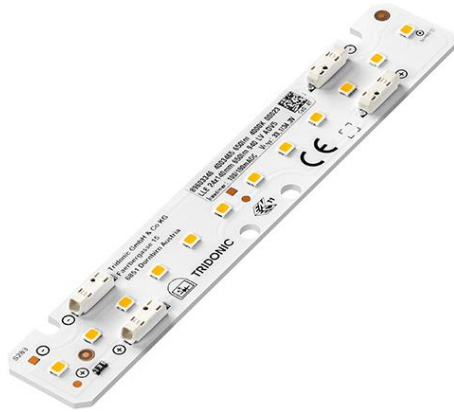


**Module LLE 24mm 1250lm CRI90 LV ADV6**

Modules LLE advanced



LLE 24x140mm 650lm LV ADV6



LLE 24x280mm 1250lm LV ADV6



LLE 24x560mm 2400lm LV ADV6

**Product description**

- \_ Ideal for linear and panel lights
- \_ 4 terminals for parallel wiring
- \_ 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
- \_ HE ... High Efficiency, NM ... Nominal Mode, HO ... High Output
- \_ Long lifetime up to 102,000 hours
- \_ 5 years guarantee (Conditions at <https://www.tridonic.com/en/int/services/manufacturer-guarantee-conditions>)

**Optical properties**

- \_ Colour temperatures 2,700, 3,000, 3,500 and 4,000 K
- \_ Efficacy of the LED module 171 lm/W at Irated and tp = 25 °C
- \_ High colour rendering index CRI > 90
- \_ High colour consistency (MacAdam 3) ①
- \_ Small luminous flux tolerances

**Mechanical properties**

- \_ Module dimension 24 x 140 mm, 24 x 280 mm and 24 x 560 mm (ZHAGA compliant)
- \_ Simple installation via clips or screws

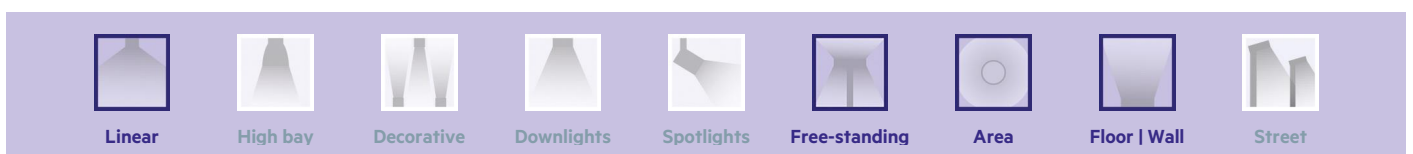
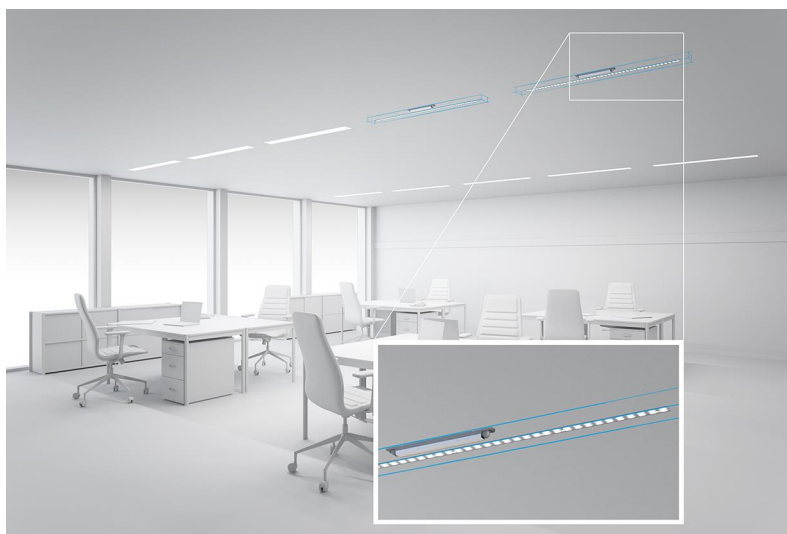
**System solution**

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

① Integral measurement over the complete module.

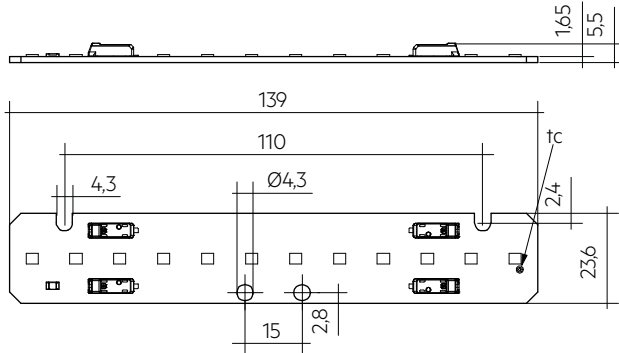
**Website**

<http://www.tridonic.com/28004860>

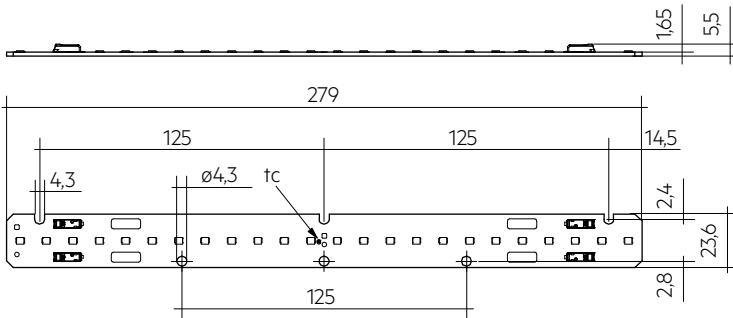


**Module LLE 24mm 1250lm CRI90 LV ADV6**

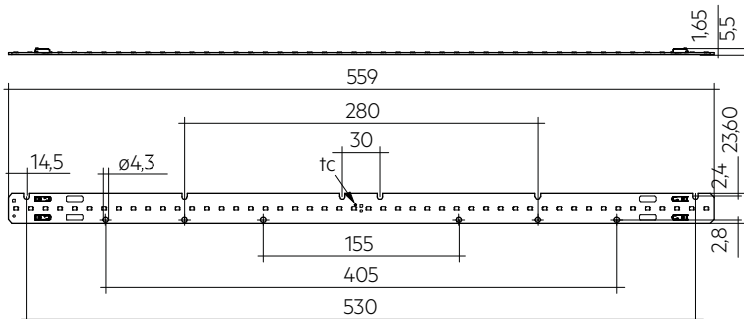
Modules LLE advanced



LLE 24x140mm 650lm LV ADV6



LLE 24x280mm 1250lm LV ADV6



LLE 24x560mm 2400lm LV ADV6

**Ordering data**

Type	Article number	Colour temperature	Packaging, carton	Weight per pc.
<b>Frontside terminal</b>				
LLE 24x140mm 650lm 927 LV ADV6	28004860	2,700 K	108 pc(s).	0.012 kg
LLE 24x140mm 650lm 930 LV ADV6	28004861	3,000 K	108 pc(s).	0.012 kg
LLE 24x140mm 650lm 935 LV ADV6	28004862	3,500 K	108 pc(s).	0.012 kg
LLE 24x140mm 650lm 940 LV ADV6	28004863	4,000 K	108 pc(s).	0.012 kg
LLE 24x280mm 1250lm 927 LV ADV6	28004870	2,700 K	108 pc(s).	0.024 kg
LLE 24x280mm 1250lm 930 LV ADV6	28004871	3,000 K	108 pc(s).	0.024 kg
LLE 24x280mm 1250lm 935 LV ADV6	28004872	3,500 K	108 pc(s).	0.024 kg
LLE 24x280mm 1250lm 940 LV ADV6	28004873	4,000 K	108 pc(s).	0.024 kg
LLE 24x560mm 2400lm 927 LV ADV6	28004880	2,700 K	108 pc(s).	0.044 kg
LLE 24x560mm 2400lm 930 LV ADV6	28004881	3,000 K	108 pc(s).	0.044 kg
LLE 24x560mm 2400lm 935 LV ADV6	28004882	3,500 K	108 pc(s).	0.044 kg
LLE 24x560mm 2400lm 940 LV ADV6	28004883	4,000 K	108 pc(s).	0.044 kg

