Module LLE 24mm 650lm CRI90 HV ADV5

Modules LLE advanced

Product description

- Ideal for linear and panel lights
- 2 terminals for serial wiring
- Typ. luminous flux 325, 650 and 1,300 lm
- Efficacy of the module up to 169 lm/W
- LED system solution with outstanding system efficacy up to 153 lm/W, consisting of linear LED modules and dimmable LED Driver LCA 50W 100–400mA lp PRE
- High colour rendering index CRI > 90
- Small colour tolerance MacAdam 3①
- Small luminous flux tolerances
- Colour temperatures 2,700 K, 3,000 K and 4,000 K
- 4,000 K module COI approved acc. to AS/NZS1680.2.5:1997
- Module dimension 24 x 140 mm, 24 x 280 mm and 24 x 560 mm (ZHAGA compliant)
- Perfectly uniform light, even if several LED modules are used together in a line
- Push terminals for quick and simple wiring of LED module to LED module
- Broad portfolio from extruded lenses and covers available
- Simple installation (e.g. clips or screws)
- Long life-time: 72,000 hours
- 5-year guarantee

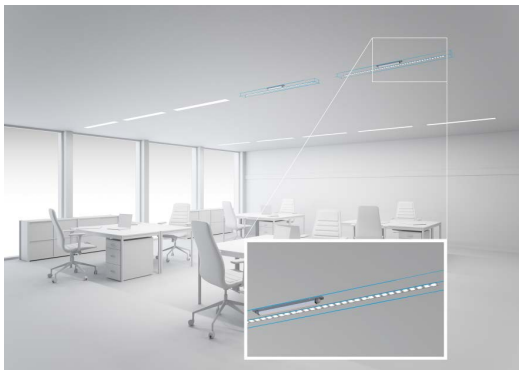
Standards, page 10

Colour temperatures and tolerances, page 15

LLE 24x140mm 325lm HV ADV5

LLE 24x280mm 650lm HV ADV5

LLE 24x560mm 1300lm HV ADV5



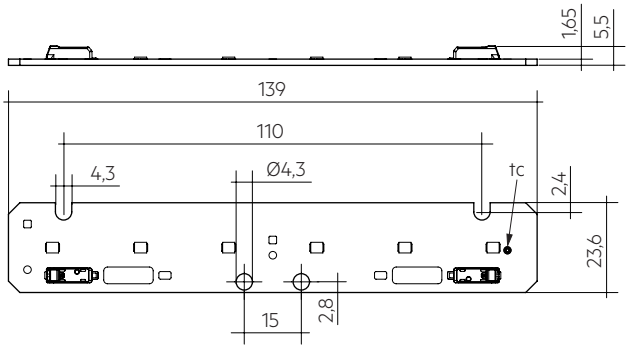
RoHS

Module LLE 24mm 650lm CRI90 HV ADV5

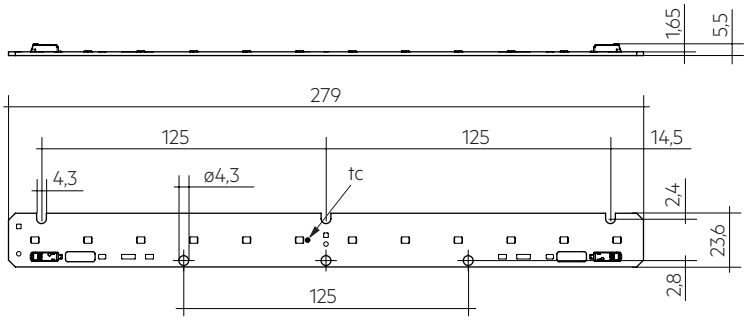
Modules LLE advanced

Technical data

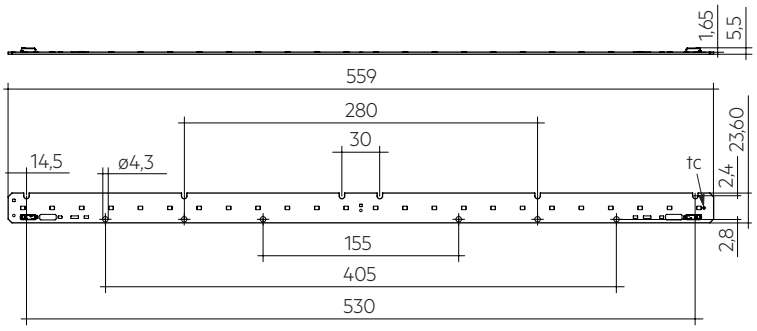
