



Module LLE 24mm 1100lm Activating Light HV EXC1

Modules LLE excite

Product description

- Ideal for linear and panel lights
- 2 terminals for serial 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
- Long lifetime: 60,000 hours
- 5 years guarantee (conditions at www.tridonic.com)

Optical properties for biologically effective lighting

- Colour temperature 4,200 K
- Useful luminous flux 1,080 lm (24 x 280 mm) and 2,160 lm (24 x 560 mm) at I_{rated} and $t_p = 25^\circ\text{C}$
- Efficacy of the LED module 150 lm/W at I_{rated} and $t_p = 25^\circ\text{C}$
- Melanopic ratio MEER 0.91
- 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/>)



Standards, page 9

Colour temperatures and tolerances, page 13



LLE 24x280mm 1100lm AL HV EXC1



LLE 24x560mm 2200lm AL HV EXC1

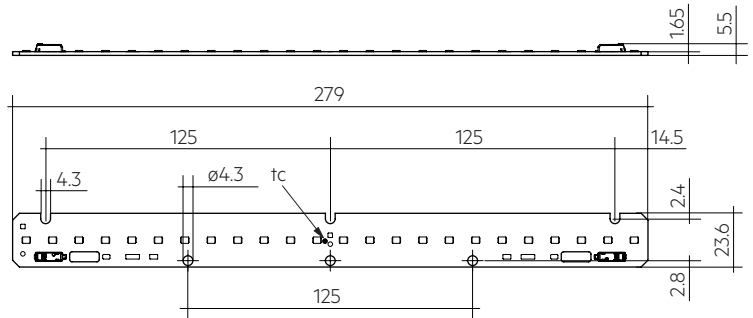


Module LLE 24mm 1100lm Activating Light HV EXC1

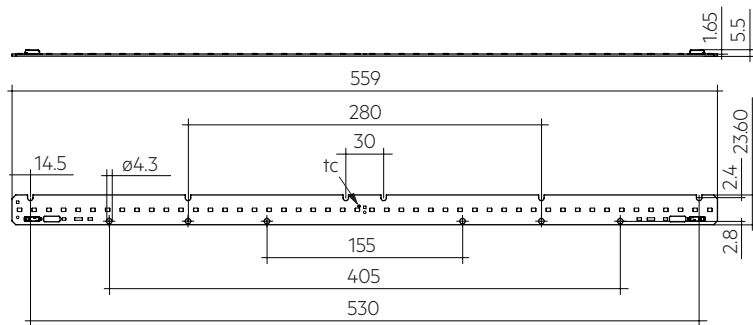
Modules LLE excite

Technical data

Beam characteristic	120°
Ambient temperature range	-40 ... +65 °C
tp rated	50 °C
tc	85 °C
Irated	325 mA
Imax	540 mA
Max. permissible LF current ripple	1.060 mA
Max. permissible peak current	1.800 mA / max. 10 ms
Max. working voltage for insulation®	440 V
Insulation test voltage	1.88 kV
CTI of the printed circuit board	≥ 600
ESD classification	severity level 2
Risk group (IEC 62471)	RG0
Classification acc. to IEC 62031	Built-in
Type of protection	IPO0
Lumen maintenance L70B50	60,000 h
Guarantee	5 years



LLE 24x280mm 1100lm AL HV EXC1



LLE 24x560mm 2200lm AL HV EXC1

Ordering data

Type	Article number	Colour temperature	Packaging carton	Weight per pc.
LLE 24x280mm 1100lm 842 AL HV EXC1	28004202	4,200 K	210 pc(s).	0.023 kg
LLE 24x560mm 2200lm 842 AL HV EXC1	28004203	4,200 K	180 pc(s).	0.046 kg