**Technical data**

Beam characteristic	120°
Ambient temperature $t_a$	-40 ... +65 °C
$t_p$ rated	50 °C
$t_c$	85 °C
I <sub>rated</sub> for 650 lm	100 mA
I <sub>rated</sub> for 1,250 lm	200 mA
I <sub>rated</sub> for 2,400 lm	400 mA
I <sub>max</sub> for 650 lm	200 mA
I <sub>max</sub> for 1,250 lm	400 mA
I <sub>max</sub> for 2,400 lm	800 mA
Max. permissible LF current ripple for 650 lm	220 mA
Max. permissible LF current ripple for 1,250 lm	440 mA
Max. permissible LF current ripple for 2,400 lm	880 mA
Max. permissible peak current for 650 lm	300 mA / max. 10 ms
Max. permissible peak current for 1,250 lm	600 mA / max. 10 ms
Max. permissible peak current for 2,400 lm	1,200 mA / max. 10 ms
Max. working voltage for insulation SELV <sup>®</sup>	60 V
Insulation test voltage	0.5 kV
Colour tolerance	3 SDCM
ESD classification	Severity level 2
Risk group (IEC 62471) for 650 lm	RG1 (> 95 – 200 mA (I <sub>max</sub> )), RGO (≤ 95 mA)
Risk group (IEC 62471) for 1,250lm	RG1 (> 190 – 400 mA (I <sub>max</sub> )), RGO (≤ 190 mA)
Risk group (IEC 62471) for 2,400 lm	RG1 (> 380 – 800 mA (I <sub>max</sub> )), RGO (≤ 380 mA)
Classification acc. to IEC 62031	Built-in
Type of protection	IP00
Lumen maintenance L70B50	102,000 h
Guarantee (conditions at www.tridonic.com)	5 Year(s)

**Approval marks****Standards**

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

## Specific technical data

Type	Article number	Photometric code <sup>②</sup>	Useful luminous flux at tp = 25 °C <sup>④</sup>	Expected luminous flux at tp rated <sup>⑤</sup>	Typ. forward current	Min. forward voltage at tp rated	Max. forward voltage at tp = 25 °C	Power consumption Pon at tp = 25 °C <sup>⑥</sup>	Efficacy of the module at tp = 25 °C	Expected efficacy of the module at tp rated	Colour rendering index CRI
<b>Operating mode HE</b>											
LLE 24x140mm 650lm 927 LV ADV6	28004860	927/359	-	260 lm	50 mA	31.1 V	32.7 V	-	-	163 lm/W	>90
LLE 24x140mm 650lm 930 LV ADV6	28004861	930/359	-	268 lm	50 mA	31.1 V	32.7 V	-	-	168 lm/W	>90
LLE 24x140mm 650lm 935 LV ADV6	28004862	935/359	-	275 lm	50 mA	31.1 V	32.7 V	-	-	172 lm/W	>90
LLE 24x140mm 650lm 940 LV ADV6	28004863	940/359	-	278 lm	50 mA	31.1 V	32.7 V	-	-	174 lm/W	>90
LLE 24x280mm 1250lm 927 LV ADV6	28004870	927/359	-	520 lm	100 mA	31.1 V	32.7 V	-	-	163 lm/W	>90
LLE 24x280mm 1250lm 930 LV ADV6	28004871	930/359	-	536 lm	100 mA	31.1 V	32.7 V	-	-	168 lm/W	>90
LLE 24x280mm 1250lm 935 LV ADV6	28004872	935/359	-	550 lm	100 mA	31.1 V	32.7 V	-	-	172 lm/W	>90
LLE 24x280mm 1250lm 940 LV ADV6	28004873	940/359	-	557 lm	100 mA	31.1 V	32.7 V	-	-	174 lm/W	>90
LLE 24x560mm 2400lm 927 LV ADV6	28004880	927/359	-	1,040 lm	200 mA	31.1 V	32.7 V	-	-	162 lm/W	>90
LLE 24x560mm 2400lm 930 LV ADV6	28004881	930/359	-	1,072 lm	200 mA	31.1 V	32.7 V	-	-	167 lm/W	>90
LLE 24x560mm 2400lm 935 LV ADV6	28004882	935/359	-	1,100 lm	200 mA	31.1 V	32.7 V	-	-	172 lm/W	>90
LLE 24x560mm 2400lm 940 LV ADV6	28004883	940/359	-	1,114 lm	200 mA	31.1 V	32.7 V	-	-	174 lm/W	>90
<b>Operating mode NM</b>											
LLE 24x140mm 650lm 927 LV ADV6	28004860	927/359	528 lm	507 lm	100 mA	32.1 V	33.6 V	3.3 W	159 lm/W	154 lm/W	>90
LLE 24x140mm 650lm 930 LV ADV6	28004861	930/359	544 lm	522 lm	100 mA	32.1 V	33.6 V	3.3 W	164 lm/W	159 lm/W	>90
LLE 24x140mm 650lm 935 LV ADV6	28004862	935/359	558 lm	536 lm	100 mA	32.1 V	33.6 V	3.3 W	168 lm/W	163 lm/W	>90
LLE 24x140mm 650lm 940 LV ADV6	28004863	940/359	566 lm	543 lm	100 mA	32.1 V	33.6 V	3.3 W	171 lm/W	165 lm/W	>90
LLE 24x280mm 1250lm 927 LV ADV6	28004870	927/359	1,056 lm	1,014 lm	200 mA	32.1 V	33.6 V	6.6 W	159 lm/W	154 lm/W	>90
LLE 24x280mm 1250lm 930 LV ADV6	28004871	930/359	1,088 lm	1,045 lm	200 mA	32.1 V	33.6 V	6.6 W	164 lm/W	159 lm/W	>90
LLE 24x280mm 1250lm 935 LV ADV6	28004872	935/359	1,117 lm	1,072 lm	200 mA	32.1 V	33.6 V	6.6 W	168 lm/W	163 lm/W	>90
LLE 24x280mm 1250lm 940 LV ADV6	28004873	940/359	1,132 lm	1,086 lm	200 mA	32.1 V	33.6 V	6.6 W	171 lm/W	165 lm/W	>90
LLE 24x560mm 2400lm 927 LV ADV6	28004880	927/359	2,112 lm	2,027 lm	400 mA	32.1 V	33.6 V	13.3 W	159 lm/W	154 lm/W	>90
LLE 24x560mm 2400lm 930 LV ADV6	28004881	930/359	2,177 lm	2,090 lm	400 mA	32.1 V	33.6 V	13.3 W	164 lm/W	159 lm/W	>90
LLE 24x560mm 2400lm 935 LV ADV6	28004882	935/359	2,235 lm	2,145 lm	400 mA	32.1 V	33.6 V	13.3 W	168 lm/W	163 lm/W	>90
LLE 24x560mm 2400lm 940 LV ADV6	28004883	940/359	2,264 lm	2,173 lm	400 mA	32.1 V	33.6 V	13.3 W	170 lm/W	165 lm/W	>90
<b>Operating mode HO</b>											
LLE 24x140mm 650lm 927 LV ADV6	28004860	927/359	-	857 lm	175 mA	33.3 V	34.8 V	-	-	144 lm/W	>90
LLE 24x140mm 650lm 930 LV ADV6	28004861	930/359	-	883 lm	175 mA	33.3 V	34.8 V	-	-	148 lm/W	>90
LLE 24x140mm 650lm 935 LV ADV6	28004862	935/359	-	906 lm	175 mA	33.3 V	34.8 V	-	-	152 lm/W	>90
LLE 24x140mm 650lm 940 LV ADV6	28004863	940/359	-	918 lm	175 mA	33.3 V	34.8 V	-	-	154 lm/W	>90
LLE 24x280mm 1250lm 927 LV ADV6	28004870	927/359	-	1,713 lm	350 mA	33.3 V	34.8 V	-	-	144 lm/W	>90
LLE 24x280mm 1250lm 930 LV ADV6	28004871	930/359	-	1,766 lm	350 mA	33.3 V	34.8 V	-	-	148 lm/W	>90
LLE 24x280mm 1250lm 935 LV ADV6	28004872	935/359	-	1,813 lm	350 mA	33.3 V	34.8 V	-	-	152 lm/W	>90
LLE 24x280mm 1250lm 940 LV ADV6	28004873	940/359	-	1,836 lm	350 mA	33.3 V	34.8 V	-	-	154 lm/W	>90
LLE 24x560mm 2400lm 927 LV ADV6	28004880	927/359	-	3,426 lm	700 mA	33.3 V	34.8 V	-	-	144 lm/W	>90
LLE 24x560mm 2400lm 930 LV ADV6	28004881	930/359	-	3,532 lm	700 mA	33.3 V	34.8 V	-	-	148 lm/W	>90
LLE 24x560mm 2400lm 935 LV ADV6	28004882	935/359	-	3,625 lm	700 mA	33.3 V	34.8 V	-	-	152 lm/W	>90
LLE 24x560mm 2400lm 940 LV ADV6	28004883	940/359	-	3,672 lm	700 mA	33.3 V	34.8 V	-	-	154 lm/W	>90