Beam characteristic	120°
Ambient temperature range	-40 … +65 °C
tp rated	50 °C
tc	85 °C
Irated	300 mA
Imax	540 mA
Max. permissible LF current ripple	595 mA
Max. permissible peak current	900 mA / max. 10 ms
Max. working voltage for insulation[2]	440 V
Insulation test voltage	1.88 kV
CTI of the printed circuit board	≥ 600
ESD classification	severity level 4
Risk group (IEC 62471:2008)[3]	RG0
Classification acc. to IEC 62031	Built-in
Type of protection	IP00
Life-time	up to 72,000 h



LLE 24x140mm 325lm HV ADV5



LLE 24x280mm 650lm HV ADV5



LLE 24x560mm 1300lm HV ADV5

Ordering data

Type	Article number	Article status	Colour temperature	Packaging carton	Weight per pc.
LLE 24x140mm 325lm 927 HV ADV5	**28003027**	On demand	2,700 K	420 pc(s).	0.011 kg
LLE 24x140mm 325lm 930 HV ADV5	**28003028**	Standard	3,000 K	420 pc(s).	0.011 kg
LLE 24x140mm 325lm 940 HV ADV5	**28003029**	Standard	4,000 K	420 pc(s).	0.011 kg
LLE 24x280mm 650lm 927 HV ADV5	**28003030**	On demand	2,700 K	210 pc(s).	0.021 kg
LLE 24x280mm 650lm 930 HV ADV5	**28003031**	Standard	3,000 K	210 pc(s).	0.021 kg
LLE 24x280mm 650lm 940 HV ADV5	**28003032**	Standard	4,000 K	210 pc(s).	0.021 kg
LLE 24x560mm 1300lm 927 HV ADV5	**28003033**	On demand	2,700 K	180 pc(s).	0.041 kg
LLE 24x560mm 1300lm 930 HV ADV5	**28003034**	Standard	3,000 K	180 pc(s).	0.041 kg
LLE 24x560mm 1300lm 940 HV ADV5	**28003035**	Standard	4,000 K	180 pc(s).	0.041 kg

