made for 40 mm modules with pre-alignment knobs
- Clip-on for LINEAR COVER and LINEAR LENS[®]
- For LLE 24 with 280 mm module minimum 2 bridges required
- For LLE 24 with 560 mm module minimum 3 bridges required
- Fixation via M3 or M4 countersunk screw, max. tightening torque 0.5 Nm
- BRIDGE made of white polycarbonate



Ordering data

Type	Article number	Colour	Packaging carton ^①	Weight per pc.
ACL BRIDGE LLE24/40 SCREW-FIX	28001205	White	600 Stk.	0.001 kg

^① Minimum sales quantity 600 pcs.

[®] Beam characteristics will change due to the elevated fixation (see photometric files for details).

1. Standards

IEC 62031
IEC 62471
IEC 62778
IEC 62717
IEC 61547

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

1.2 Energy classification

Type	Forward current	Energy classification
LLE G2 24x280mm 2000lm 830 SNC	200 – 325 mA	A++
LLE G2 24x280mm 2000lm 840 SNC	200 – 325 mA	A++
LLE G2 24x280mm 2000lm 865 SNC	200 – 325 mA	A++
LLE G2 24x560mm 4000lm 830 SNC	200 – 325 mA	A++
LLE G2 24x560mm 4000lm 840 SNC	200 – 325 mA	A++
LLE G2 24x560mm 4000lm 865 SNC	200 – 325 mA	A++
LLE G2 24x280mm 2000lm 830 SNC	400 mA	A+
LLE G2 24x280mm 2000lm 840 SNC	400 mA	A++
LLE G2 24x280mm 2000lm 865 SNC	400 mA	A++
LLE G2 24x560mm 4000lm 830 SNC	400 mA	A+
LLE G2 24x560mm 4000lm 840 SNC	400 mA	A++
LLE G2 24x560mm 4000lm 865 SNC	400 mA	A++
LLE G2 24x280mm 2000lm 830 SNC	450 mA	A+
LLE G2 24x280mm 2000lm 840 SNC	450 mA	A+
LLE G2 24x280mm 2000lm 865 SNC	450 mA	A+
LLE G2 24x560mm 4000lm 830 SNC	450 mA	A+
LLE G2 24x560mm 4000lm 840 SNC	450 mA	A+
LLE G2 24x560mm 4000lm 865 SNC	450 mA	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	-40 ... +100 °C
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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 G2 24x280mm 2000lm 8xx SNC

ta	tp	Forward current	R _{th, hs-a}	Cooling area
25 °C	65 °C	200 mA	9.32 K/W	72 cm²
25 °C	65 °C	250 mA	7.13 K/W	93 cm²
25 °C	65 °C	325 mA	4.96 K/W	134 cm²
25 °C	65 °C	400 mA	3.84 K/W	174 cm²
25 °C	65 °C	450 mA	3.26 K/W	204 cm²
35 °C	65 °C	200 mA	6.99 K/W	95 cm²
35 °C	65 °C	250 mA	5.35 K/W	125 cm²
35 °C	65 °C	325 mA	3.72 K/W	179 cm²
35 °C	65 °C	400 mA	2.88 K/W	232 cm²
35 °C	65 °C	450 mA	2.44 K/W	273 cm²
40 °C	65 °C	200 mA	5.82 K/W	114 cm²
40 °C	65 °C	250 mA	4.45 K/W	150 cm²
40 °C	65 °C	325 mA	3.10 K/W	215 cm²
40 °C	65 °C	400 mA	2.40 K/W	278 cm²
40 °C	65 °C	450 mA	2.04 K/W	328 cm²
45 °C	65 °C	200 mA	4.66 K/W	143 cm²
45 °C	65 °C	250 mA	3.56 K/W	187 cm²
45 °C	65 °C	325 mA	2.48 K/W	269 cm²
45 °C	65 °C	400 mA	1.92 K/W	348 cm²
45 °C	65 °C	450 mA	1.63 K/W	410 cm²
50 °C	65 °C	200 mA	3.49 K/W	191 cm²
50 °C	65 °C	250 mA	2.67 K/W	250 cm²
50 °C	65 °C	325 mA	1.86 K/W	359 cm²
50 °C	65 °C	400 mA	1.44 K/W	465 cm²
50 °C	65 °C	450 mA	1.22 K/W	547 cm²
55 °C	65 °C	200 mA	2.33 K/W	287 cm²
55 °C	65 °C	250 mA	1.78 K/W	375 cm²
55 °C	65 °C	325 mA	1.23 K/W	540 cm²
55 °C	65 °C	400 mA	0.95 K/W	698 cm²
55 °C	65 °C	450 mA	0.81 K/W	823 cm²
60 °C	65 °C	200 mA	1.16 K/W	575 cm²
60 °C	65 °C	250 mA	0.89 K/W	753 cm²
60 °C	65 °C	325 mA	0.61 K/W	1,086 cm²
60 °C	65 °C	400 mA	0.47 K/W	1,407 cm²
60 °C	65 °C	450 mA	0.40 K/W	1,660 cm²

