



Module LLE 24mm 650lm CRI90 LV ADV6

Modules LLE advanced

Product description

- Ideal for linear and panel lights
- 4 terminals for parallel wiring
- 4,000 K module COI approved acc. to AS/NZS1680.2.5:1997
- 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: 72,000 hours
- 5 years guarantee (conditions at www.tridonic.com)

Optical properties

- Colour temperatures 2,700 K, 3,000 K, 3,500 K and 4,000 K
- Useful luminous flux 1,088 lm at Irated and tp = 25 °C
- 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)[®]
- Small luminous flux tolerances

Mechanical properties

- Module dimension 24 x 280 mm and 24 x 560 mm (ZHAGA compliant)
- Simple installation (e.g. 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/>)



LLE 24x280mm 650lm LV ADV6



LLE 24x560mm 1300lm LV ADV6



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Colour temperatures and tolerances, page 19



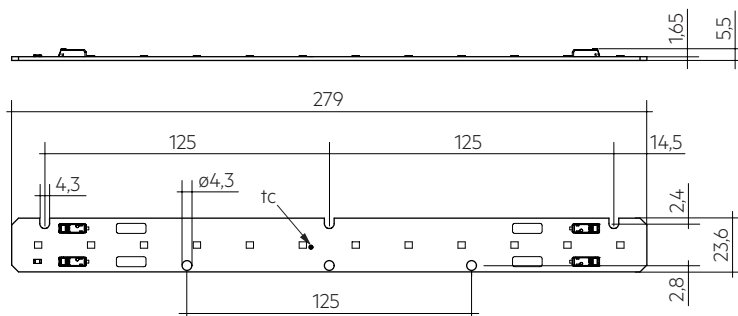
Module LLE 24mm 650lm CRI90 LV ADV6

Modules LLE advanced

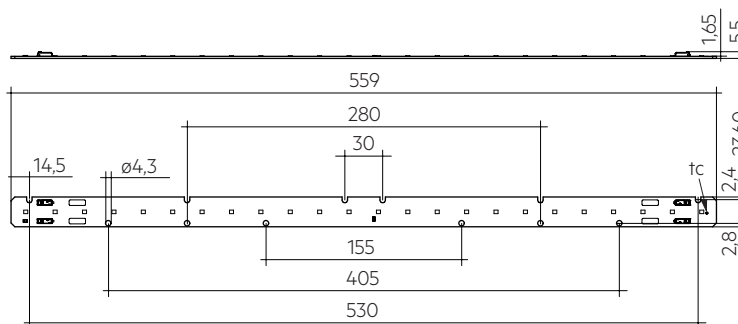
Technical data

Colour consistency ^①	3 SDCM
ESD classification	severity level 2
Classification acc. to IEC 62031	Built-in
Type of protection	IP00
Lumen maintenance L70B50	72,000 h
Guarantee	5 year(s)

^① Integral measurement over the complete module.



LLE 24x280mm 650lm LV ADV6



LLE 24x560mm 1300lm LV ADV6

LED modules

LED linear / area

Module LLE 24mm 650lm CRI90 LV ADV6

Modules LLE advanced

Ordering data

Type	Article number	Packaging carton	Weight per pc.
LLE 24x280mm 650lm 927 LV ADV6	28004813	108 pc(s).	0.022 kg
LLE 24x280mm 650lm 930 LV ADV6	28004814	108 pc(s).	0.022 kg
LLE 24x280mm 650lm 935 LV ADV6	28004815	108 pc(s).	0.022 kg
LLE 24x280mm 650lm 940 LV ADV6	28004816	108 pc(s).	0.022 kg
LLE 24x560mm 1300lm 927 LV ADV6	28004823	108 pc(s).	0.042 kg
LLE 24x560mm 1300lm 930 LV ADV6	28004824	108 pc(s).	0.042 kg
LLE 24x560mm 1300lm 935 LV ADV6	28004825	108 pc(s).	0.042 kg
LLE 24x560mm 1300lm 940 LV ADV6	28004826	108 pc(s).	0.042 kg

Photometric data

Type	Colour temperature	Photometric Code ^①	Useful luminous flux at tp = 25 °C ^②	Luminous flux at tp rated ^③			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.				
Operating mode HE										
LLE 24x280mm 650lm 927 LV ADV6	2,700 K	927/359	–	234 lm	260 lm	286 lm	–	163 lm/W	120°	> 90
LLE 24x280mm 650lm 930 LV ADV6	3,000 K	930/359	–	241 lm	268 lm	295 lm	–	168 lm/W	120°	> 90
LLE 24x280mm 650lm 935 LV ADV6	3,500 K	935/359	–	247 lm	275 lm	303 lm	–	172 lm/W	120°	> 90
LLE 24x280mm 650lm 940 LV ADV6	4,000 K	940/359	–	250 lm	278 lm	307 lm	–	174 lm/W	120°	> 90
LLE 24x560mm 1300lm 927 LV ADV6	2,700 K	927/359	–	468 lm	520 lm	572 lm	–	163 lm/W	120°	> 90
LLE 24x560mm 1300lm 930 LV ADV6	3,000 K	930/359	–	482 lm	536 lm	590 lm	–	168 lm/W	120°	> 90
LLE 24x560mm 1300lm 935 LV ADV6	3,500 K	935/359	–	495 lm	550 lm	605 lm	–	172 lm/W	120°	> 90
LLE 24x560mm 1300lm 940 LV ADV6	4,000 K	940/359	–	501 lm	557 lm	613 lm	–	174 lm/W	120°	> 90
Operating mode NM										
LLE 24x280mm 650lm 927 LV ADV6	2,700 K	927/359	528 lm	456 lm	507 lm	558 lm	159 lm/W	154 lm/W	120°	> 90
LLE 24x280mm 650lm 930 LV ADV6	3,000 K	930/359	544 lm	470 lm	522 lm	575 lm	164 lm/W	159 lm/W	120°	> 90
LLE 24x280mm 650lm 935 LV ADV6	3,500 K	935/359	558 lm	482 lm	536 lm	590 lm	168 lm/W	163 lm/W	120°	> 90
LLE 24x280mm 650lm 940 LV ADV6	4,000 K	940/359	566 lm	488 lm	543 lm	598 lm	171 lm/W	165 lm/W	120°	> 90
LLE 24x560mm 1300lm 927 LV ADV6	2,700 K	927/359	1,056 lm	912 lm	1,014 lm	1,116 lm	159 lm/W	154 lm/W	120°	> 90
LLE 24x560mm 1300lm 930 LV ADV6	3,000 K	930/359	1,088 lm	940 lm	1,045 lm	1,150 lm	164 lm/W	159 lm/W	120°	> 90
LLE 24x560mm 1300lm 935 LV ADV6	3,500 K	935/359	1,117 lm	965 lm	1,072 lm	1,180 lm	168 lm/W	163 lm/W	120°	> 90
LLE 24x560mm 1300lm 940 LV ADV6	4,000 K	940/359	1,132 lm	977 lm	1,086 lm	1,195 lm	171 lm/W	165 lm/W	120°	> 90
Operating mode HO										
LLE 24x280mm 650lm 927 LV ADV6	2,700 K	927/359	–	771 lm	857 lm	942 lm	–	144 lm/W	120°	> 90
LLE 24x280mm 650lm 930 LV ADV6	3,000 K	930/359	–	795 lm	883 lm	971 lm	–	148 lm/W	120°	> 90
LLE 24x280mm 650lm 935 LV ADV6	3,500 K	935/359	–	816 lm	906 lm	997 lm	–	152 lm/W	120°	> 90
LLE 24x280mm 650lm 940 LV ADV6	4,000 K	940/359	–	826 lm	918 lm	1,010 lm	–	154 lm/W	120°	> 90
LLE 24x560mm 1300lm 927 LV ADV6	2,700 K	927/359	–	1,542 lm	1,713 lm	1,885 lm	–	144 lm/W	120°	> 90
LLE 24x560mm 1300lm 930 LV ADV6	3,000 K	930/359	–	1,589 lm	1,766 lm	1,942 lm	–	148 lm/W	120°	> 90
LLE 24x560mm 1300lm 935 LV ADV6	3,500 K	935/359	–	1,631 lm	1,813 lm	1,994 lm	–	152 lm/W	120°	> 90
LLE 24x560mm 1300lm 940 LV ADV6	4,000 K	940/359	–	1,652 lm	1,836 lm	2,020 lm	–	154 lm/W	120°	> 90