② If mounted with M4 screws with 7 mm head diameter.

③ The detailed explanation, see data sheet section 1.1.

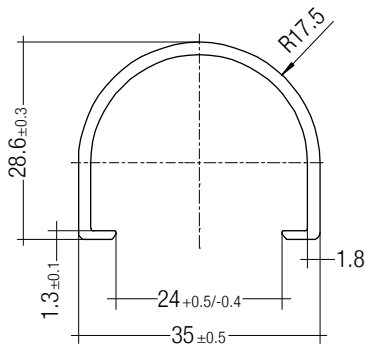
④ Tolerance of useful light flux - 0 % / + 15 %. Measurement uncertainty ± 10 %.

⑤ Measurement uncertainty ± 10 %. Based on calculation.

⑥ Tolerance of power consumption Pon ± 10 %. Measurement uncertainty ± 5 %.

## LINEAR COVER LLE

Accessory



## Product description

- \_ LINEAR COVER for LLE
- \_ Protection against direct touch for non-SELV applications (recommendation LLE 20: use all fixing points and screwed Endcap, recommendation LLE 24: use all fixing points)
- \_ Fast snap on mounting on to LLE 20: with M4 screws and plastic washers, to LLE 24: with clips or plastic washers
- \_ High transmission: transparent, semi-transparent and diffuse
- \_ Material: PMMA
- \_ Tolerances:  $\pm 1$  mm for 597 mm length (ends finished), + 10 mm from length 1,150 mm (ends raw)

## Website

<http://www.tridonic.com/28000338>



## Ordering data

Type	Article number	Colour	Length L	Efficiency	Packaging, carton	Weight per pc.
LINEAR COVER SY Transparent 1600mm	28000338	Transparent	1,600 mm	94 %	12 pc(s).	0.272 kg
LINEAR COVER SY Frosted 1800mm	28000437	Semi-transparent	1,800 mm	87 %	12 pc(s).	0.308 kg
LINEAR COVER SY Frosted 1600mm	28000339	Semi-transparent	1,600 mm	87 %	12 pc(s).	0.272 kg
LINEAR COVER SY Frosted 1500mm	28000435	Semi-transparent	1,500 mm	87 %	12 pc(s).	0.244 kg
LINEAR COVER SY Frosted 1200mm	28000422	Semi-transparent	1,200 mm	87 %	12 pc(s).	0.205 kg
LINEAR COVER SY Frosted 597mm	28000340	Semi-transparent	597 mm	87 %	12 pc(s).	0.102 kg
LINEAR COVER SY Diffuse 1800mm	28000438	Diffuse	1,800 mm	76 %	12 pc(s).	0.308 kg
LINEAR COVER SY Diffuse 1600mm	28000341	Diffuse	1,600 mm	76 %	12 pc(s).	0.272 kg
LINEAR COVER SY Diffuse 1500mm	28000436	Diffuse	1,500 mm	76 %	12 pc(s).	0.257 kg
LINEAR COVER SY Diffuse 1200mm	28000434	Diffuse	1,200 mm	76 %	12 pc(s).	0.205 kg
LINEAR COVER SY Diffuse 597mm	28000342	Diffuse	597 mm	76 %	12 pc(s).	0.102 kg

## ACL ENDCAP LLE

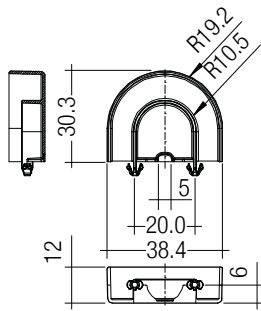
Accessory

**Product description**

- \_ ENDCAP for LLE
- \_ 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 (not included), tightening torque 0.7 Nm
- \_ Clip made of polycarbonate

**Website**

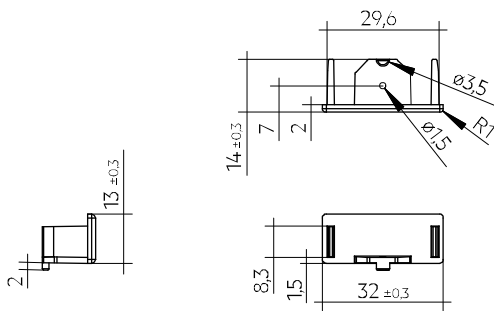
<http://www.tridonic.com/28001037>

**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

## ACL LINEAR LENS 24mm

Accessory

**Product description LINEAR LENS**

- \_ Linear lens for LLE 20 / 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 20: with M4 screws and plastic washers, to LLE 24: with clips or plastic washers
- \_ Recommendation: Fastening with screws and plastic washers, see 2.3 Heat sink specifications in data sheet
- \_ Material: PMMA
- \_ Available lengths: 1,200, 1,500 and 1,800 mm, Tolerance: + 10 mm (ends raw)
- \_ 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

**Website**

<http://www.tridonic.com/28001428>

**Ordering data**

Type	Article number	Length L	Beam characteristic	Efficiency	Packaging, carton	Weight per pc.
ACL LINEAR LENS 24x1200mm 60°	28001428	1,200 mm	60°	97 %	21 pc(s).	0.196 kg
ACL LINEAR LENS 24x1200mm 90°	28001429	1,200 mm	90°	97 %	21 pc(s).	0.165 kg
ACL LINEAR LENS 24x1500mm 60°	28000953	1,500 mm	60°	97 %	21 pc(s).	0.261 kg
ACL LINEAR LENS 24x1500mm 90°	28000955	1,500 mm	90°	97 %	21 pc(s).	0.221 kg
ACL LINEAR LENS 24x1200mm INTENSE	28002024	1,200 mm	40°	95 %	18 pc(s).	0.261 kg
ACL LINEAR LENS 24x1500mm INTENSE	28002025	1,500 mm	40°	95 %	18 pc(s).	0.326 kg
ACL LINEAR LENS 24x1800mm INTENSE	28002026	1,800 mm	40°	95 %	18 pc(s).	0.392 kg
ACL LINEAR LENS 24x1200mm BATWING	28002027	1,200 mm	batwing	95 %	18 pc(s).	0.275 kg
ACL LINEAR LENS 24x1500mm BATWING	28002028	1,500 mm	batwing	95 %	18 pc(s).	0.344 kg
ACL LINEAR LENS 24x1800mm BATWING	28002029	1,800 mm	batwing	95 %	18 pc(s).	0.412 kg
ACL LINEAR LENS 24x1200mm ASY	28002030	1,200 mm	asymmetric	95 %	18 pc(s).	0.250 kg
ACL LINEAR LENS 24x1500mm ASY	28002031	1,500 mm	asymmetric	95 %	18 pc(s).	0.312 kg
ACL LINEAR LENS 24x1800mm ASY	28002032	1,800 mm	asymmetric	95 %	18 pc(s).	0.375 kg
ACL LINEAR LENS 24x1200mm DASY	28002033	1,200 mm	double asymmetric	92 %	18 pc(s).	0.249 kg
ACL LINEAR LENS 24x1500mm DASY	28002034	1,500 mm	double asymmetric	92 %	18 pc(s).	0.311 kg
ACL LINEAR LENS 24x1800mm DASY	28002035	1,800 mm	double asymmetric	92 %	18 pc(s).	0.373 kg
ACL Endcap LENS 24mm PSF	28002669	-	-	-	3,600 pc(s).	0.003 kg

## ACL CLIP 4.3mm

Accessory

**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 polycarbonate
- \_ Minimum sales quantity 500 pcs.

**Website**

<http://www.tridonic.com/28001036>

**Ordering data**

Type	Article number	Colour	Packaging, bag <sup>①</sup>	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.