Specific technical data

Type®	Photo- metric code	Useful luminous flux at tp = 25 °C④	Expected luminous flux at tp rated®	Typ. forward current	Min. forward voltage at tp rated	Max. forward voltage at tp = 25 °C	Power con- sumption Pon at tp = 25 °C®	Efficacy of the module at tp = 25 °C	Expected efficacy of the module at tp rated	Colour rendering index CRI
Operating mode HE at 200 mA										
LLE 24x280mm 1100lm 842 AL HV EXC1	842/359	–	641 lm	200 mA	20.5 V	22.0 V	–	–	149 lm/W	> 80
LLE 24x560mm 2200lm 842 AL HV EXC1	842/359	–	1,282 lm	200 mA	411 V	439 V	–	–	149 lm/W	> 80
Operating mode NM at 325 mA										
LLE 24x280mm 1100lm 842 AL HV EXC1	842/359	1,080 lm	1,047 lm	325 mA	211 V	22.6 V	7.2 W	150 lm/W	147 lm/W	> 80
LLE 24x560mm 2200lm 842 AL HV EXC1	842/359	2,160 lm	2,095 lm	325 mA	42.2 V	45.1 V	14.4 W	150 lm/W	147 lm/W	> 80
Operating mode HO at 500 mA										
LLE 24x280mm 1100lm 842 AL HV EXC1	842/359	–	1,519 lm	500 mA	21.8 V	23.3 V	–	–	134 lm/W	> 80
LLE 24x560mm 2200lm 842 AL HV EXC1	842/359	–	3,038 lm	500 mA	43.6 V	46.5 V	–	–	134 lm/W	> 80

^① Integral measurement over the complete module.

② If mounted with M4 screws and plastic washers.

^③ HE ... high efficiency, NM ... nominal mode, HO ... high output.

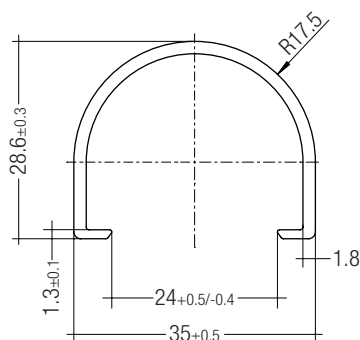
^④ Tolerance of useful light flux - 0 % / + 15 %. Measurement uncertainty ± 10 %.

^⑤ Tolerance of expected light flux - 0 % / + 15 %. Measurement uncertainty ± 10 %. Based on calculation.

[®] Tolerance of power consumption $P_{on} \pm 10\%$. Measurement uncertainty $\pm 5\%$.

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

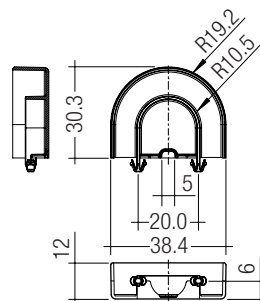
- ENDCAP for LLE 24
- PUSH-FIX: Fast snap on mounting (sheet thickness 0.5 – 1.0 mm), for drilling hole 4 mm
- SCREW-FIX: Screw mounting with EJOT Delta PT WN 5451 30x8 (not included), tightening torque 0.7 Nm
- Made of Polycarbonat



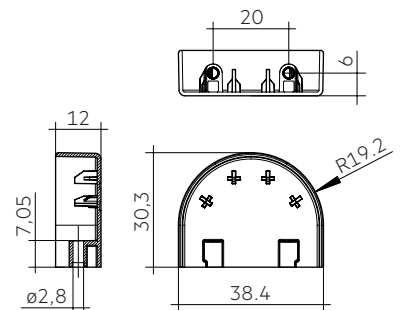
ACL ENDCAP LLE24 PUSH-FIX



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
- 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