Specific technical data

Type[4]	Photo-metric code	Typ. luminous flux at tp = 25 °C[5]	Typ. luminous flux at tp = 50 °C[5]	Typ. forward current	Min. forward voltage at tp = 50 °C	Max. forward voltage at tp = 25 °C	Typ. power consumption at tp = 50 °C[5]	Efficacy of the module at tp = 25 °C	Efficacy of the module at tp = 50 °C	Efficacy of the system at tp = 50 °C	Colour rendering index CRI
Operating mode HE at 200 mA											
LLE 24x140mm 325lm 927 HV ADV5	927/359	170 lm	165 lm	200 mA	5.2 V	5.6 V	1.1 W	156 lm/W	153 lm/W	141 lm/W	> 90
LLE 24x140mm 325lm 930 HV ADV5	930/359	175 lm	170 lm	200 mA	5.2 V	5.6 V	1.1 W	162 lm/W	159 lm/W	146 lm/W	> 90
LLE 24x140mm 325lm 940 HV ADV5	940/359	185 lm	180 lm	200 mA	5.2 V	5.6 V	1.1 W	169 lm/W	166 lm/W	153 lm/W	> 90
LLE 24x280mm 650lm 927 HV ADV5	927/359	340 lm	330 lm	200 mA	10.3 V	11.2 V	2.2 W	156 lm/W	153 lm/W	141 lm/W	> 90
LLE 24x280mm 650lm 930 HV ADV5	930/359	350 lm	345 lm	200 mA	10.3 V	11.2 V	2.2 W	162 lm/W	159 lm/W	146 lm/W	> 90
LLE 24x280mm 650lm 940 HV ADV5	940/359	370 lm	360 lm	200 mA	10.3 V	11.2 V	2.2 W	169 lm/W	166 lm/W	153 lm/W	> 90
LLE 24x560mm 1300lm 927 HV ADV5	927/359	680 lm	660 lm	200 mA	20.7 V	22.4 V	4.3 W	156 lm/W	153 lm/W	141 lm/W	> 90
LLE 24x560mm 1300lm 930 HV ADV5	930/359	705 lm	685 lm	200 mA	20.7 V	22.4 V	4.3 W	162 lm/W	159 lm/W	146 lm/W	> 90
LLE 24x560mm 1300lm 940 HV ADV5	940/359	735 lm	715 lm	200 mA	20.7 V	22.4 V	4.3 W	169 lm/W	166 lm/W	153 lm/W	> 90
Operating mode NM at 300 mA											
LLE 24x140mm 325lm 927 HV ADV5	927/359	245 lm	240 lm	300 mA	5.3 V	5.7 V	1.7 W	147 lm/W	144 lm/W	132 lm/W	> 90
LLE 24x140mm 325lm 930 HV ADV5	930/359	255 lm	250 lm	300 mA	5.3 V	5.7 V	1.7 W	152 lm/W	149 lm/W	137 lm/W	> 90
LLE 24x140mm 325lm 940 HV ADV5	940/359	265 lm	260 lm	300 mA	5.3 V	5.7 V	1.7 W	159 lm/W	156 lm/W	144 lm/W	> 90
LLE 24x280mm 650lm 927 HV ADV5	927/359	490 lm	475 lm	300 mA	10.5 V	11.4 V	3.3 W	147 lm/W	144 lm/W	132 lm/W	> 90
LLE 24x280mm 650lm 930 HV ADV5	930/359	510 lm	495 lm	300 mA	10.5 V	11.4 V	3.3 W	152 lm/W	149 lm/W	137 lm/W	> 90
LLE 24x280mm 650lm 940 HV ADV5	940/359	530 lm	515 lm	300 mA	10.5 V	11.4 V	3.3 W	159 lm/W	156 lm/W	144 lm/W	> 90
LLE 24x560mm 1300lm 927 HV ADV5	927/359	980 lm	955 lm	300 mA	21.1 V	22.8 V	6.6 W	147 lm/W	144 lm/W	132 lm/W	> 90
LLE 24x560mm 1300lm 930 HV ADV5	930/359	1,010 lm	990 lm	300 mA	21.1 V	22.8 V	6.6 W	152 lm/W	149 lm/W	137 lm/W	> 90
LLE 24x560mm 1300lm 940 HV ADV5	940/359	1,060 lm	1,030 lm	300 mA	21.1 V	22.8 V	6.6 W	159 lm/W	156 lm/W	144 lm/W	> 90
Operating mode HO at 500 mA											
LLE 24x140mm 325lm 927 HV ADV5	927/359	395 lm	385 lm	500 mA	5.5 V	5.9 V	2.9 W	138 lm/W	135 lm/W	124 lm/W	> 90
LLE 24x140mm 325lm 930 HV ADV5	930/359	410 lm	400 lm	500 mA	5.5 V	5.9 V	2.9 W	143 lm/W	140 lm/W	129 lm/W	> 90
LLE 24x140mm 325lm 940 HV ADV5	940/359	430 lm	415 lm	500 mA	5.5 V	5.9 V	2.9 W	149 lm/W	146 lm/W	134 lm/W	> 90
LLE 24x280mm 650lm 927 HV ADV5	927/359	790 lm	770 lm	500 mA	10.9 V	11.8 V	5.7 W	138 lm/W	135 lm/W	124 lm/W	> 90
LLE 24x280mm 650lm 930 HV ADV5	930/359	820 lm	800 lm	500 mA	10.9 V	11.8 V	5.7 W	143 lm/W	140 lm/W	129 lm/W	> 90
LLE 24x280mm 650lm 940 HV ADV5	940/359	855 lm	830 lm	500 mA	10.9 V	11.8 V	5.7 W	149 lm/W	146 lm/W	134 lm/W	> 90
LLE 24x560mm 1300lm 927 HV ADV5	927/359	1,580 lm	1,540 lm	500 mA	21.8 V	23.5 V	11.4 W	138 lm/W	135 lm/W	124 lm/W	> 90
LLE 24x560mm 1300lm 930 HV ADV5	930/359	1,640 lm	1,590 lm	500 mA	21.8 V	23.5 V	11.4 W	143 lm/W	140 lm/W	129 lm/W	> 90
LLE 24x560mm 1300lm 940 HV ADV5	940/359	1,710 lm	1,660 lm	500 mA	21.8 V	23.5 V	11.4 W	149 lm/W	146 lm/W	134 lm/W	> 90

[1] Integral measurement over the complete module.