## ACL BRIDGE LLE24/40

Accessory

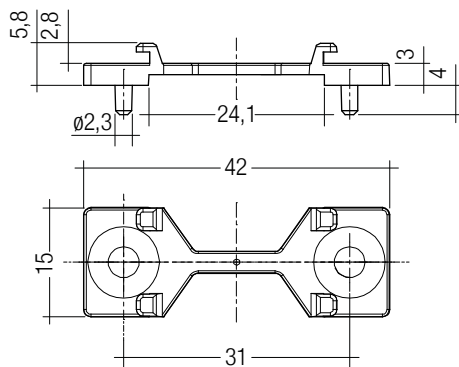
**Product description**

- \_ 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 <sup>①</sup>
- \_ 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
- \_ Material: white polycarbonate
- \_ Minimum sales quantity 600 pcs.

<sup>①</sup> Beam characteristics will change due to the elevated fixation (see photometric files for details).

**Website**

<http://www.tridonic.com/28001205>

**Ordering data**

Type	Article number	Colour	Packaging, carton	Weight per pc.
ACL BRIDGE LLE24/40 SCREW-FIX	28001205	White	600 pc(s).	0.001 kg

## 1. Standards

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

### 1.1 Photometric code

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

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

### 1.2 Risk group

#### LLE 24x140mm 650lm LV ADV6

Forward current	Risk group (IEC 62471)
≤ 95 mA	RG0
> 95 – 200 mA (Imax)	RG1

#### LLE 24x280mm 1250lm LV ADV6

Forward current	Risk group (IEC 62471)
≤ 190 mA	RG0
> 190 – 400 mA (Imax)	RG1

#### LLE 24x560mm 2400lm LV ADV6

Forward current	Risk group (IEC 62471)
≤ 380 mA	RG0
> 380 – 800 mA (Imax)	RG1

### 1.3 Energy classification

Type	Colour temperature	Forward current	Energy classification	Energy consumption
LLE 24x140mm 650lm 927 LV ADV6	2,700 K	100 mA	D	4 kWh / 1,000 h
LLE 24x140mm 650lm 930 LV ADV6	3,000 K	100 mA	D	4 kWh / 1,000 h
LLE 24x140mm 650lm 935 LV ADV6	3,500 K	100 mA	D	4 kWh / 1,000 h
LLE 24x140mm 650lm 940 LV ADV6	4,000 K	100 mA	D	4 kWh / 1,000 h
LLE 24x280mm 1250lm 927 LV ADV6	2,700 K	200 mA	D	7 kWh / 1,000 h
LLE 24x280mm 1250lm 930 LV ADV6	3,000 K	200 mA	D	7 kWh / 1,000 h
LLE 24x280mm 1250lm 935 LV ADV6	3,500 K	200 mA	D	7 kWh / 1,000 h
LLE 24x280mm 1250lm 940 LV ADV6	4,000 K	200 mA	D	7 kWh / 1,000 h
LLE 24x560mm 2400lm 927 LV ADV6	2,700 K	400 mA	D	14 kWh / 1,000 h
LLE 24x560mm 2400lm 930 LV ADV6	3,000 K	400 mA	D	14 kWh / 1,000 h
LLE 24x560mm 2400lm 935 LV ADV6	3,500 K	400 mA	D	14 kWh / 1,000 h
LLE 24x560mm 2400lm 940 LV ADV6	4,000 K	400 mA	D	14 kWh / 1,000 h

Energy label and further information at [www.tridonic.com](http://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 50 °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	-40... +80 °C
---------------------	---------------

Operation only in non condensing environment.

Humidity during processing of the module should be between 30 to 70 %.

### 2.3 Heat sink values

#### LLE 24x140mm 650lm LV ADV6

ta	tp	Forward current	R <sub>th, hs-a</sub>	Cooling area
25 °C	50 °C	100 mA	16.61 K/W	40 cm <sup>2</sup>
25 °C	50 °C	175 mA	7.51 K/W	89 cm <sup>2</sup>
35 °C	50 °C	100 mA	9.39 K/W	71 cm <sup>2</sup>
35 °C	50 °C	175 mA	3.94 K/W	169 cm <sup>2</sup>
40 °C	50 °C	100 mA	5.79 K/W	115 cm <sup>2</sup>
40 °C	50 °C	175 mA	2.15 K/W	310 cm <sup>2</sup>
45 °C	50 °C	100 mA	2.18 K/W	306 cm <sup>2</sup>
45 °C	50 °C	175 mA	0.36 K/W	1854 cm <sup>2</sup>

#### LLE 24x280mm 1250lm LV ADV6

ta	tp	Forward current	R <sub>th, hs-a</sub>	Cooling area
25 °C	50 °C	200 mA	8.30 K/W	80 cm <sup>2</sup>
25 °C	50 °C	350 mA	3.76 K/W	177 cm <sup>2</sup>
35 °C	50 °C	200 mA	4.70 K/W	142 cm <sup>2</sup>
35 °C	50 °C	350 mA	1.97 K/W	339 cm <sup>2</sup>
40 °C	50 °C	200 mA	2.89 K/W	230 cm <sup>2</sup>
40 °C	50 °C	350 mA	1.07 K/W	621 cm <sup>2</sup>
45 °C	50 °C	200 mA	1.09 K/W	612 cm <sup>2</sup>
45 °C	50 °C	350 mA	0.18 K/W	3,708 cm <sup>2</sup>

#### LLE 24x560mm 2400lm LV ADV6

ta	tp	Forward current	R <sub>th, hs-a</sub>	Cooling area
25 °C	50 °C	400 mA	4.15 K/W	161 cm <sup>2</sup>
25 °C	50 °C	700 mA	1.88 K/W	355 cm <sup>2</sup>
35 °C	50 °C	400 mA	2.35 K/W	284 cm <sup>2</sup>
35 °C	50 °C	700 mA	0.98 K/W	678 cm <sup>2</sup>
40 °C	50 °C	400 mA	1.45 K/W	461 cm <sup>2</sup>
40 °C	50 °C	700 mA	0.54 K/W	1,242 cm <sup>2</sup>
45 °C	50 °C	400 mA	0.54 K/W	1,224 cm <sup>2</sup>
45 °C	50 °C	700 mA	0.09 K/W	7,415 cm <sup>2</sup>

### 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.

For applications with a small distance between LED module and lens, screw mounting is recommended to ensure a reliable thermal connection between LED module and cooling surface.

### 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 best homogeneity, only connect modules from one batch in parallel.

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

The max. permissible output current of the LED driver for parallel wiring is 2.8 A.

With parallel connection and a supply on one side, the Irated current must not be exceeded.

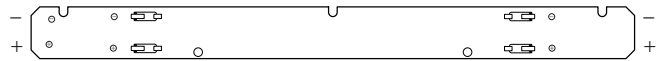
With parallel connection and supply on both sides, the forward current for the high output operating mode must not be exceeded.

LLE have to be operated with SELV LED drivers.