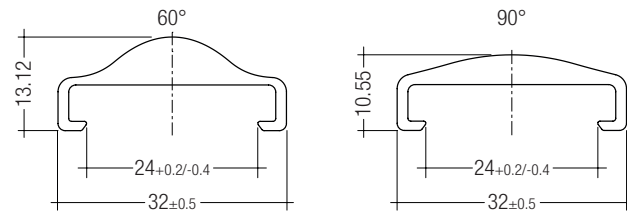


ACL LINEAR LENS 24mm DASY

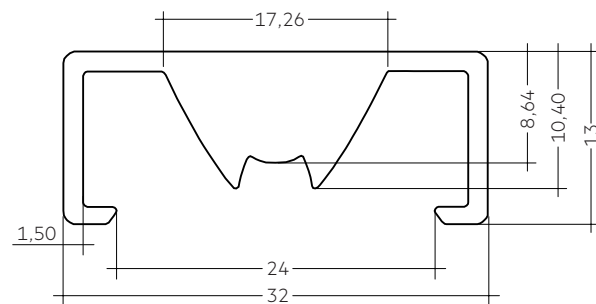


ACL Endcap LENS 24mm PSF

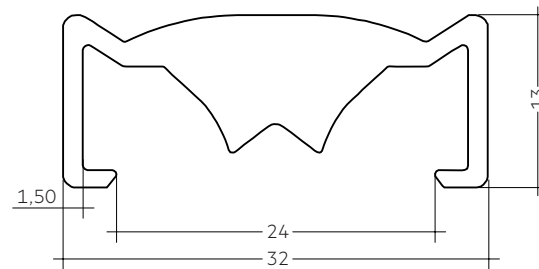
ACL LENS 24mm



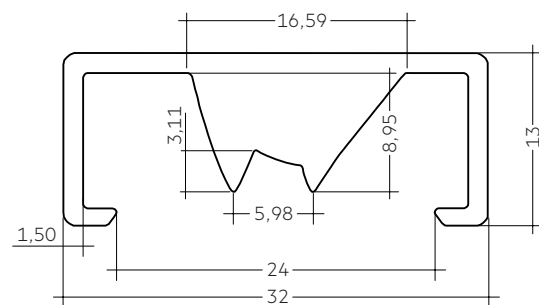
ACL LINEAR LENS 24mm 60° and 90°



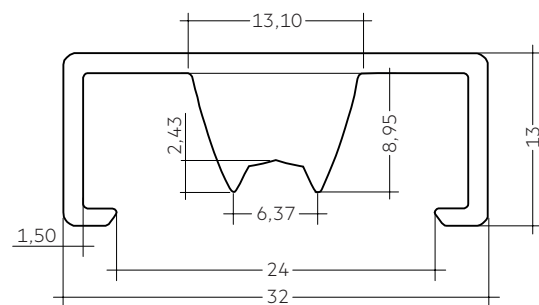
ACL LINEAR LENS 24mm INTENSE



ACL LINEAR LENS 24mm BATWING

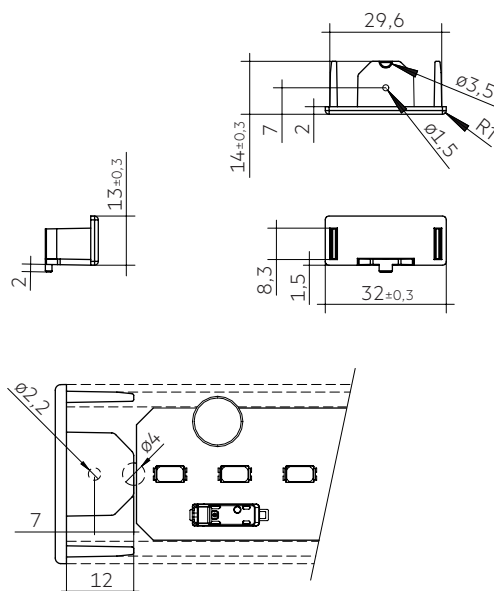


ACL LINEAR LENS 24mm ASY



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

ACCESSORIES

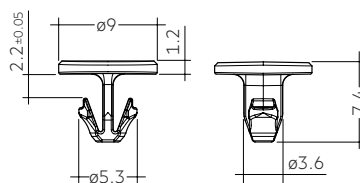
CLIP 4.3mm

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



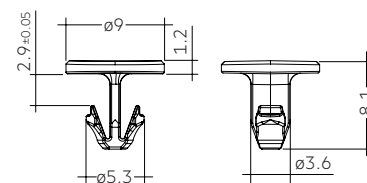
ACL CLIP 4.3mm PUSH-FIX



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

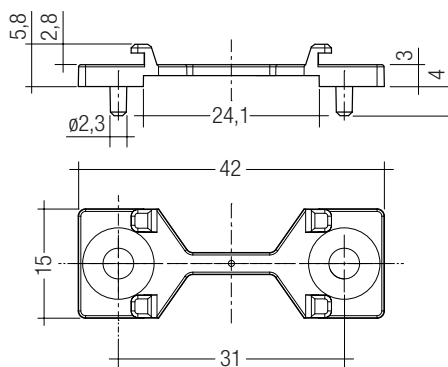
^① Minimum sales quantity 500 pcs.

ACCESSORIES

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

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 Energy classification

Type	Colour temperature	Forward current	Energy classification	Energy consumption
LLE 24x280mm 1100lm 842 AL HV EXC1	4,200 K	325 mA	D	8 kWh / 1,000 h
LLE 24x560mm 2200lm 842 AL HV EXC1	4,200 K	325 mA	D	15 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
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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 1100lm AL HV EXC1