LLE G2 24x560mm 4000lm 8xx SNC

ta	tp	Forward current	R _{th, hs-a}	Cooling area
25 °C	65 °C	200 mA	4.68 K/W	143 cm ²
25 °C	65 °C	250 mA	3.55 K/W	188 cm ²
25 °C	65 °C	325 mA	2.49 K/W	268 cm ²
25 °C	65 °C	400 mA	1.91 K/W	348 cm ²
25 °C	65 °C	450 mA	1.63 K/W	410 cm ²
35 °C	65 °C	200 mA	3.51 K/W	190 cm ²
35 °C	65 °C	250 mA	2.66 K/W	251 cm ²
35 °C	65 °C	325 mA	1.87 K/W	357 cm ²
35 °C	65 °C	400 mA	1.43 K/W	465 cm ²
35 °C	65 °C	450 mA	1.22 K/W	547 cm ²
40 °C	65 °C	200 mA	2.92 K/W	228 cm ²
40 °C	65 °C	250 mA	2.22 K/W	301 cm ²
40 °C	65 °C	325 mA	1.56 K/W	428 cm ²
40 °C	65 °C	400 mA	1.19 K/W	558 cm ²
40 °C	65 °C	450 mA	1.01 K/W	657 cm ²
45 °C	65 °C	200 mA	2.34 K/W	285 cm ²
45 °C	65 °C	250 mA	1.77 K/W	376 cm ²
45 °C	65 °C	325 mA	1.24 K/W	536 cm ²
45 °C	65 °C	400 mA	0.96 K/W	698 cm ²
45 °C	65 °C	450 mA	0.81 K/W	822 cm ²
50 °C	65 °C	200 mA	1.75 K/W	381 cm ²
50 °C	65 °C	250 mA	1.33 K/W	502 cm ²
50 °C	65 °C	325 mA	0.93 K/W	715 cm ²
50 °C	65 °C	400 mA	0.72 K/W	932 cm ²
50 °C	65 °C	450 mA	0.61 K/W	1,097 cm ²
55 °C	65 °C	200 mA	1.17 K/W	571 cm ²
55 °C	65 °C	250 mA	0.88 K/W	754 cm ²
55 °C	65 °C	325 mA	0.62 K/W	1,074 cm ²
55 °C	65 °C	400 mA	0.48 K/W	1,401 cm ²
55 °C	65 °C	450 mA	0.40 K/W	1,650 cm ²
60 °C	65 °C	200 mA	0.58 K/W	1,146 cm ²
60 °C	65 °C	250 mA	0.44 K/W	1,513 cm ²
60 °C	65 °C	325 mA	0.31 K/W	2,161 cm ²
60 °C	65 °C	400 mA	0.24 K/W	2,822 cm ²
60 °C	65 °C	450 mA	0.20 K/W	3,328 cm ²

Notes

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

3. Installation / wiring

3.1 Electrical supply/choice of LED Driver

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



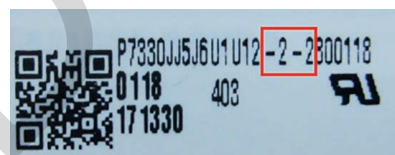
LLE modules must be supplied by a constant current LED Driver. Operation with a constant voltage LED Driver will lead to an irreversible damage of the module.