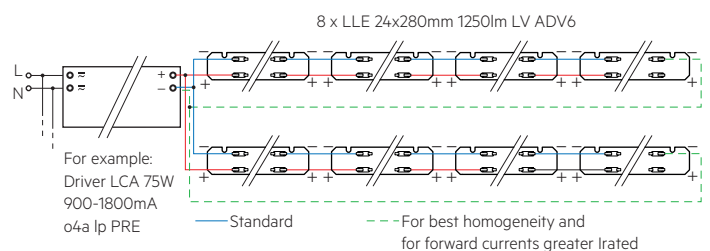
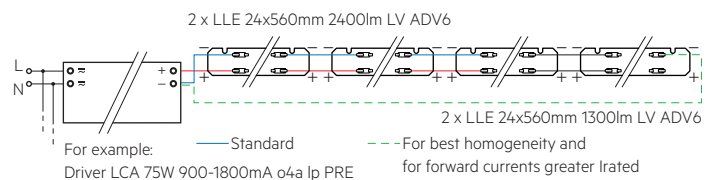
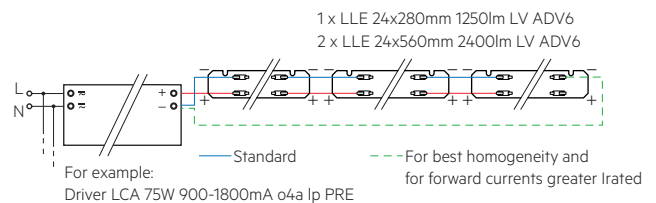
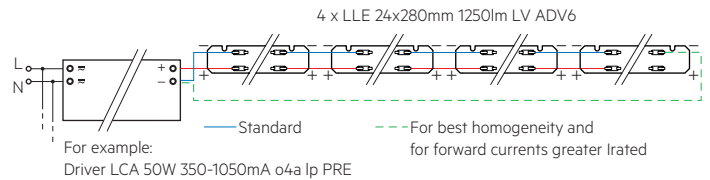


LLE are basic insulated up to 60 V SELV (if mounted with M4 screws with head diameter 7 mm in combination with plastic washers) against ground and can be mounted directly on earthed metal parts of the luminaire. If the max. output voltage of the LED driver (also against earth) is above 60 V SELV, an additional insulation between LED module and heat sink is required (for example by insulated thermal pads) or by a suitable luminaire construction.

#### 3.2 Wiring

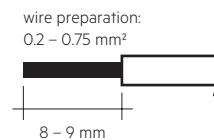


#### Wiring examples



#### 3.3 Wiring type and cross section

For wiring use stranded wire with ferrules or solid wire from 0.2 to 0.75 mm<sup>2</sup>. For the push-wire connection you have to strip the insulation (8–9 mm).



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

### 3.4 Mounting instruction



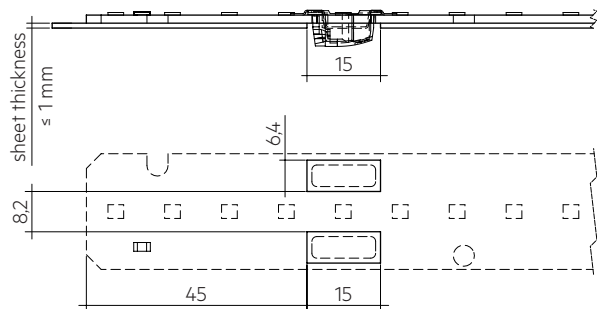
None of the components of the LLE (substrate, LED, electronic components etc.) may be exposed to tensile or compressive stresses.

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.

Only touch the module at the edge to separate the modules (see marking below).

Cut out on gear tray for backside terminal:



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

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

Avoid corrosive atmosphere during usage and storage.

### 3.5 EOS/ESD safety guidelines



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

## 4. Lifetime

### 4.1 Lifetime, lumen maintenance and failure rate

The light output of an LED module decreases over the lifetime, this is characterized with the L value.  
L70 means that the LED module will give 70 % of its initial luminous flux.  
This value is always related to the number of operation hours and therefore defines the lifetime of an LED module.

As the L value is a statistical value and the lumen maintenance may vary over the delivered LED modules.

The B value defines the amount of modules which are below the specific L value, e.g. L70B10 means 10 % of the LED modules are below 70 % of the initial luminous flux, respectively 90 % will be above 70 % of the initial value.  
In addition the percentage of failed modules (fatal failure) is characterized by the C value.

### 4.2 Lumen maintenance for LLE 24mm LV ADV6

Forward current	tp tempera- ture						
		L90 / B10	L90 / B50	L80 / B10	L80 / B50	L70 / B10	L70 / B50
350 mA / ft (280 mm module length)	55 °C	52k h	52k h	> 102k h	> 102k h	> 102k h	> 102k h
	85 °C	52k h	52k h	> 102k h	> 102k h	> 102k h	> 102k h

L00C03 > 102k h. At tp rated and I rated, based on 10 switching 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 I<sub>max</sub>

## 5. Electrical values

### 5.1 Declaration of electrical parameters

Irated ... Nominal operating current the module is designed for.

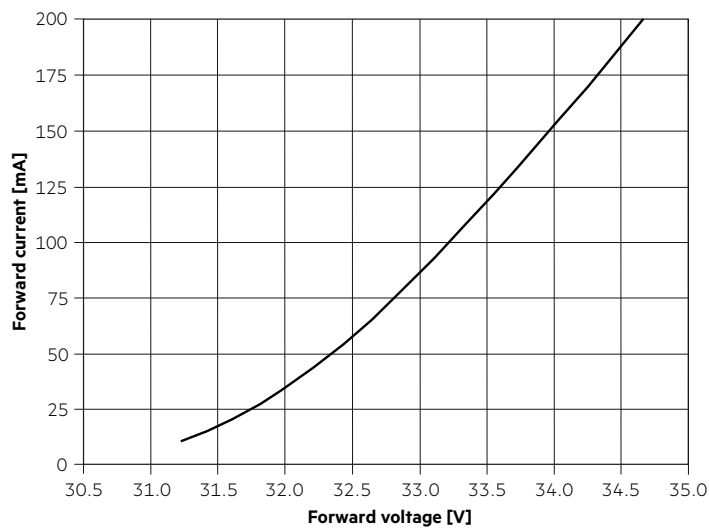
I<sub>max</sub> ... Max. permissible continuous operating current incl. The tolerances of the LED driver.

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

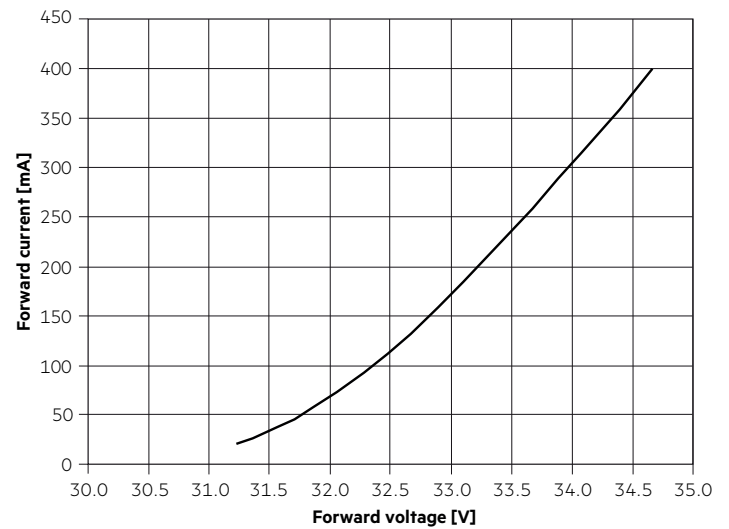
Max. permissible peak current ... The max. output peak current of the LED driver must not exceed this value.