ta	tp	Forward current	R _{th, hs-a}	Cooling area
25 °C	50 °C	200 mA	3.99 K/W	168 cm²
25 °C	85 °C	200 mA	3.99 K/W	168 cm²
25 °C	50 °C	325 mA	3.99 K/W	168 cm²
25 °C	85 °C	325 mA	3.99 K/W	168 cm²
25 °C	50 °C	500 mA	3.99 K/W	168 cm²
25 °C	85 °C	500 mA	3.99 K/W	168 cm²
35 °C	50 °C	200 mA	3.99 K/W	168 cm²
35 °C	85 °C	200 mA	3.99 K/W	168 cm²
35 °C	50 °C	325 mA	3.99 K/W	168 cm²
35 °C	85 °C	325 mA	3.99 K/W	168 cm²
35 °C	50 °C	500 mA	2.44 K/W	274 cm²
35 °C	85 °C	500 mA	3.99 K/W	168 cm²
40 °C	50 °C	200 mA	3.99 K/W	168 cm²
40 °C	85 °C	200 mA	3.99 K/W	168 cm²
40 °C	50 °C	325 mA	2.79 K/W	240 cm²
40 °C	85 °C	325 mA	3.99 K/W	168 cm²
40 °C	50 °C	500 mA	1.62 K/W	411 cm²
40 °C	85 °C	500 mA	3.99 K/W	168 cm²
45 °C	50 °C	200 mA	2.49 K/W	268 cm²
45 °C	85 °C	200 mA	3.99 K/W	168 cm²
45 °C	50 °C	325 mA	1.39 K/W	479 cm²
45 °C	85 °C	325 mA	3.99 K/W	168 cm²
45 °C	50 °C	500 mA	0.81 K/W	825 cm²
45 °C	85 °C	500 mA	3.99 K/W	168 cm²

LLE 24x560mm 2200lm AL HV EXC1

ta	tp	Forward current	R _{th, hs-a}	Cooling area
25 °C	50 °C	200 mA	2.00 K/W	336 cm²
25 °C	85 °C	200 mA	2.00 K/W	336 cm²
25 °C	50 °C	325 mA	2.00 K/W	336 cm²
25 °C	85 °C	325 mA	2.00 K/W	336 cm²
25 °C	50 °C	500 mA	2.00 K/W	336 cm²
25 °C	85 °C	500 mA	2.00 K/W	336 cm²
35 °C	50 °C	200 mA	2.00 K/W	336 cm²
35 °C	85 °C	200 mA	2.00 K/W	336 cm²
35 °C	50 °C	325 mA	2.00 K/W	336 cm²
35 °C	85 °C	325 mA	2.00 K/W	336 cm²
35 °C	50 °C	500 mA	1.23 K/W	544 cm²
35 °C	85 °C	500 mA	2.00 K/W	336 cm²
40 °C	50 °C	200 mA	2.00 K/W	336 cm²
40 °C	85 °C	200 mA	2.00 K/W	336 cm²
40 °C	50 °C	325 mA	1.41 K/W	473 cm²
40 °C	85 °C	325 mA	2.00 K/W	336 cm²
40 °C	50 °C	500 mA	0.82 K/W	817 cm²
40 °C	85 °C	500 mA	2.00 K/W	336 cm²
45 °C	50 °C	200 mA	1.26 K/W	528 cm²
45 °C	85 °C	200 mA	2.00 K/W	336 cm²
45 °C	50 °C	325 mA	0.70 K/W	949 cm²
45 °C	85 °C	325 mA	2.00 K/W	336 cm²
45 °C	50 °C	500 mA	0.41 K/W	1,639 cm²
45 °C	85 °C	500 mA	2.00 K/W	336 cm²

Notes

In any case a minimum cooling area of 168 cm² for LLE 24x280mm and 336 cm² for LLE 24x560mm is required!

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.

The LLE module is designed for serial wiring.

With parallel wiring tolerance-related differences in output are possible (thermal stress of the module) and can cause differences in brightness.

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

Max. 8 pieces 280 mm modules or 4 pieces 560 mm modules may be connected in parallel.

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



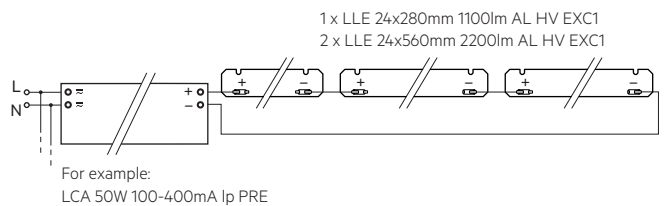
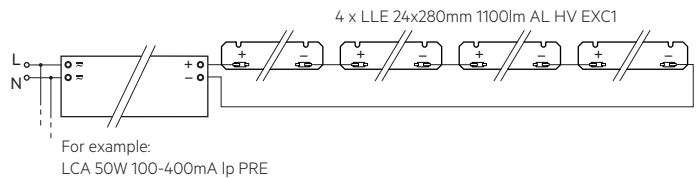
LLE are basic insulated up to 440 V (if mounted with M4 screws with head diameter 7 mm in combination with plastic washers) against ground and can be mounted directly on earthed metal parts of the luminaire. If the max. output voltage of the LED driver (also against earth) is above 440 V, an additional 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.