[2] If mounted with M4 screws and plastic washers.

[3] Measured at operating mode HO.

[4] HE ... high efficiency, NM ... nominal mode, HO ... high output.

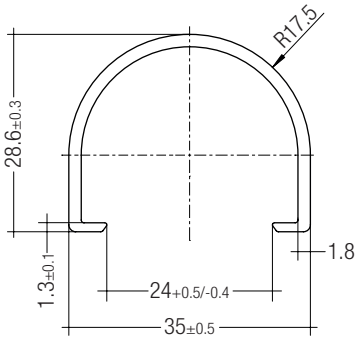
[5] Tolerance range for optical and electrical data: ±10 %.

ACCES-SORIES

LINEAR COVER SY

Product description

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



Ordering data

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

ACCES-SORIES

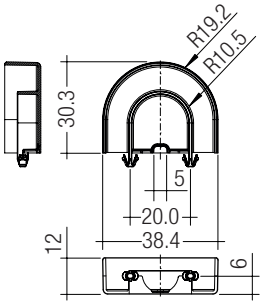
ACL ENDCAP LLE24 PUSH-FIX / SCREW-FIX

Product description

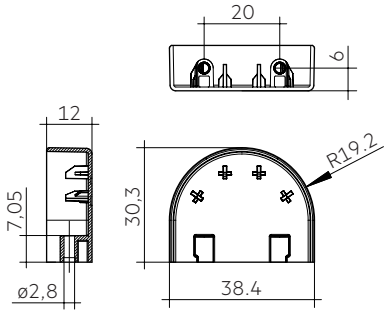
- ENDCAP for LLE 24
- PUSH-FIX: Fast snap on mounting
  (sheet thickness 0.5 – 1.0 mm), for drilling hole 4 mm
- SCREW-FIX: Screw mounting with EJOT Delta PT WN 5451 30x8,
  tightening torque 0.7 Nm
- Made of Polycarbonat