### 5.2 Typ. forward voltage vs. forward current

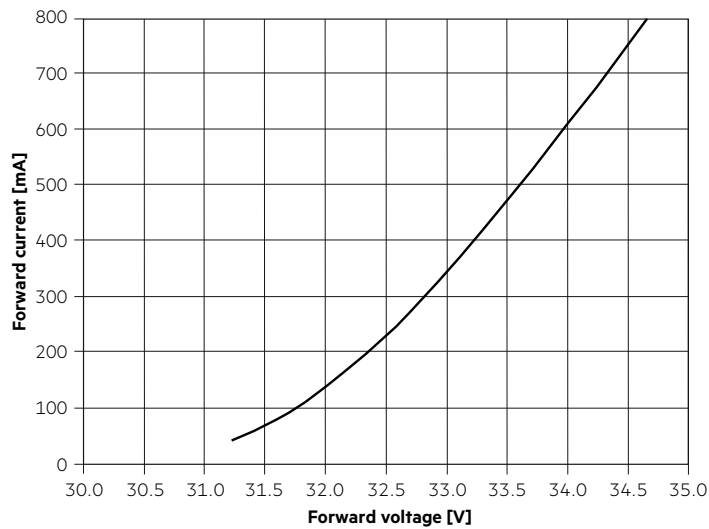
#### LLE 24x140mm 650lm 9xx LV ADV6



#### LLE 24x280mm 1250lm 9xx LV ADV6

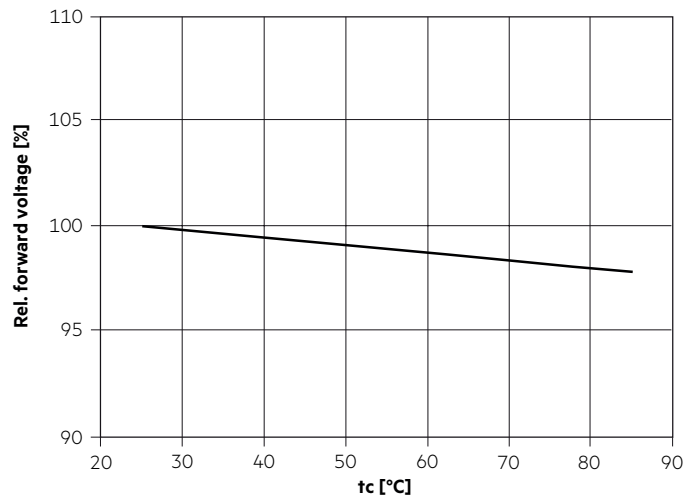


#### LLE 24x560mm 2400lm 9xx LV ADV6



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

### 5.3 Forward voltage vs. tc temperature



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

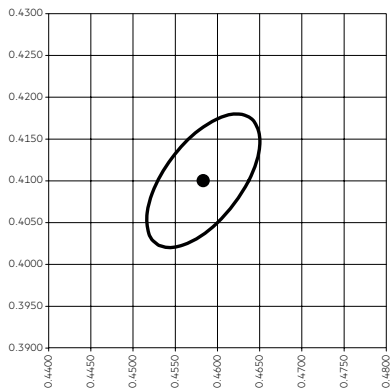
## 6. Photometric characteristics

### 6.1 Coordinates and tolerances according to CIE 1931

The specified colour coordinates are integral measured by current impulse of 195 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  $\pm 0.01$ .