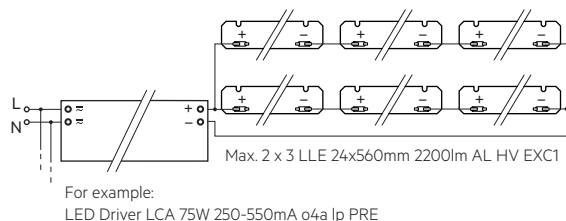
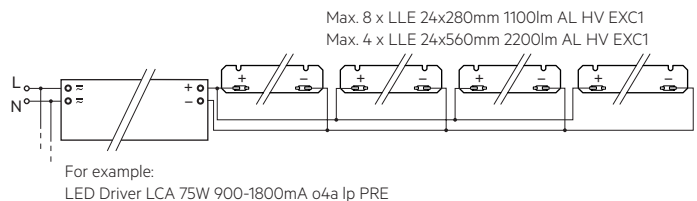
3.2 Wiring



Wiring examples for serial wiring

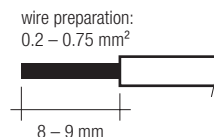


Wiring examples for parallel wiring



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.



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.

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 24mm AL HV EXC1

Forward current	tp tempera- ture						
		L90 / B10	L90 / B50	L80 / B10	L80 / B50	L70 / B10	L70 / B50
325 mA	40 °C	49k h	52k h	>60k h	>60k h	>60k h	>60k h
	45 °C	49k h	51k h	>60k h	>60k h	>60k h	>60k h
	50 °C	48k h	50k h	>60k h	>60k h	>60k h	>60k h
	55 °C	47k h	49k h	>60k h	>60k h	>60k h	>60k h
	60 °C	46k h	48k h	>60k h	>60k h	>60k h	>60k h
	65 °C	45k h	47k h	>60k h	>60k h	>60k h	>60k h
	70 °C	45k h	46k h	>60k h	>60k h	>60k h	>60k h
	75 °C	44k h	45k h	>60k h	>60k h	>60k h	>60k h
	80 °C	44k h	45k h	>60k h	>60k h	>60k h	>60k h
	85 °C	43k h	44k h	>60k h	>60k h	>60k h	>60k h
500 mA	40 °C	47k h	50k h	>60k h	>60k h	>60k h	>60k h
	45 °C	47k h	49k h	>60k h	>60k h	>60k h	>60k h
	50 °C	46k h	49k h	>60k h	>60k h	>60k h	>60k h
	55 °C	45k h	48k h	>60k h	>60k h	>60k h	>60k h
	60 °C	45k h	47k h	>60k h	>60k h	>60k h	>60k h
	65 °C	44k h	46k h	>60k h	>60k h	>60k h	>60k h
	70 °C	43k h	45k h	>60k h	>60k h	>60k h	>60k h
	75 °C	43k h	45k h	>60k h	>60k h	>60k h	>60k h
	80 °C	42k h	44k h	>60k h	>60k h	>60k h	>60k h
	85 °C	41k h	43k h	>60k h	>60k h	>60k h	>60k h

L0C10 >60k h. At tp rated, based on 10 switching cycles per day.

4.3 Switching capability

100,000 cycles

Tridonic test according to IEC 62717 CI 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.

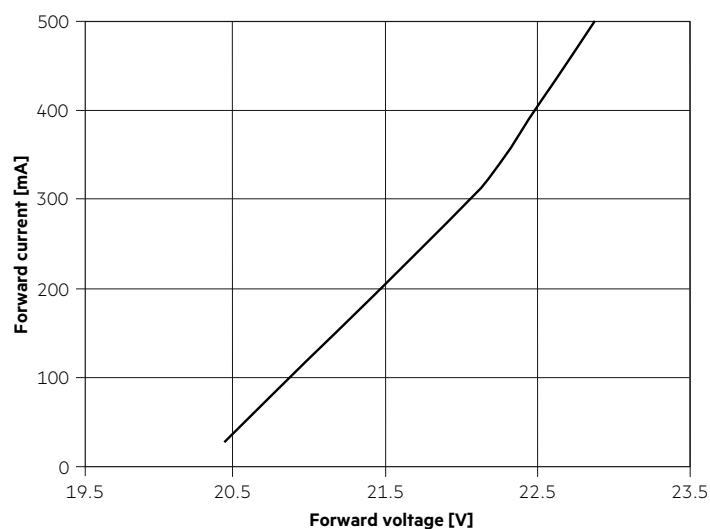
I_{max} ... Max. permissible continuous operating current incl. The tolerances of the LED driver.