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.

For parallel wiring only modules of the same forward voltage bin may be used.

The forward voltage bin is indicated on the label of the module.



If a wire breaks or a complete module fails then the current passing through the other module increases. This may reduce its life considerably.

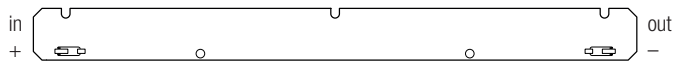
LLE can be operated either from SELV LED Drivers or from LED Drivers with LV output voltage.



LLE are basic insulated up to 335 V (if mounted with M4 screws with head diameter 7 mm in combination with plastic washers) against ground and can be mounted directly on earthed metal parts of the luminaire. If the max. output voltage of the LED Driver (also against earth) is above 335 V, an additional insulation between LED module and heat sink is required (for example by insulated thermal pads) or by a suitable luminaire construction.

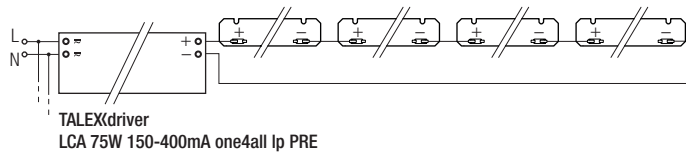
At voltages > 60 V an additional protection against direct touch (test finger) to the light emitting side of the module has to be guaranteed. This is typically achieved by means of a non removable light distributor over the module.

3.2 Wiring



Wiring examples

Serial wiring:



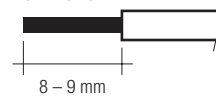
3.3 Wiring type and cross section

The wiring can be in stranded wires or solid with a cross section of 0.2 to 0.75 mm².

For the push-wire connection you have to strip the insulation (8-9 mm).

wire preparation:

0.2 – 0.75 mm²



To remove the wires use a suitable tool (e.g. Microcon release pin) or 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.

Max. torque for fixing: 0.5 Nm.

The LED modules are mounted onto a heat sink with min. 3 screws per module or ACL CLIP 4.3mm.



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

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

Avoid corrosive atmosphere during usage and storage.

3.5 EOS/ESD safety guidelines



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

4. Life-time

4.1 Life-time, lumen maintenance and failure rate

The light output of an LED Module decreases over the life-time, this is characterized with the L value.

L70 means that the LED module will give 70 % of its initial luminous flux. This value is always related to the number of operation hours and therefore defines the life-time of an LED module.

As the L value is a statistical value and the lumen 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 G2 24mm SNC

Forward current	tp temperature	L90 / F10	L90 / F50	L80 / F10	L80 / F50	L70 / F10	L70 / F50
200 mA	45 °C	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
	55 °C	46,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
	65 °C	35,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
	75 °C	27,000 h	42,000 h	>50,000 h	>50,000 h	>50,000 h	>50,000 h
	85 °C	22,000 h	33,000 h	48,000 h	>50,000 h	>50,000 h	>50,000 h
300 mA	45 °C	27,000 h	42,000 h	50,000 h	>50,000 h	>50,000 h	>50,000 h
	55 °C	20,000 h	31,000 h	39,000 h	>50,000 h	>50,000 h	>50,000 h
	65 °C	16,000 h	24,000 h	31,000 h	47,000 h	47,000 h	>50,000 h
	75 °C	12,000 h	19,000 h	25,000 h	37,000 h	38,000 h	>50,000 h
	85 °C	10,000 h	15,000 h	20,000 h	30,000 h	31,000 h	46,000 h
350 mA	45 °C	20,000 h	31,000 h	36,000 h	>50,000 h	>50,000 h	>50,000 h
	55 °C	13,000 h	23,000 h	28,000 h	42,000 h	42,000 h	>50,000 h
	65 °C	12,000 h	18,000 h	22,000 h	33,000 h	34,000 h	50,000 h
	75 °C	9,000 h	14,000 h	18,000 h	27,000 h	27,000 h	41,000 h
	85 °C	7,000 h	11,000 h	14,000 h	22,000 h	22,000 h	33,000 h
500 mA	45 °C	10,000 h	15,000 h	17,000 h	25,000 h	25,000 h	36,000 h
	55 °C	7,000 h	11,000 h	13,000 h	19,000 h	19,000 h	29,000 h
	65 °C	6,000 h	9,000 h	10,000 h	15,000 h	16,000 h	23,000 h
	75 °C	4,000 h	7,000 h	8,000 h	12,000 h	13,000 h	19,000 h
	85 °C	4,000 h	5,000 h	7,000 h	10,000 h	10,000 h	15,000 h