ACL ENDCAP LLE24 PUSH-FIX

ACL ENDCAP LLE24 SCREW-FIX



ACL ENDCAP LLE24 PUSH-FIX



ACL ENDCAP LLE24 SCREW-FIX

Ordering data

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

ACCES-SORIES

ACL LENS 24mm

Product description LINEAR LENS

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

Product description Endcap

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

ACL LINEAR LENS 24mm 60°

ACL LINEAR LENS 24mm 90°

ACL LINEAR LENS 24mm INTENSE

ACL LINEAR LENS 24mm BATWING

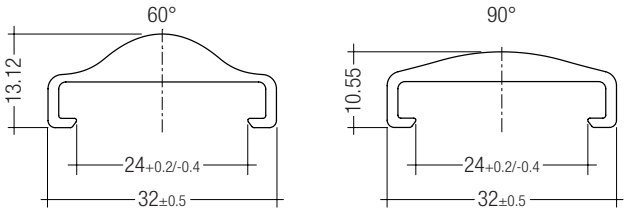
ACL LINEAR LENS 24mm ASY

ACL LINEAR LENS 24mm DASY

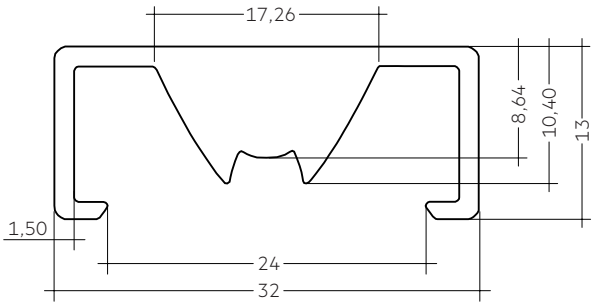
ACL Endcap LENS 24mm PSF

ACCES-SORIES

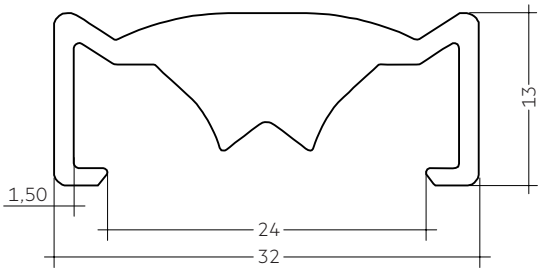
ACL LENS 24mm



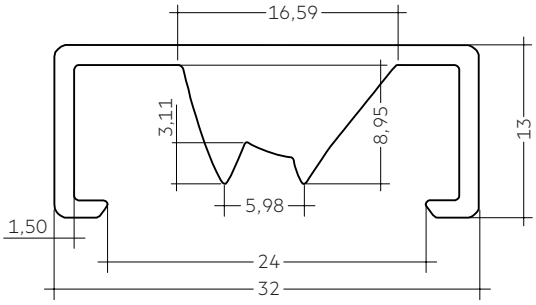
ACL LINEAR LENS 24mm 60° and 90°



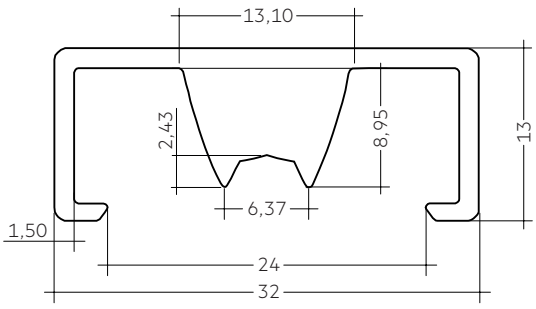
ACL LINEAR LENS 24mm INTENSE



ACL LINEAR LENS 24mm BATWING



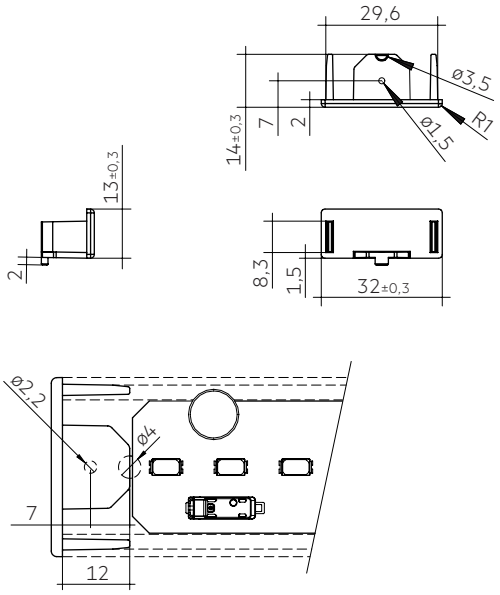
ACL LINEAR LENS 24mm ASY



ACL LINEAR LENS 24mm DASY

ACCES-SORIES

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

ACCES-SORIES

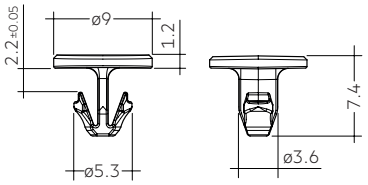
CLIP 4.3mm

Product description

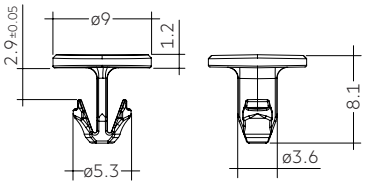
- Clip for fixation of LED modules with 4.3 mm holes
- Fast snap on mounting (sheet thickness 0.5 – 1.0 mm for PUSH-FIX and 1 – 2 mm for PUSH-FIX Long)
- For drilling hole 4 mm
- Clip made of Polycarbonat

ACL CLIP 4.3mm PUSH-FIX

ACL CLIP 4.3mm PUSH-FIX Long



ACL CLIP 4.3mm PUSH-FIX



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

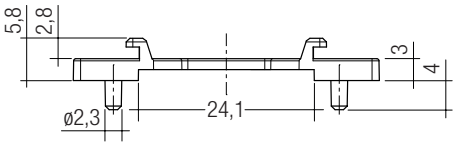
[1] Minimum sales quantity 500 pcs.