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

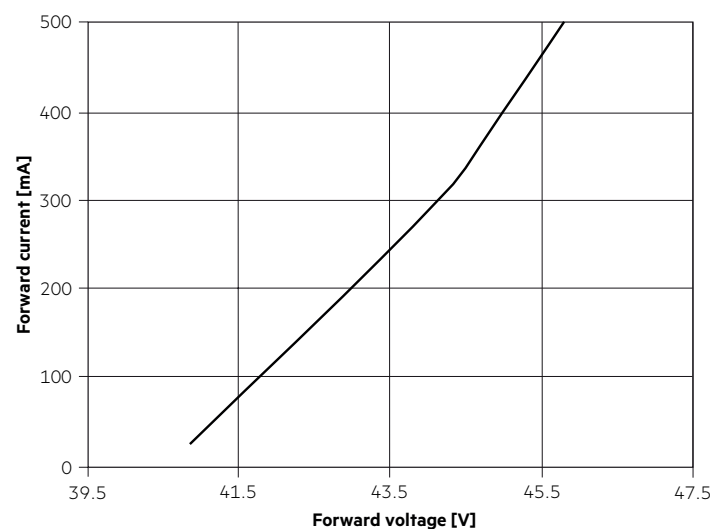
Max. permissible peak current ... The max. output peak current of the LED driver must not exceed this value.

5.2 Typ. forward voltage vs. forward current

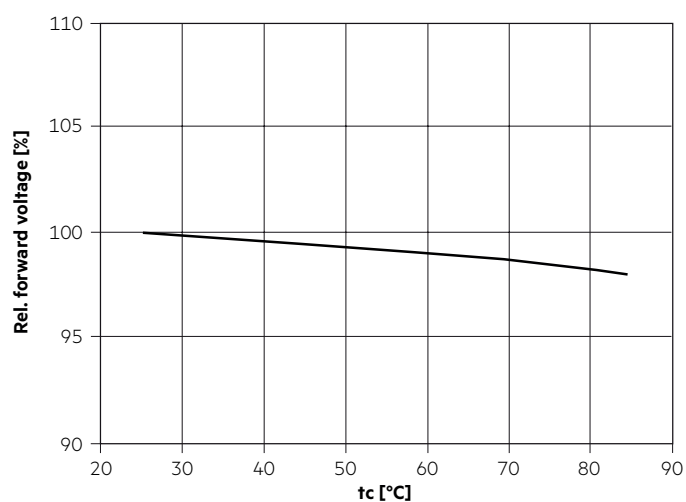
LLE 24x280mm 1100lm AL HV EXC1



LLE 24x560mm 2200lm AL HV EXC1



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

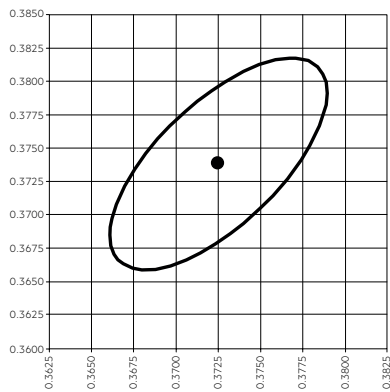
The specified colour coordinates are integral measured by current impulse of 195 mA and a duration of 100 ms.

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

The measurement tolerance of the colour coordinates are ± 0.01 .