4.3 Switching capability

50,000 cycles

Tested 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

I_{rated} ... Nominal operating current the module is designed for.

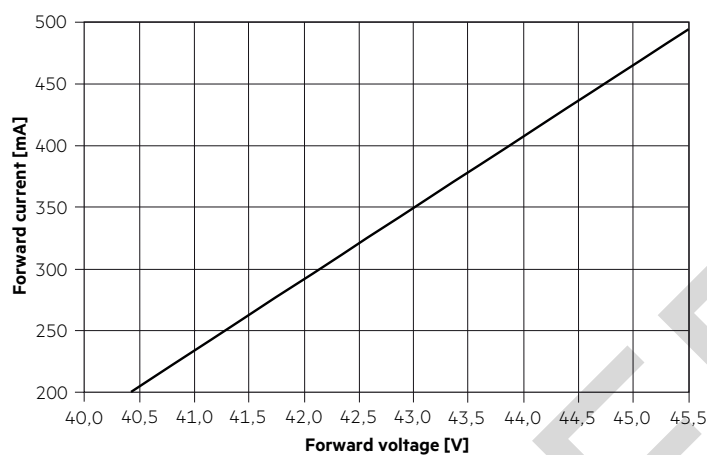
I_{max} ... Max. permissible continuous operating current incl. The tolerances of the LED driver.

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

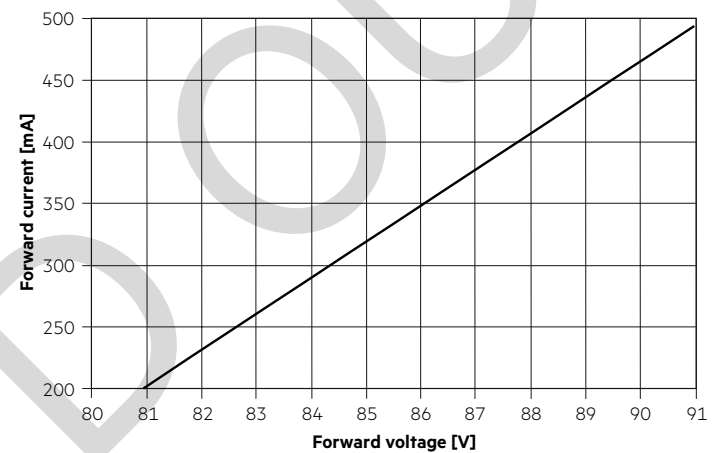
Max. permissible peak current ... The max. output peak current of the LED driver must not exceed this value.