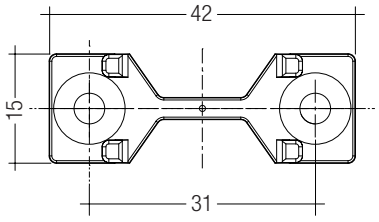
ACCES-SORIES

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[2]
- 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.

[2] 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

1.1 Photometric code

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

1st digit		2nd + 3rd digit	4th digit	5th digit	6th digit	
Code	CRI	Colour temperature in Kelvin x 100	MacAdam initial	MacAdam after 25% of the life-time (max.6000h)	Luminous flux after 25% of the life-time (max.6000h)	
					Code	Luminous flux
7	70 – 79				7	≥ 70 %
8	80 – 89				8	≥ 80 %
9	≥90				9	≥ 90 %

1.2 Energy classification

Typ	Energieklassifizierung
LLE 24mm HV ADV5	A++

2. Thermal details

2.1 tc point, ambient temperature and life-time

The temperature at tp reference point is crucial for the light output and life-time of a LED product.

For LLE a tp temperature of 50 °C has to be complied in order to achieve an optimum between heat sink requirements, light output and life-time.

Compliance with the maximum permissible reference temperature at the tc point must be checked under operating conditions in a thermally stable state. The maximum value must be determined under worst-case conditions for the relevant application.

The tc and tp temperature of LED modules from Tridonic are measured at the same reference point.

2.2 Storage and humidity

Storage temperature	-30 … +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 325lm ADV5

ta	tp	Forward current	$R_{th, hs-a}$	Cooling area
25 °C	50 °C	300 mA	self cooling	
25 °C	50 °C	500 mA	17.2 K/W	39 cm²
35 °C	50 °C	300 mA	19.5 K/W	35 cm²
35 °C	50 °C	500 mA	10.3 K/W	65 cm²
45 °C	50 °C	300 mA	6.3 K/W	105 cm²
45 °C	50 °C	500 mA	3.4 K/W	194 cm²

LLE 24x280mm 650lm ADV5

ta	tp	Forward current	$R_{th, hs-a}$	Cooling area
25 °C	50 °C	300 mA	self cooling	
25 °C	50 °C	500 mA	8.61 K/W	77 cm²
35 °C	50 °C	300 mA	9.50 K/W	70 cm²
35 °C	50 °C	500 mA	5.17 K/W	129 cm²
45 °C	50 °C	300 mA	3.16 K/W	211 cm²
45 °C	50 °C	500 mA	1.72 K/W	388 cm²

LLE 24x560mm 1300lm ADV5

ta	tp	Forward current	$R_{th, hs-a}$	Cooling area
25 °C	50 °C	300 mA	self cooling	
25 °C	50 °C	500 mA	4.31 K/W	155 cm²
35 °C	50 °C	300 mA	4.75 K/W	140 cm²
35 °C	50 °C	500 mA	2.58 K/W	258 cm²
45 °C	50 °C	300 mA	1.58 K/W	422 cm²
45 °C	50 °C	500 mA	0.86 K/W	776 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.

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.

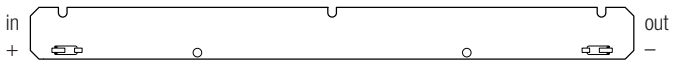
If a wire breaks or a complete module fails then the current passing through the other module increases. This may reduce its life considerably.

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

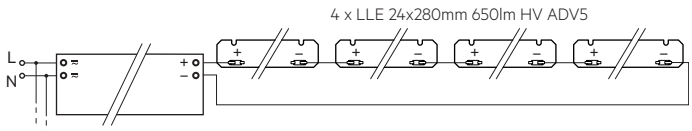
LLE can be operated either from SELV LED Drivers or from LED Drivers with LV output voltage.

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.