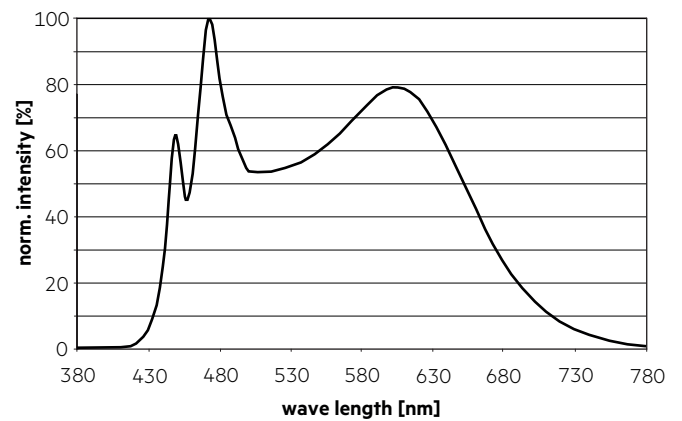
4,200 K

	x0	y0
Center	0.3725	0.3738

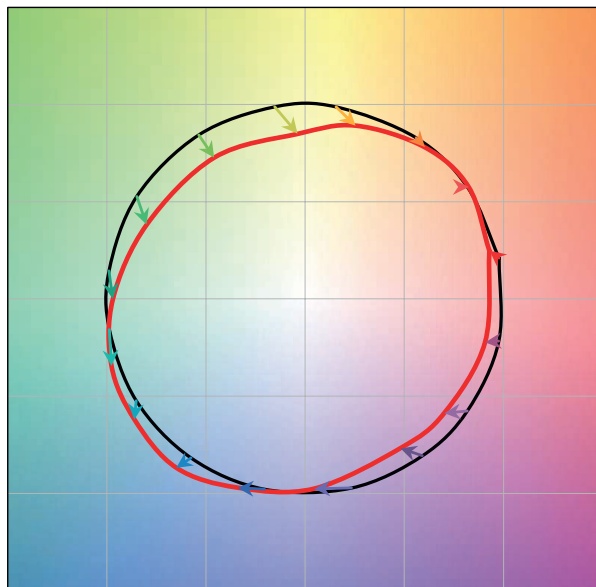


— MacAdam Ellipse: 3SDCM

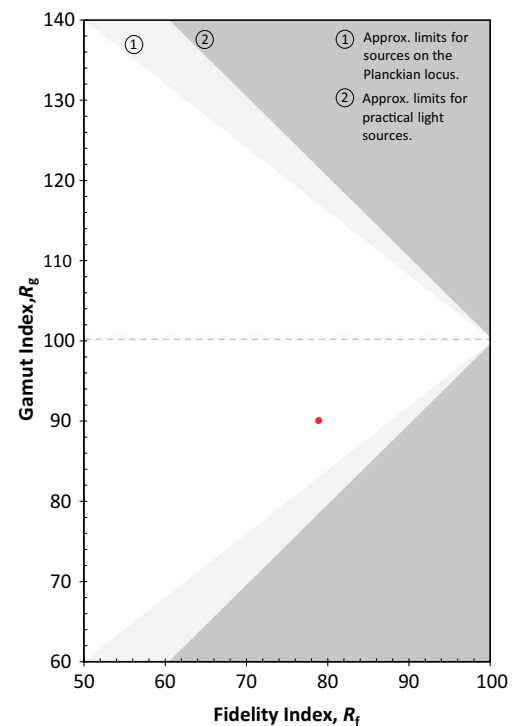
TM30		CRI		Mel. ratio	
Rf	Rg	Ra	R9	MDR	MEER
79	90	86	76	0.82	0.91