^① The detailed explanation, see data sheet section 1.1.

^② Tolerance of useful light flux - 0 % / + 15 %. Measurement uncertainty ± 10 %.

^③ Measurement uncertainty ± 10 %. Based on calculation.

Electrical data

Type	Forward current	Min. forward voltage at tp rated	Typ. forward voltage at tp rated	Max. forward voltage at tp = 25 °C	Power consumption Pon at tp = 25 °C [®]	Energy classification	Energy consumption	Type of light source
Operating mode HE								
LLE 24x280mm 650lm 927 LV ADV6	50 mA	31.8 V	32.0 V	33.3 V	–	–	–	–
LLE 24x280mm 650lm 930 LV ADV6	50 mA	31.8 V	32.0 V	33.3 V	–	–	–	–
LLE 24x280mm 650lm 935 LV ADV6	50 mA	31.8 V	32.0 V	33.3 V	–	–	–	–
LLE 24x280mm 650lm 940 LV ADV6	50 mA	31.8 V	32.0 V	33.3 V	–	–	–	–
LLE 24x560mm 1300lm 927 LV ADV6	100 mA	31.8 V	32.0 V	33.3 V	–	–	–	–
LLE 24x560mm 1300lm 930 LV ADV6	100 mA	31.8 V	32.0 V	33.3 V	–	–	–	–
LLE 24x560mm 1300lm 935 LV ADV6	100 mA	31.8 V	32.0 V	33.3 V	–	–	–	–
LLE 24x560mm 1300lm 940 LV ADV6	100 mA	31.8 V	32.0 V	33.3 V	–	–	–	–
Operating mode NM								
LLE 24x280mm 650lm 927 LV ADV6	100 mA	32.7 V	32.9 V	34.2 V	3.3 W	D	4 kWh / 1,000 h	non-directional
LLE 24x280mm 650lm 930 LV ADV6	100 mA	32.7 V	32.9 V	34.2 V	3.3 W	D	4 kWh / 1,000 h	non-directional
LLE 24x280mm 650lm 935 LV ADV6	100 mA	32.7 V	32.9 V	34.2 V	3.3 W	D	4 kWh / 1,000 h	non-directional
LLE 24x280mm 650lm 940 LV ADV6	100 mA	32.7 V	32.9 V	34.2 V	3.3 W	D	4 kWh / 1,000 h	non-directional
LLE 24x560mm 1300lm 927 LV ADV6	200 mA	32.7 V	32.9 V	34.2 V	6.6 W	D	7 kWh / 1,000 h	non-directional
LLE 24x560mm 1300lm 930 LV ADV6	200 mA	32.7 V	32.9 V	34.2 V	6.6 W	D	7 kWh / 1,000 h	non-directional
LLE 24x560mm 1300lm 935 LV ADV6	200 mA	32.7 V	32.9 V	34.2 V	6.6 W	D	7 kWh / 1,000 h	non-directional
LLE 24x560mm 1300lm 940 LV ADV6	200 mA	32.7 V	32.9 V	34.2 V	6.6 W	D	7 kWh / 1,000 h	non-directional
Operating mode HO								
LLE 24x280mm 650lm 927 LV ADV6	175 mA	33.8 V	34.0 V	35.3 V	–	–	–	–
LLE 24x280mm 650lm 930 LV ADV6	175 mA	33.8 V	34.0 V	35.3 V	–	–	–	–
LLE 24x280mm 650lm 935 LV ADV6	175 mA	33.8 V	34.0 V	35.3 V	–	–	–	–
LLE 24x280mm 650lm 940 LV ADV6	175 mA	33.8 V	34.0 V	35.3 V	–	–	–	–
LLE 24x560mm 1300lm 927 LV ADV6	350 mA	33.8 V	34.0 V	35.3 V	–	–	–	–
LLE 24x560mm 1300lm 930 LV ADV6	350 mA	33.8 V	34.0 V	35.3 V	–	–	–	–
LLE 24x560mm 1300lm 935 LV ADV6	350 mA	33.8 V	34.0 V	35.3 V	–	–	–	–
LLE 24x560mm 1300lm 940 LV ADV6	350 mA	33.8 V	34.0 V	35.3 V	–	–	–	–

[®] Tolerance of power consumption Pon ± 10 %. Measurement uncertainty ± 5 %.