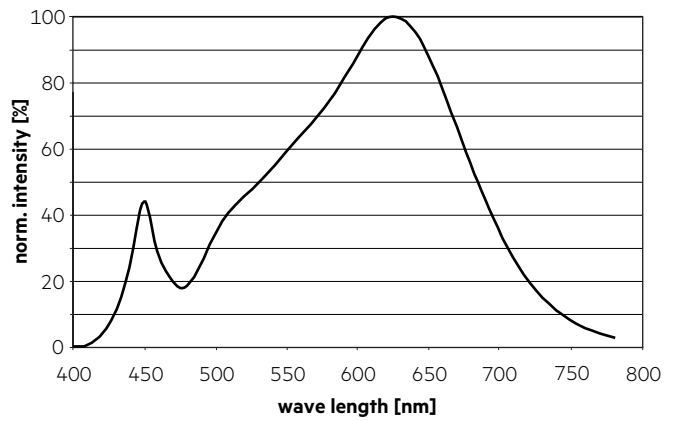
#### 2,700 K

	x0	y0
Centre	0.4578	0.4101

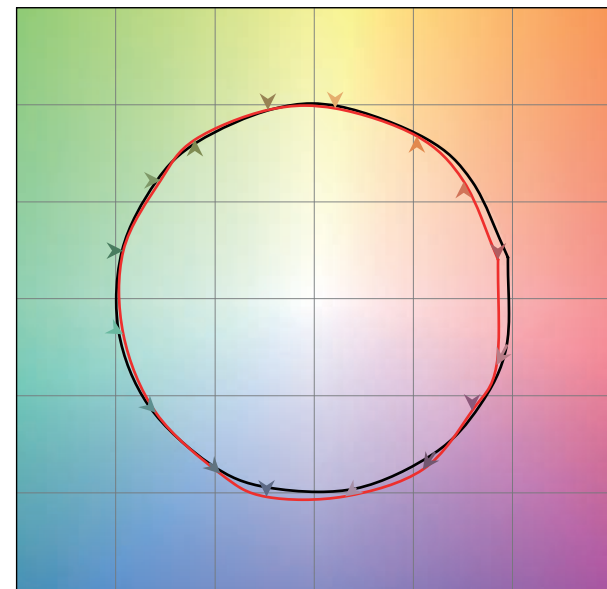


— MacAdam Ellipse: 3SDCM

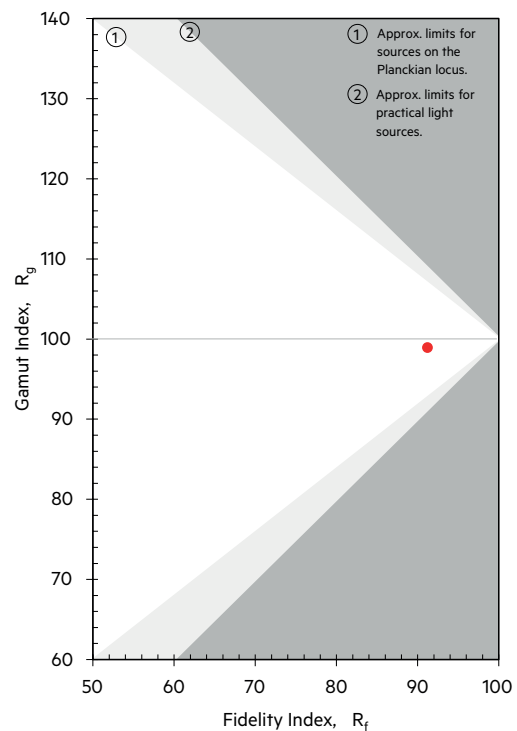
TM30		CRI	
Rf	Rg	Ra	R9
91	99	93	57



#### Colour vector graphic

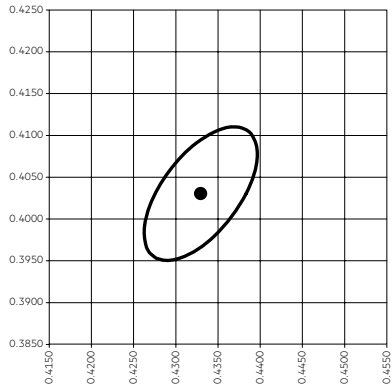


— Reference source  
 — Test source



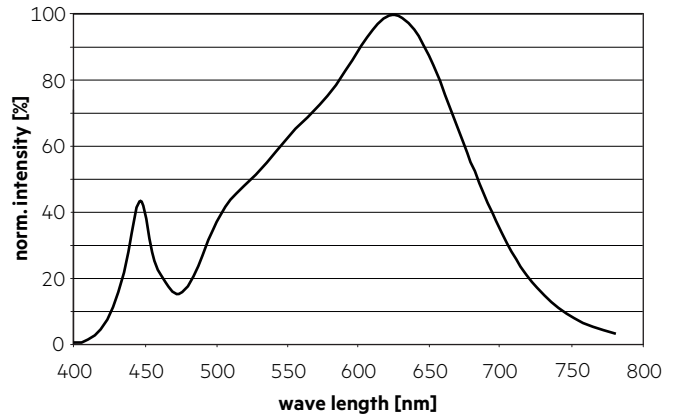
3,000 K

	x0	y0
Centre	0.4338	0.4030

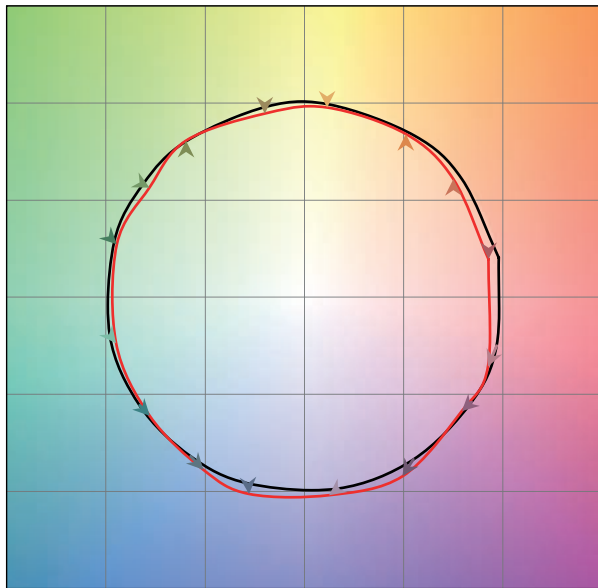


— MacAdam Ellipse: 3SDCM

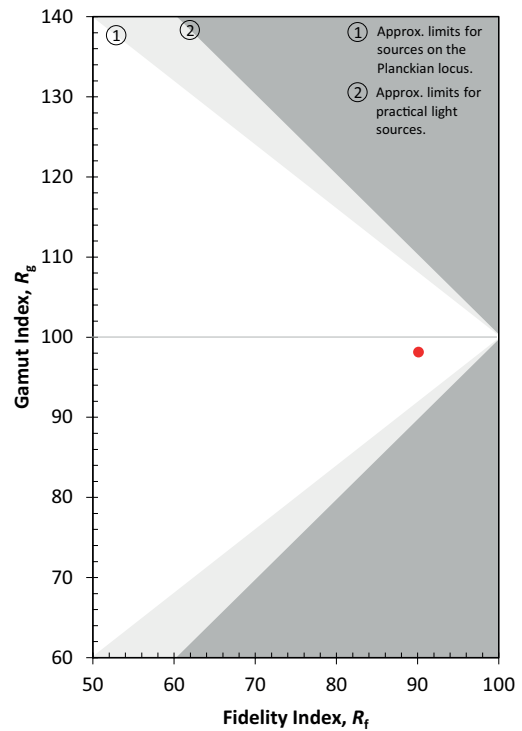
TM30		CRI	
Rf	Rg	Ra	R9
90	98	92	57



Colour vector graphic

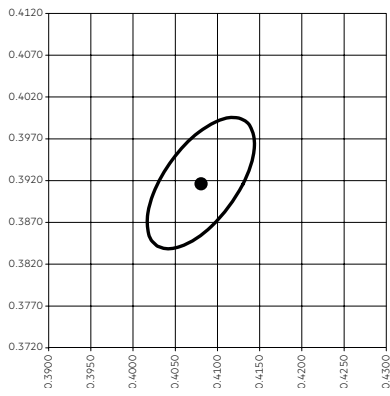


— Reference source  
— Test source



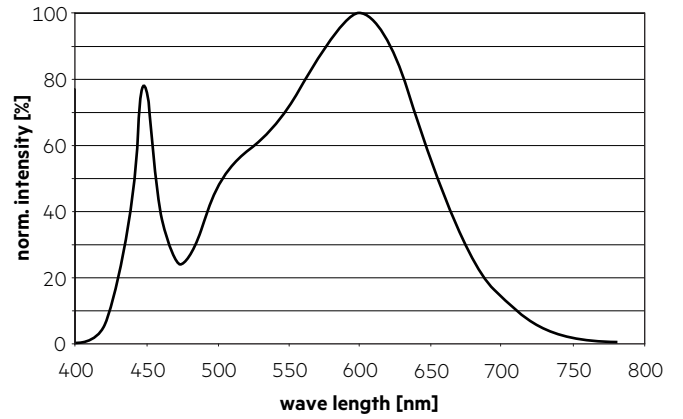
3,500 K

	x0	y0
Centre	0.4073	0.3917

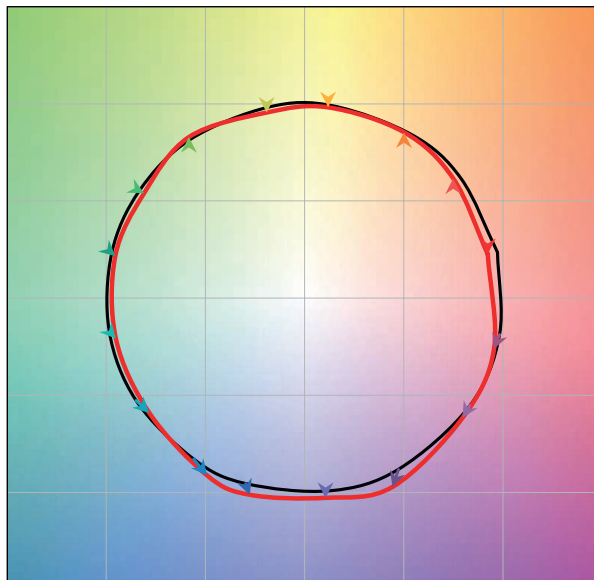


— MacAdam Ellipse: 3SDCM

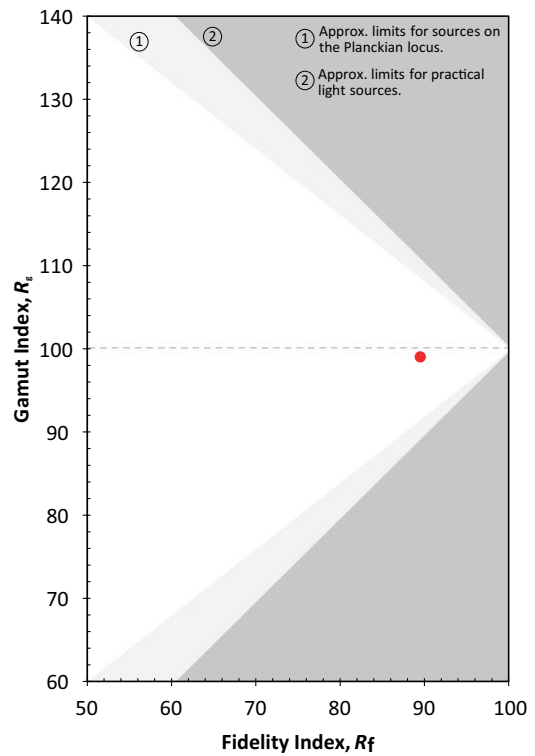
TM30		CRI	
Rf	Rg	Ra	R9
90	99	93	63



Colour vector graphic

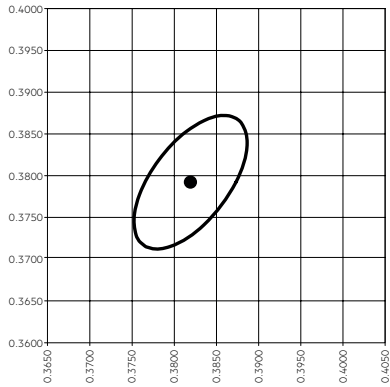


— Reference source  
— Test source



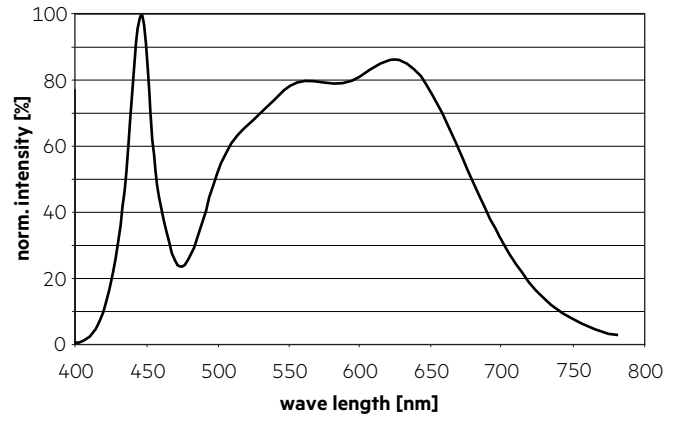
4,000 K

	x0	y0
Center	0.3818	0.3797

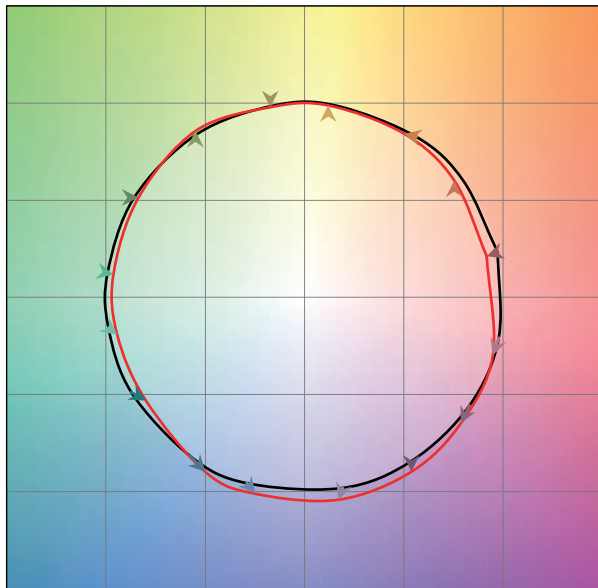


— MacAdam Ellipse: 3SDCM

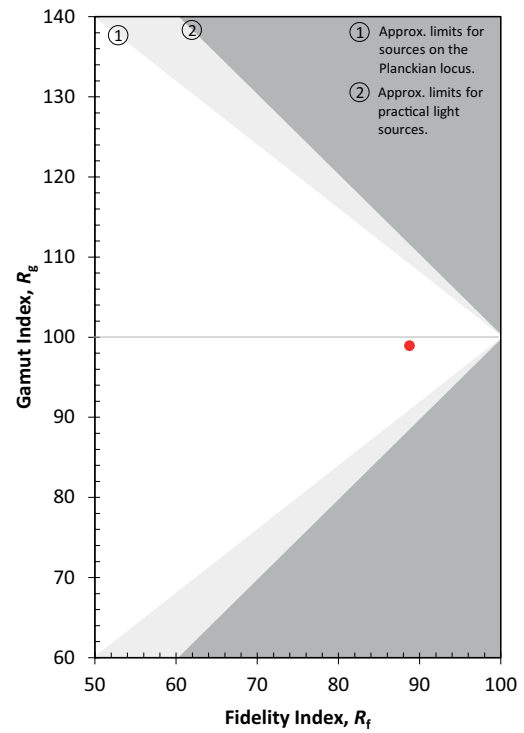
TM30		CRI	