5.2 Typ. forward voltage vs. forward current

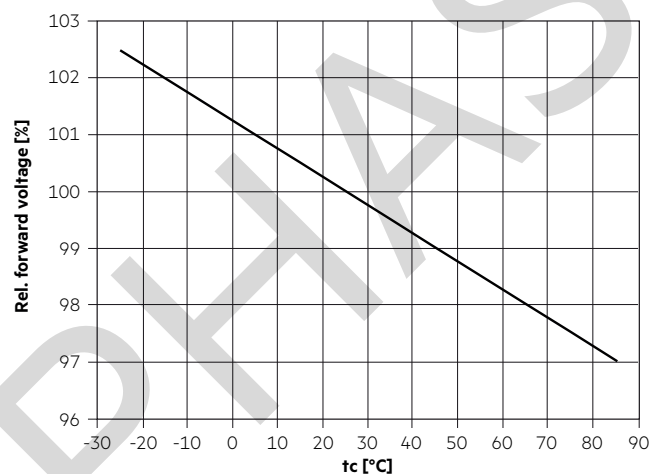
LLE G2 24x280mm 2000lm 8xx SNC



LLE G2 24x560mm 4000lm 8xx SNC



5.3 Forward voltage vs. t_c 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

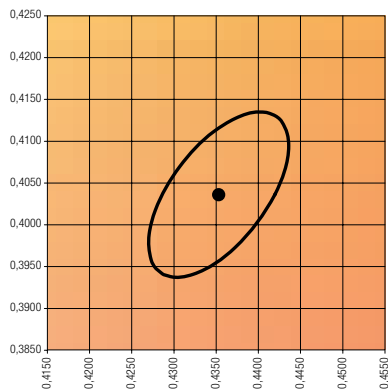
The specified colour coordinates are integral measured by current impulse of 300 mA and a duration of 100 ms.

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

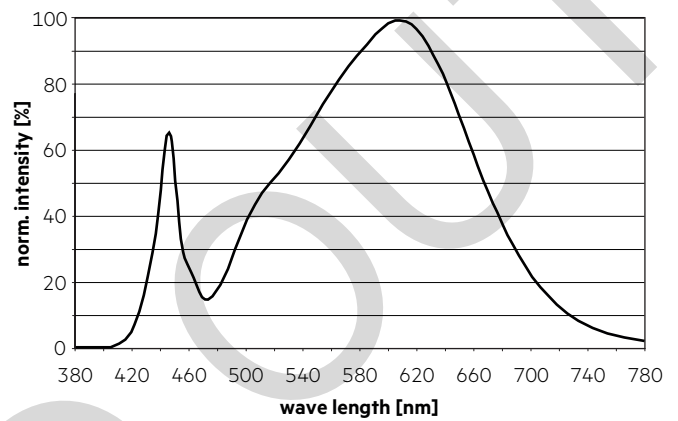
The measurement tolerance of the colour coordinates are ± 0.01 .