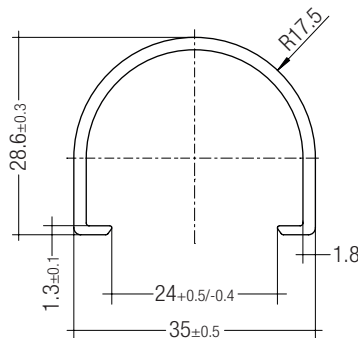
Specific technical data

Type	I _{rated}	I _{max}	Max. permissible LF current ripple	Max. permissible peak current / max. pulse width	Max. working voltage for insulation SELV ^①	Electrical strength	t _a	t _p rated	t _c
LLE 24x280mm 1250lm 927 LV ADV6	100 mA	200 mA	220 mA	300 mA / 10 ms	60 V	0.5 kV	-40 ... +65 °C	50 °C	85 °C
LLE 24x280mm 1250lm 930 LV ADV6	100 mA	200 mA	220 mA	300 mA / 10 ms	60 V	0.5 kV	-40 ... +65 °C	50 °C	85 °C
LLE 24x280mm 1250lm 935 LV ADV6	100 mA	200 mA	220 mA	300 mA / 10 ms	60 V	0.5 kV	-40 ... +65 °C	50 °C	85 °C
LLE 24x280mm 1250lm 940 LV ADV6	100 mA	200 mA	220 mA	300 mA / 10 ms	60 V	0.5 kV	-40 ... +65 °C	50 °C	85 °C
LLE 24x560mm 2400lm 927 LV ADV6	200 mA	400 mA	440 mA	600 mA / 10 ms	60 V	0.5 kV	-40 ... +65 °C	50 °C	85 °C
LLE 24x560mm 2400lm 930 LV ADV6	200 mA	400 mA	440 mA	600 mA / 10 ms	60 V	0.5 kV	-40 ... +65 °C	50 °C	85 °C
LLE 24x560mm 2400lm 935 LV ADV6	200 mA	400 mA	440 mA	600 mA / 10 ms	60 V	0.5 kV	-40 ... +65 °C	50 °C	85 °C
LLE 24x560mm 2400lm 940 LV ADV6	200 mA	400 mA	440 mA	600 mA / 10 ms	60 V	0.5 kV	-40 ... +65 °C	50 °C	85 °C

^① If mounted with M4 screws with 7 mm head diameter.

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),
+ 10 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

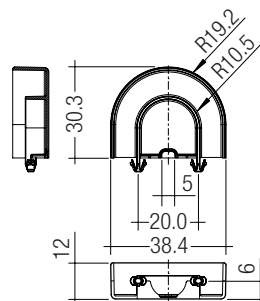
- ENDCAP for LLE 24
- PUSH-FIX: Fast snap on mounting (sheet thickness 0.5 – 1.0 mm), for drilling hole 4 mm
- SCREW-FIX: Screw mounting with EJOT Delta PT WN 5451 30x8 (not included), tightening torque 0.7 Nm
- Made of Polycarbonat



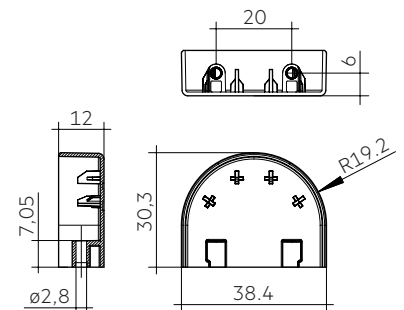
ACL ENDCAP LLE24 PUSH-FIX



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
- Recommendation: Fastening with screws and plastic washers, see 2.3 Heat sink specifications
- Linear lense made of PMMA
- Available lengths: 1,200, 1,500, 1,600 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



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

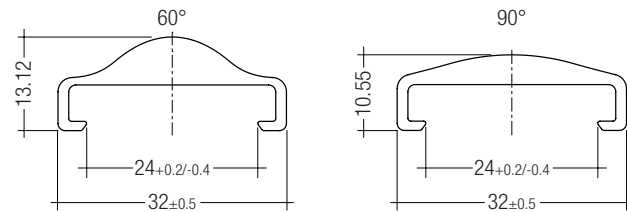


ACL LINEAR LENS 24mm DASY

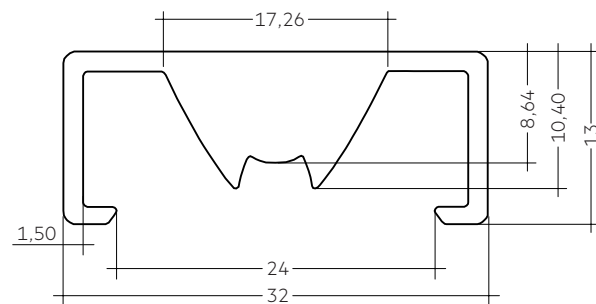


ACL Endcap LENS 24mm PSF

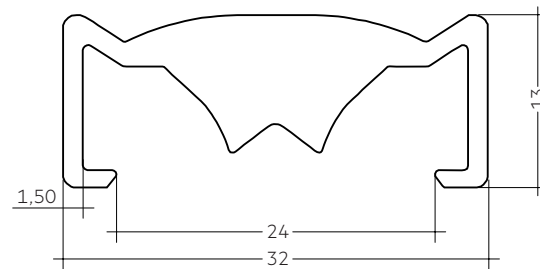
ACL LENS 24mm



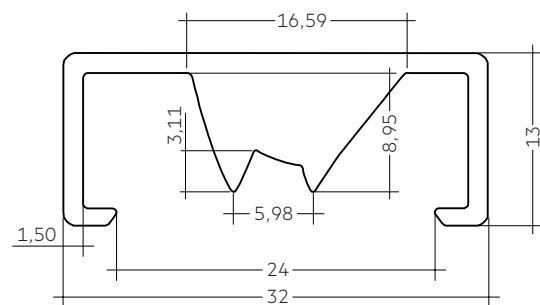
ACL LINEAR LENS 24mm 60° and 90°



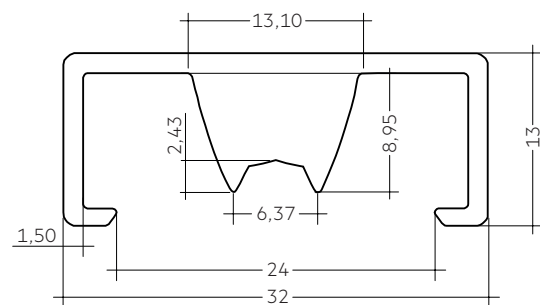
ACL LINEAR LENS 24mm INTENSE



ACL LINEAR LENS 24mm BATWING

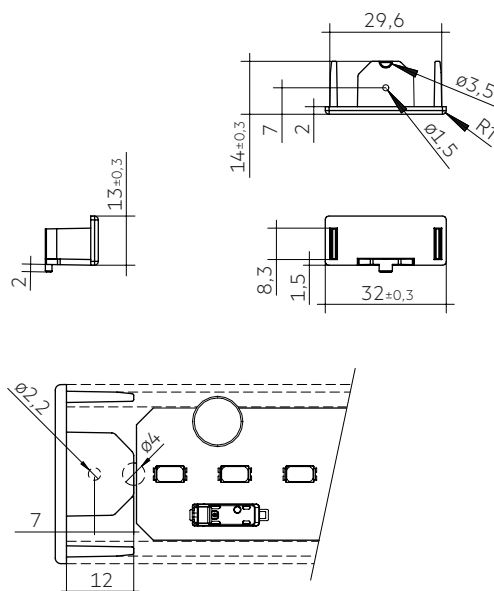


ACL LINEAR LENS 24mm ASY



ACL LINEAR LENS 24mm DASY

ACL LENS 24mm



ACL Endcap LENS 24mm PSF

Ordering data

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 24x1500mm 60°	28000953	60°	97 %	21 pc(s).	0.261 kg
ACL LINEAR LENS 24x1500mm 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	–	–	3,600 pc(s).	0.003 kg