Rf	Rg	Ra	R9
89	99	91	54



Colour vector graphic

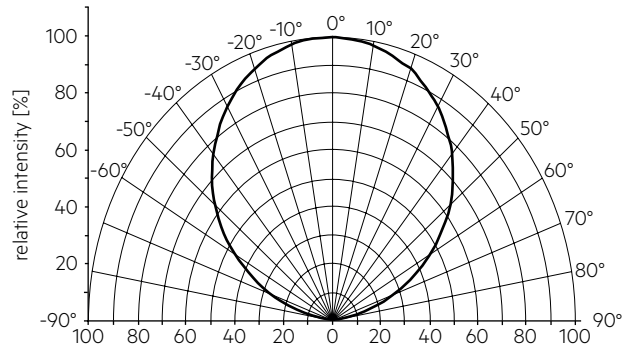


— Reference source  
— Test source



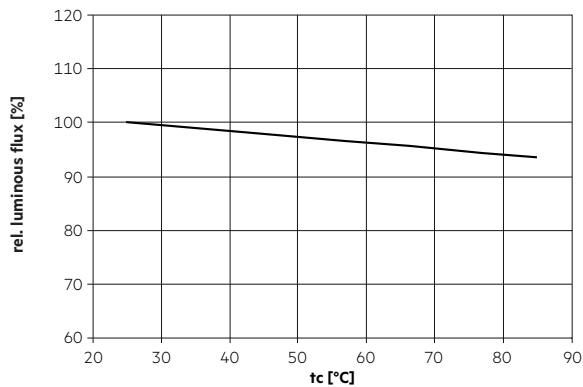
### 6.2 Light distribution

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



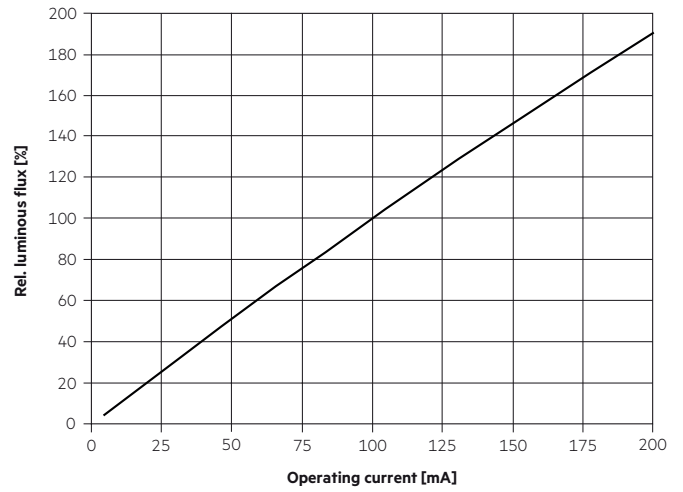
The colour temperature is measured integral over the complete module. The single LED light points can have deviations in the colour coordinates within MacAdam 3. To ensure an ideal mixture of colours and a homogeneous light distribution a suitable optic (e. g. PMMA diffuser) and a sufficient spacing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

### 6.3 Relative luminous flux vs. tc temperature

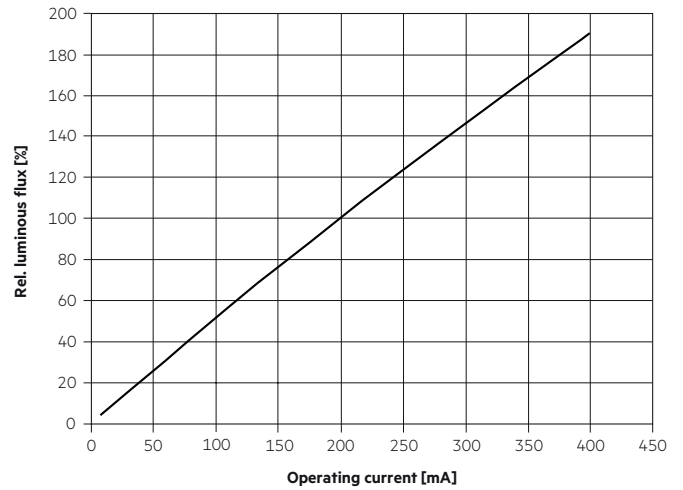


### 6.4 Relative luminous flux vs. operating current

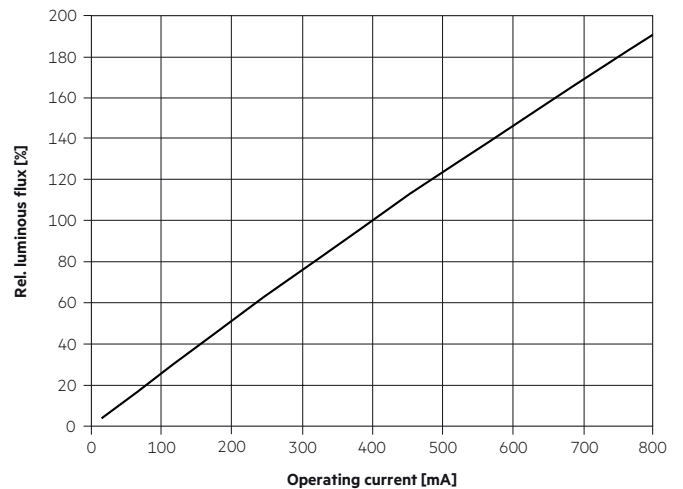
LLE 24x140mm 650lm 9xx LV ADV6



LLE 24x280mm 1250lm 9xx LV ADV6



LLE 24x560mm 2400lm 9xx LV ADV6



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](http://www.tridonic.com) → Technical Data

Guarantee conditions at [www.tridonic.com](http://www.tridonic.com) → Services

Lifetime declarations are informative and represent no warranty claim.