Colour vector graphic

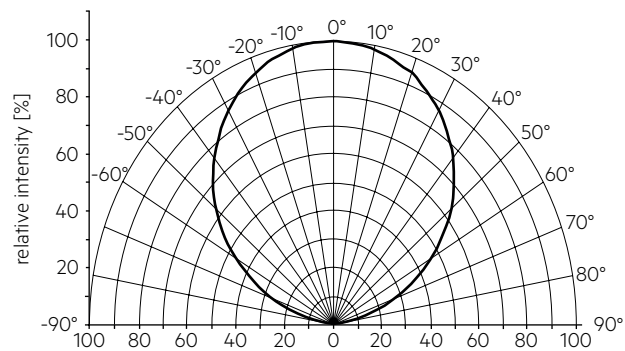


— Reference source
— Test source



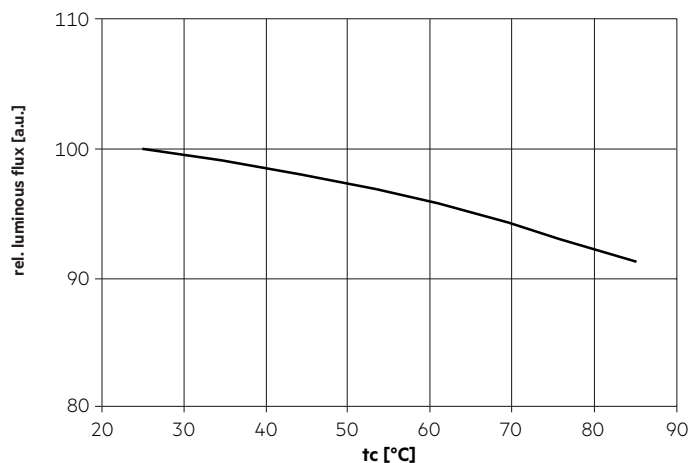
6.2 Light distribution

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

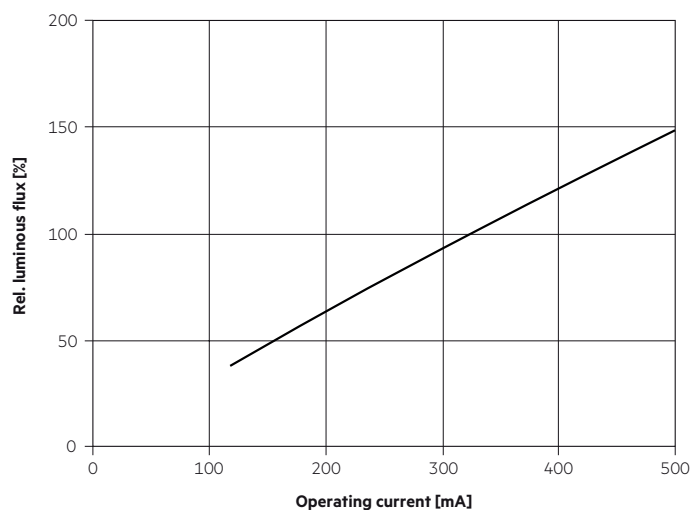


The colour temperature is measured integral over the complete module. The single LED light points can have deviations in the colour coordinates within MacAdam 5. To ensure an ideal mixture of colours and a homogeneous light distribution a suitable optic (e. g. PMMA diffuser) and a sufficient spacing between module and optic (typ. 4 cm) should be used.

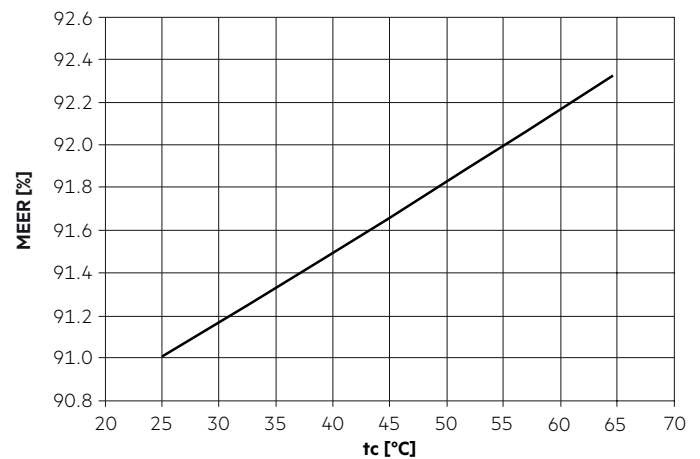
6.3 Relative luminous flux vs. tc temperature



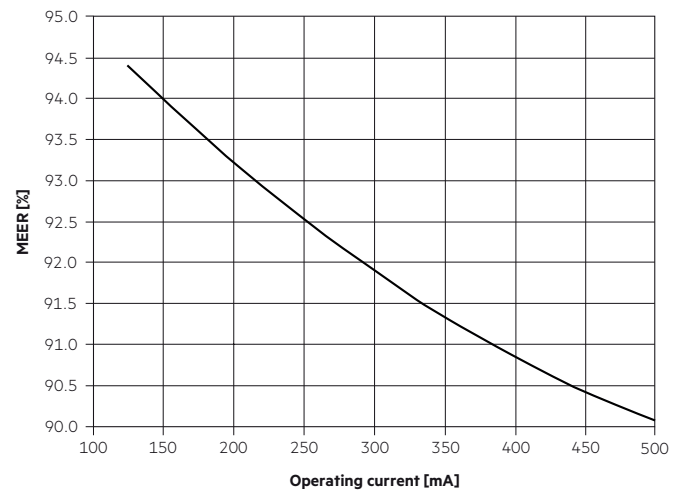
6.4 Relative luminous flux vs. operating current



6.5 Relative MEER vs. tc temperature



6.6 Relative MEER 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

Lifetime declarations are informative and represent no warranty claim.