**ACCES-
SORIES**

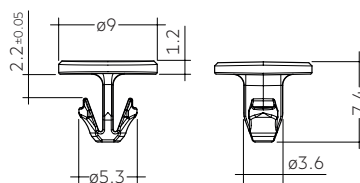
CLIP 4.3mm

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



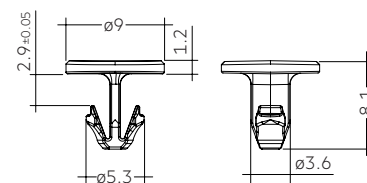
ACL CLIP 4.3mm PUSH-FIX



ACL CLIP 4.3mm PUSH-FIX



ACL CLIP 4.3mm PUSH-FIX Long



ACL CLIP 4.3mm PUSH-FIX Long

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

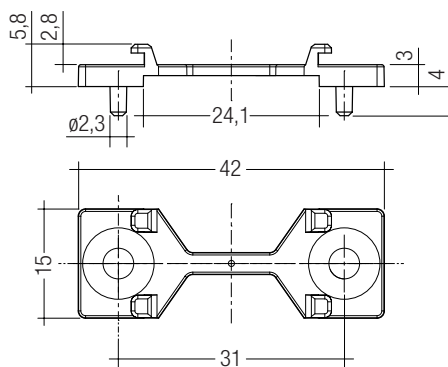
^① Minimum sales quantity 500 pcs.

**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 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 st digit	2 nd + 3 rd digit	4 th digit	5 th digit	6 th digit
Code	Colour temperature in Kelvin x 100	MacAdam initial	MacAdam after 25% of the lifetime (max.6000h)	Luminous flux after 25% of the lifetime (max.6000h)
7	70 – 79			Code
8	80 – 89			Luminous flux
9	≥90			7
				8
				9

1.2 Risk group

LLE 24x280mm 650lm LV ADV6

Forward current	Risk group (IEC 62471)
≤ 187 mA	RG0
> 187 – 200 mA (Imax)	RG1

LLE 24x560mm 1300lm LV ADV6

Forward current	Risk group (IEC 62471)
≤ 374 mA	RG0
> 374 – 400 mA (Imax)	RG1

1.3 Energy classification

Type	Colour temperature	Forward current	Energy classification	Energy consumption
LLE 24x280mm 650lm 927 LV ADV6	2,700 K	100 mA	D	4 kWh / 1,000 h
LLE 24x280mm 650lm 930 LV ADV6	3,000 K	100 mA	D	4 kWh / 1,000 h
LLE 24x280mm 650lm 935 LV ADV6	3,500 K	100 mA	D	4 kWh / 1,000 h
LLE 24x280mm 650lm 940 LV ADV6	4,000 K	100 mA	D	4 kWh / 1,000 h
LLE 24x560mm 1300lm 927 LV ADV6	2,700 K	200 mA	D	7 kWh / 1,000 h
LLE 24x560mm 1300lm 930 LV ADV6	3,000 K	200 mA	D	7 kWh / 1,000 h
LLE 24x560mm 1300lm 935 LV ADV6	3,500 K	200 mA	D	7 kWh / 1,000 h
LLE 24x560mm 1300lm 940 LV ADV6	4,000 K	200 mA	D	7 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 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 24x280mm 650lm LV ADV6

ta	tp	Forward current	R _{th, hs-a}	Cooling area
25 °C	50 °C	300 mA		self cooling
25 °C	50 °C	500 mA	8.28 K/W	80 cm²
35 °C	50 °C	300 mA		self cooling
35 °C	50 °C	500 mA	4.68 K/W	142 cm²
40 °C	50 °C	300 mA	6.54 K/W	102 cm²
40 °C	50 °C	500 mA	2.88 K/W	231 cm²
45 °C	50 °C	300 mA	2.91 K/W	229 cm²
45 °C	50 °C	500 mA	1.08 K/W	614 cm²

LLE 24x560mm 1300lm LV ADV6

ta	tp	Forward current	R _{th, hs-a}	Cooling area
25 °C	50 °C	300 mA		self cooling
25 °C	50 °C	500 mA	4.14 K/W	161 cm²
35 °C	50 °C	300 mA		self cooling
35 °C	50 °C	500 mA	2.34 K/W	285 cm²
40 °C	50 °C	300 mA	3.27 K/W	204 cm²
40 °C	50 °C	500 mA	1.44 K/W	462 cm²
45 °C	50 °C	300 mA	1.46 K/W	458 cm²
45 °C	50 °C	500 mA	0.54 K/W	1,229 cm²

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.

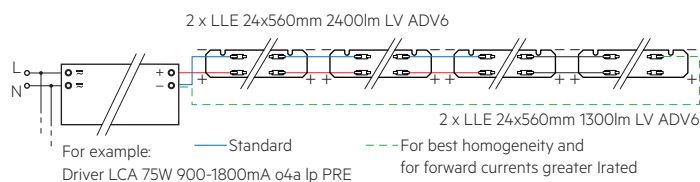
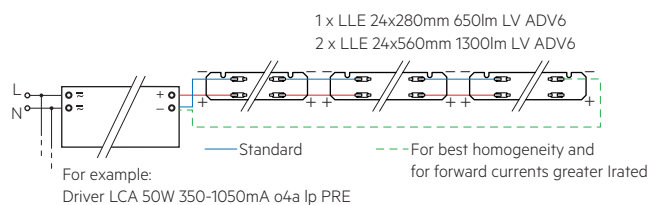
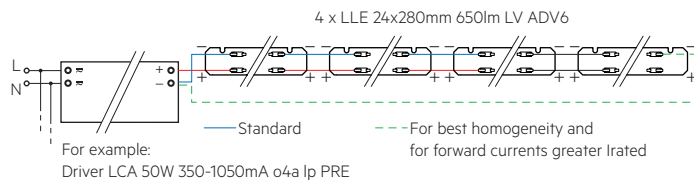


LLE are basic insulated up to 60 V SELV (if mounted with M4 screws with head diameter 7 mm in combination with plastic washers) against ground and can be mounted directly on earthed metal parts of the luminaire. If the max. output voltage of the LED driver (also against earth) is above 60 V SELV, an 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

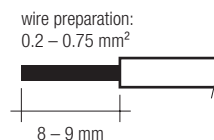


Wiring examples



3.3 Wiring type and cross section

For wiring use stranded wire with ferrules or solid wire from 0.2 to 0.75 mm². 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



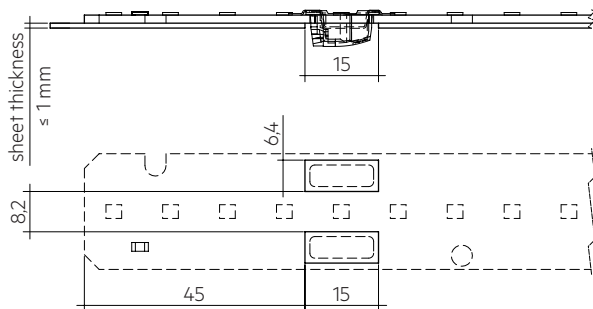
None of the components of the LLE (substrate, LED, electronic components etc.) may be exposed to tensile or compressive stresses.