3,000 K

	x0	y0
Centre	0.4353	0.4037

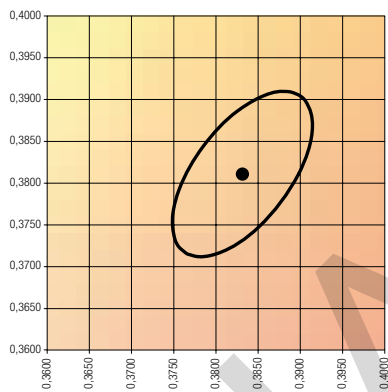


— MacAdam Ellipse: 4SDCM

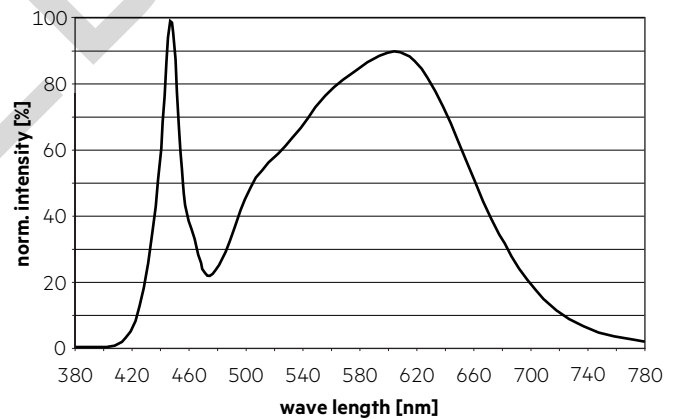


4,000 K

	x0	y0
Mittelpunkt	0.3832	0.3811

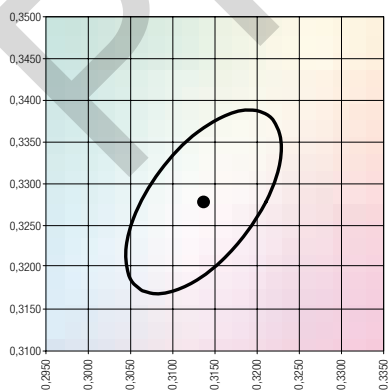


— MacAdam Ellipse: 4SDCM

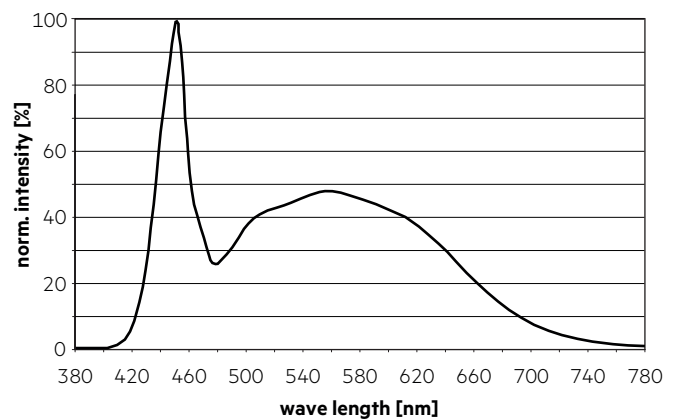


6,500 K

	x0	y0
Mittelpunkt	0.3136	0.3279

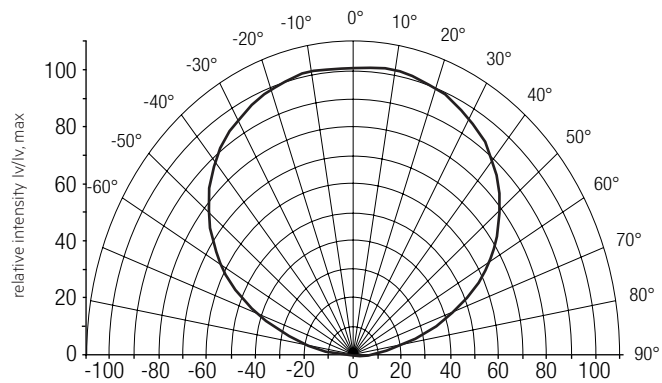


— MacAdam Ellipse: 4SDCM



6.2 Light distribution

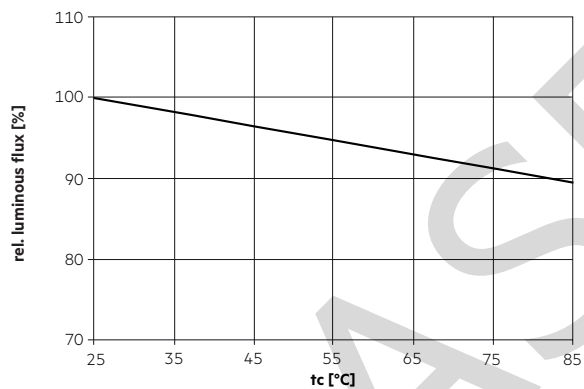
The optical design of the LLE product line ensures optimum homogeneity for the light distribution.



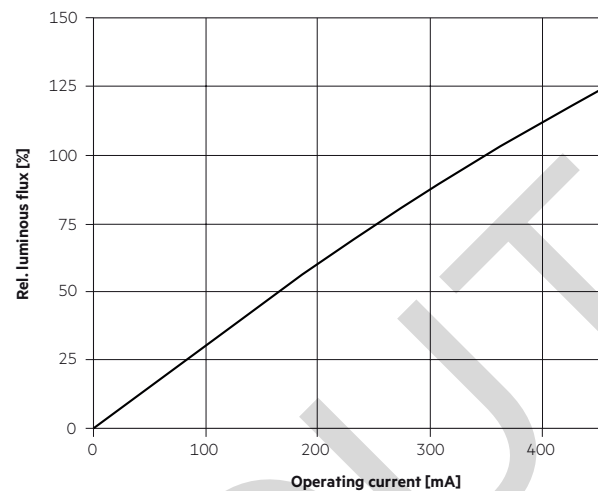
The colour temperature is measured integral over the complete module. The single LED light points can have deviations in the colour coordinates within MacAdam 3.

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



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

Guarantee conditions at www.tridonic.com → Services

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