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
50 mA / ft (280 mm module length)	40 °C	>72k h	>72k h	>72k h	>72k h	>72k h	>72k h
	50 °C	>72k h	>72k h	>72k h	>72k h	>72k h	>72k h
	60 °C	>72k h	>72k h	>72k h	>72k h	>72k h	>72k h
	70 °C	>72k h	>72k h	>72k h	>72k h	>72k h	>72k h
	80 °C	>72k h	>72k h	>72k h	>72k h	>72k h	>72k h
	85 °C	>72k h	>72k h	>72k h	>72k h	>72k h	>72k h
100 mA / ft (280 mm module length)	40 °C	61k h	>72k h	>72k h	>72k h	>72k h	>72k h
	50 °C	53k h	71k h	>72k h	>72k h	>72k h	>72k h
	60 °C	39k h	51k h	>72k h	>72k h	>72k h	>72k h
	70 °C	37k h	48k h	>72k h	>72k h	>72k h	>72k h
	80 °C	35k h	45k h	>72k h	>72k h	>72k h	>72k h
	85 °C	34k h	44k h	70k h	>72k h	>72k h	>72k h
175 mA / ft (280 mm module length)	40 °C	56k h	>72k h	>72k h	>72k h	>72k h	>72k h
	50 °C	47k h	65k h	>72k h	>72k h	>72k h	>72k h
	60 °C	42k h	57k h	>72k h	>72k h	>72k h	>72k h
	70 °C	37k h	50k h	>72k h	>72k h	>72k h	>72k h
	80 °C	32k h	44k h	66k h	>72k h	>72k h	>72k h
	85 °C	30k h	41k h	62k h	>72k h	>72k h	>72k h

LOC10 >72k h. At tp rated, based on 10 swichting 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 Imax

5. Electrical values

5.1 Declaration of electrical parameters

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

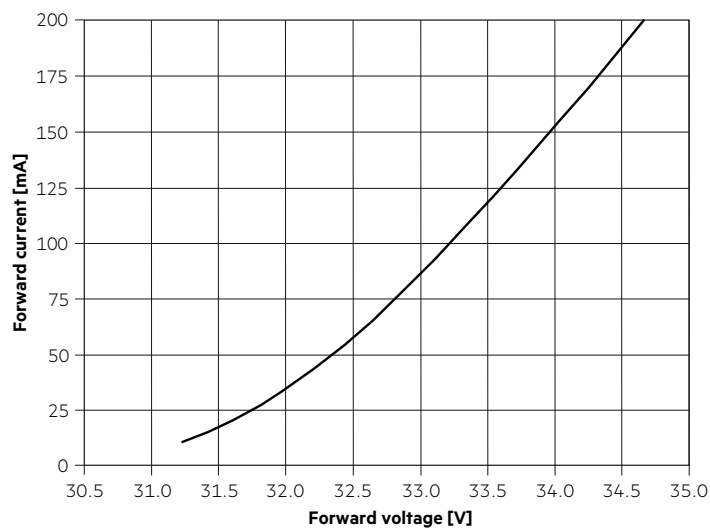
I_{max} ... Max. permissible continuous operating current incl. The tolerances of the LED driver.

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

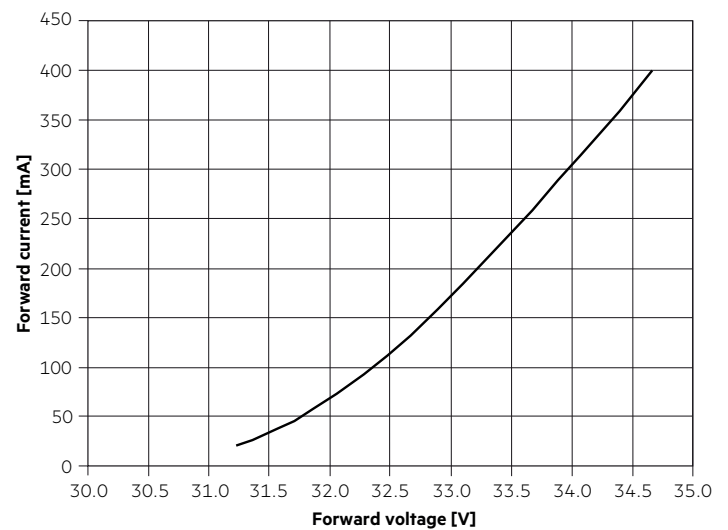
Max. permissible peak current ... The max. output peak current of the LED driver must not exceed this value.

5.2 Typ. forward voltage vs. forward current

LLE 24x280mm 650lm 9xx LV ADV6

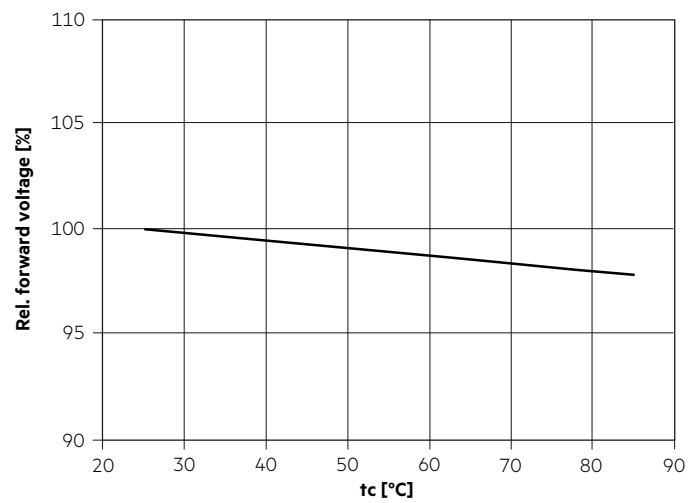


LLE 24x560mm 1300lm 9xx LV ADV6



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

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

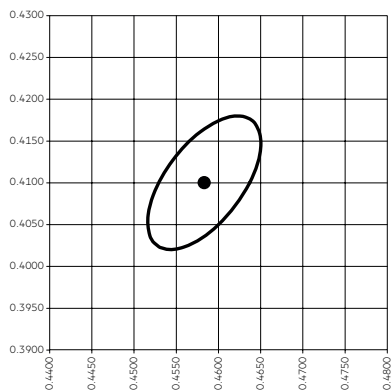
The specified colour coordinates are integral measured by current impulse of 195 mA and a duration of 100 ms.

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

The measurement tolerance of the colour coordinates are ± 0.01 .

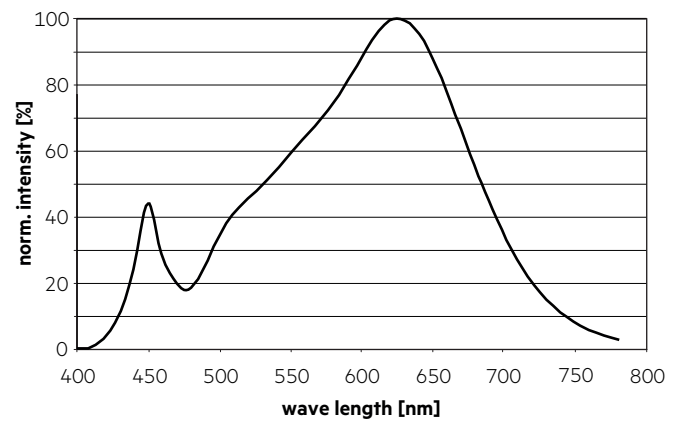
2,700 K

	x0	y0
Centre	0.4578	0.4101

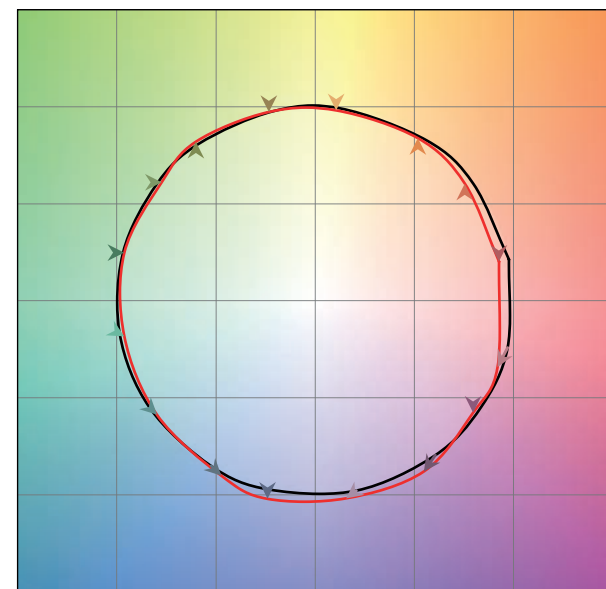


— MacAdam Ellipse: 3SDCM

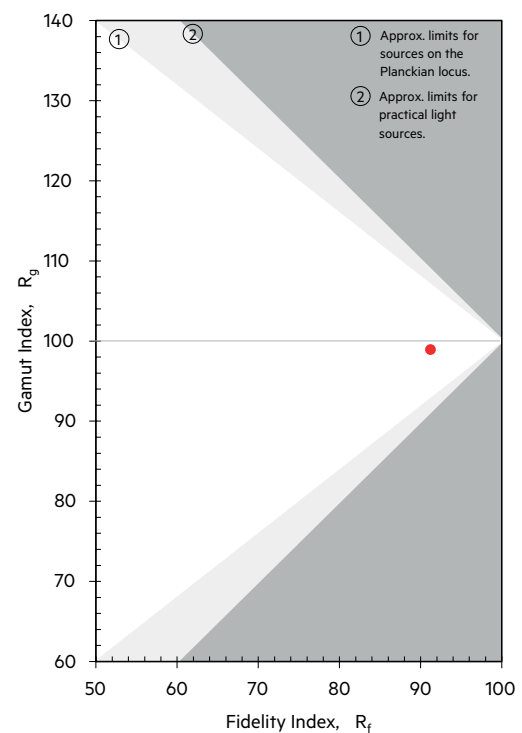
TM30		CRI	
Rf	Rg	Ra	R9
91	99	93	57



Colour vector graphic

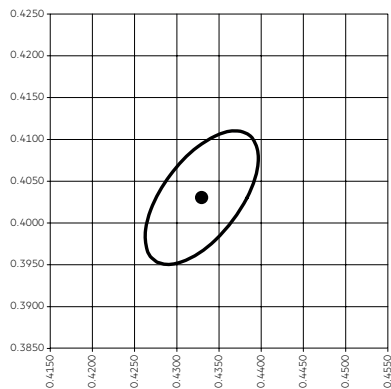


— Reference source
— Test source



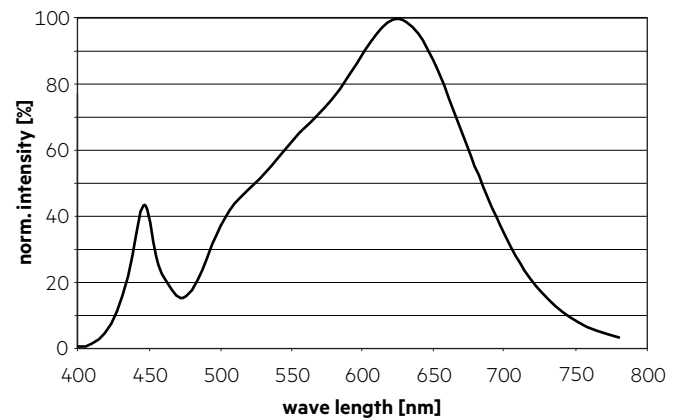
3,000 K

	x0	y0
Centre	0.4338	0.4030

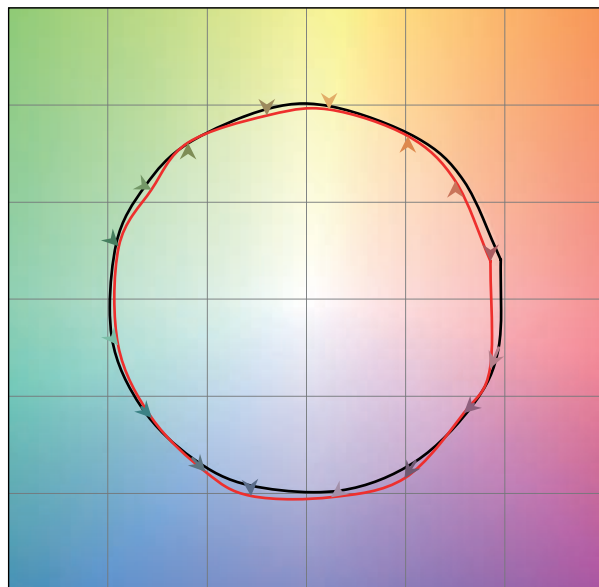


— MacAdam Ellipse: 3SDCM

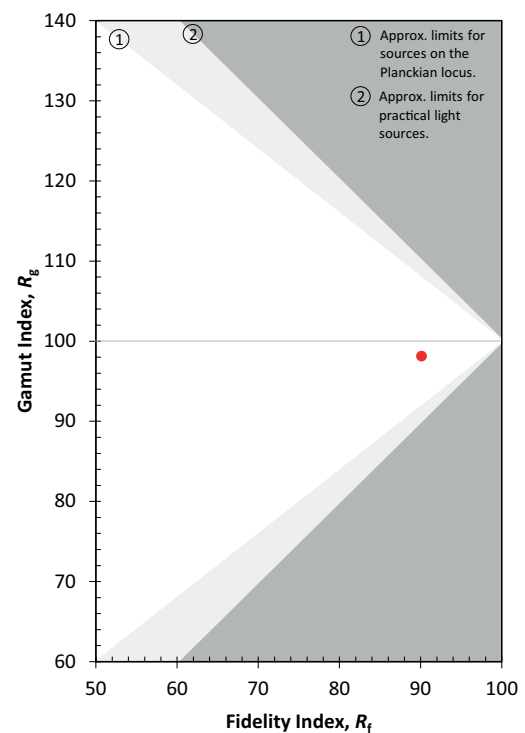
TM30		CRI	
Rf	Rg	Ra	R9
90	98	92	57



Colour vector graphic

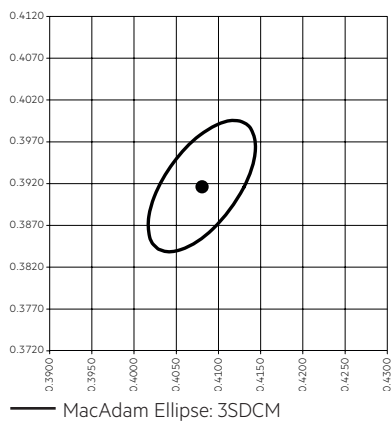


— Reference source
— Test source



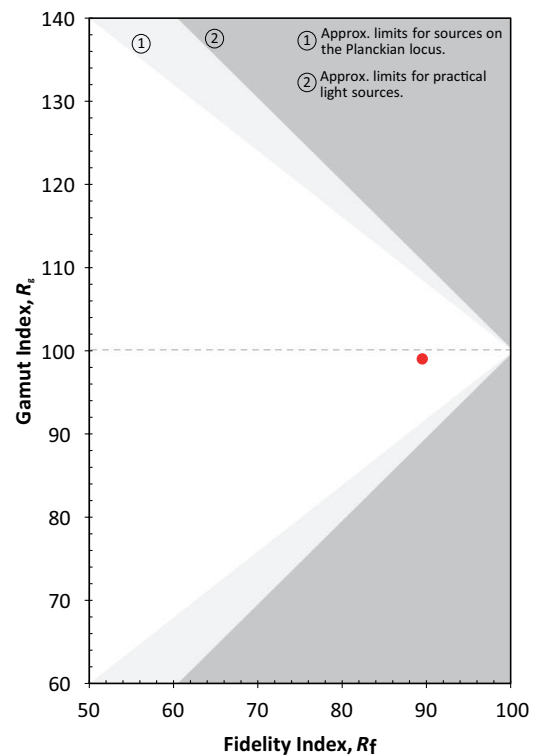
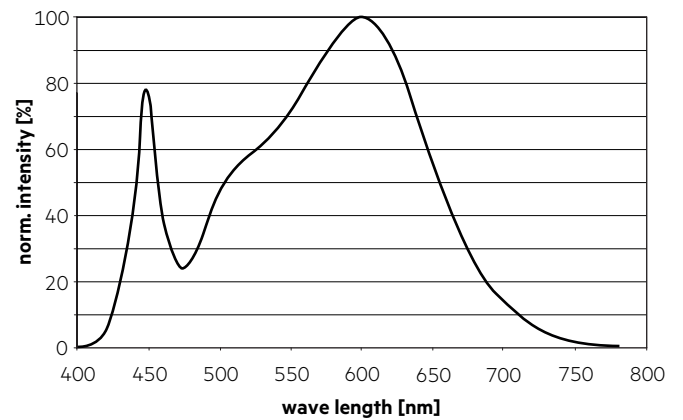
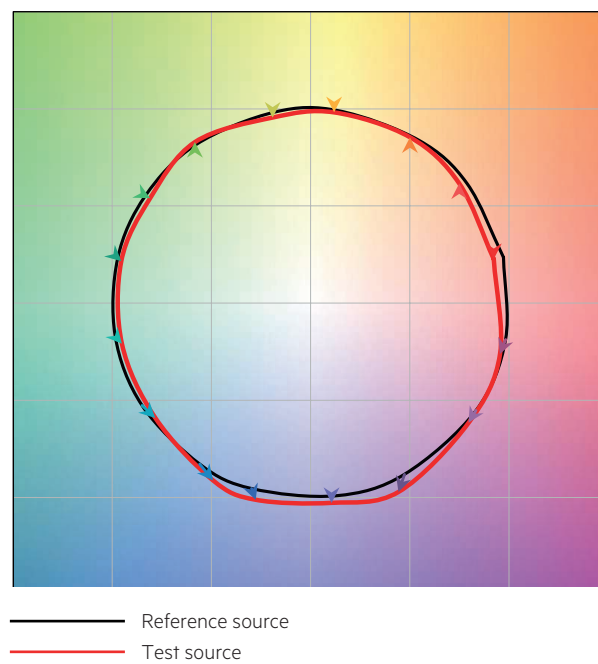
3,500 K

	x0	y0
Centre	0.4073	0.3917



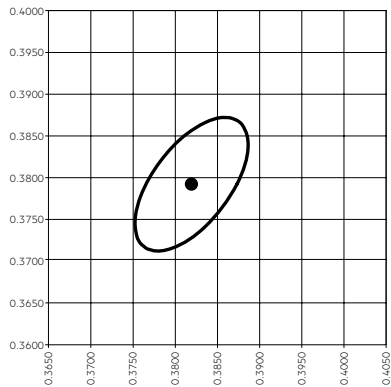
TM30		CRI	
Rf	Rg	Ra	R9
90	99	93	63

Colour vector graphic



4,000 K

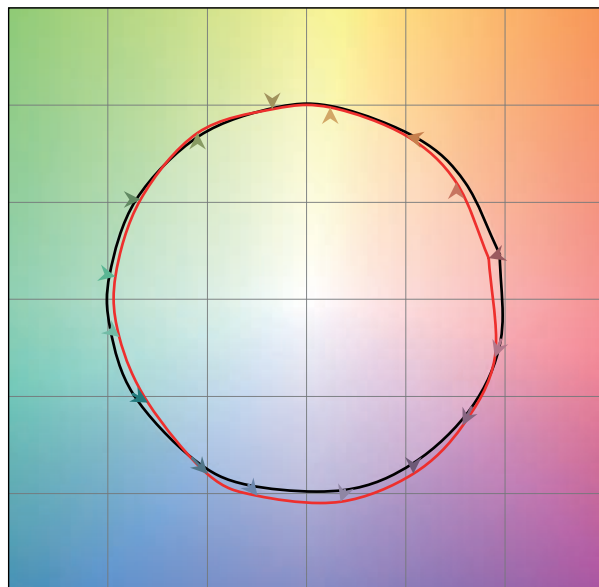
	x0	y0
Center	0.3818	0.3797



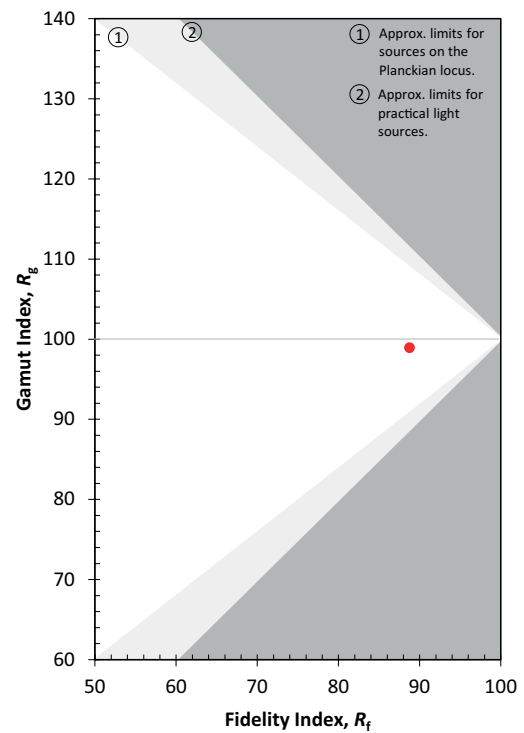
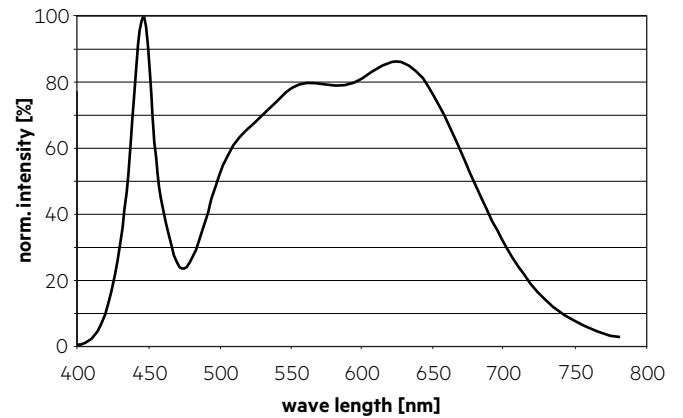
MacAdam Ellipse: 3SDCM

TM30		CRI	
Rf	Rg	Ra	R9
89	99	91	54

Colour vector graphic

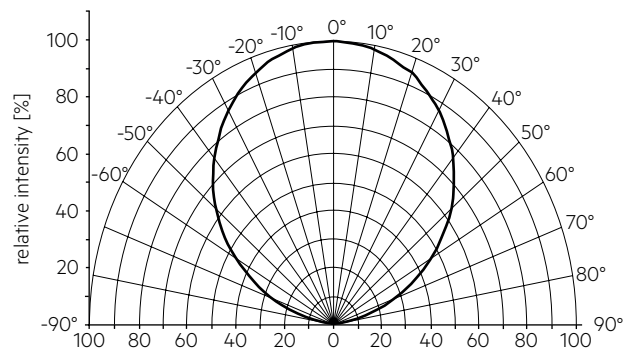


— Reference source
— Test source



6.2 Light distribution

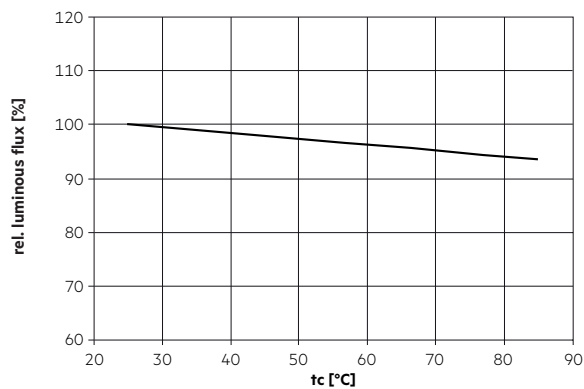
The optical design of the LLE product line ensures optimum homogeneity for the light distribution.



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.

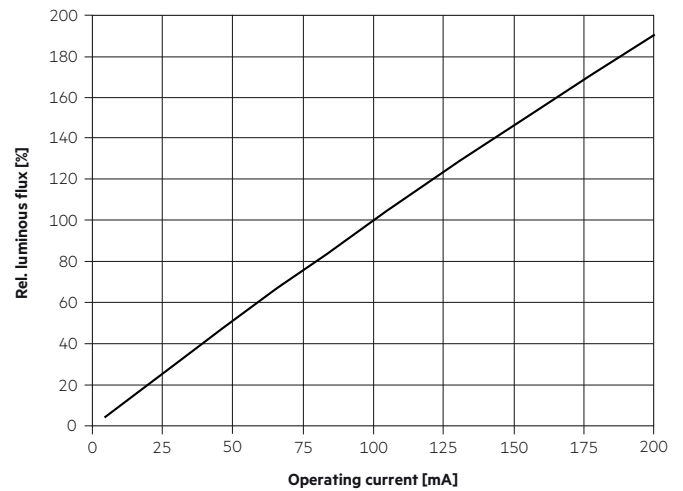
To ensure an ideal mixture of colours and a homogeneous light distribution a suitable optic (e. g. PMMA diffuser) and a sufficient spacing between module and optic (typ. 4 cm) should be used.

6.3 Relative luminous flux vs. tc temperature

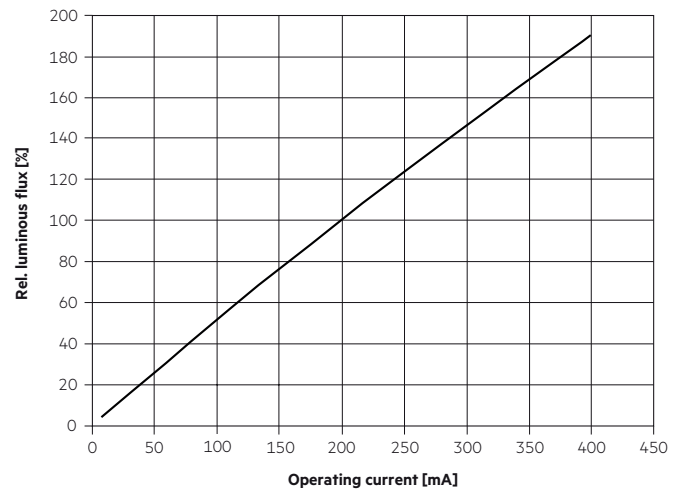


6.4 Relativer Lichtstrom vs. Betriebsstrom

LLE 24x280mm 650lm 8xx LV ADV6



LLE 24x560mm 1300lm 8xx LV ADV6



Die Diagramme basieren auf statistischen Werten.
Die realen Werte können abweichen.

7. Sonstiges

7.1 Zusätzliche Informationen

Weitere technische Informationen auf
www.tridonic.com → Technische Daten

Garantiebedingungen auf www.tridonic.com → Services

Lebensdauerangaben sind informativ und stellen keinen Garantieanspruch dar.