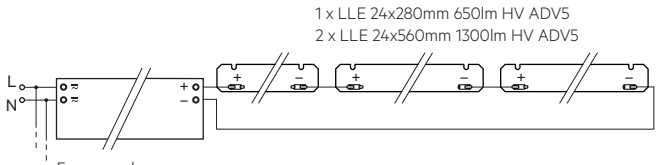
3.2 Wiring



Wiring examples for serial wiring

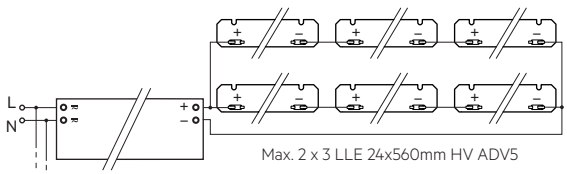


For example:
LCA 50W 100-400mA lp PRE



For example:
LCA 50W 100-400mA lp PRE

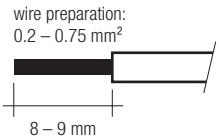
Wiring examples for parallel wiring



For example:
LED Driver LCA 75W 350-1050mA o4a lp PRE

3.3 Wiring type and cross section

The wiring can be in stranded wires or solid with a cross section of 0.2 to 0.75 mm².
For the push-wire connection you have to strip the insulation (8–9 mm).



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

3.4 Mounting instruction

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

Max. torque for fixing: 0.5 Nm.

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

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

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

3.5 EOS/ESD safety guidelines

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

4. Life-time

4.1 Life-time, lumen maintenance and failure rate

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

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

4.2 Lumen maintenance for LLE 24mm HV ADV5

Forward current	tp temperature	L90 / B10	L90 / B50	L80 / B10	L80 / B50	L70 / B10	L70 / B50
150 mA	40 °C	41k h	51k h	>72k h	>72k h	>72k h	>72k h
	50 °C	38k h	48k h	>72k h	>72k h	>72k h	>72k h
	60 °C	35k h	45k h	71k h	>72k h	>72k h	>72k h
	70 °C	32k h	42k h	65k h	>72k h	>72k h	>72k h
	80 °C	30k h	39k h	60k h	>72k h	>72k h	>72k h
200 mA	40 °C	41k h	51k h	>72k h	>72k h	>72k h	>72k h
	50 °C	37k h	47k h	>72k h	>72k h	>72k h	>72k h
	60 °C	34k h	44k h	70k h	>72k h	>72k h	>72k h
	70 °C	32k h	41k h	64k h	>72k h	>72k h	>72k h
	80 °C	29k h	38k h	59k h	>72k h	>72k h	>72k h
300 mA	40 °C	40k h	50k h	>72k h	>72k h	>72k h	>72k h
	50 °C	37k h	47k h	>72k h	>72k h	>72k h	>72k h
	60 °C	34k h	44k h	69k h	>72k h	>72k h	>72k h
	70 °C	31k h	41k h	63k h	>72k h	>72k h	>72k h
	80 °C	29k h	38k h	58k h	>72k h	>72k h	>72k h
375 mA	40 °C	39k h	49k h	>72k h	>72k h	>72k h	>72k h
	50 °C	36k h	46k h	>72k h	>72k h	>72k h	>72k h
	60 °C	33k h	43k h	68k h	>72k h	>72k h	>72k h
	70 °C	31k h	40k h	62k h	>72k h	>72k h	>72k h
	80 °C	28k h	37k h	57k h	>72k h	>72k h	>72k h
450 mA	40 °C	39k h	49k h	>72k h	>72k h	>72k h	>72k h
	50 °C	36k h	46k h	>72k h	>72k h	>72k h	>72k h
	60 °C	33k h	42k h	67k h	>72k h	>72k h	>72k h
	70 °C	30k h	40k h	61k h	>72k h	>72k h	>72k h
	80 °C	28k h	37k h	56k h	>72k h	>72k h	>72k h
500 mA	40 °C	38k h	48k h	>72k h	>72k h	>72k h	>72k h
	50 °C	35k h	45k h	71k h	>72k h	>72k h	>72k h
	60 °C	32k h	42k h	65k h	>72k h	>72k h	>72k h
	70 °C	30k h	39k h	60k h	>72k h	>72k h	>72k h
	80 °C	27k h	36k h	55k h	>72k h	>72k h	>72k h

L0C10 >72 kh
At tp rated and Irated, 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 Imax

5. Electrical values

5.1 Declaration of electrical parameters

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

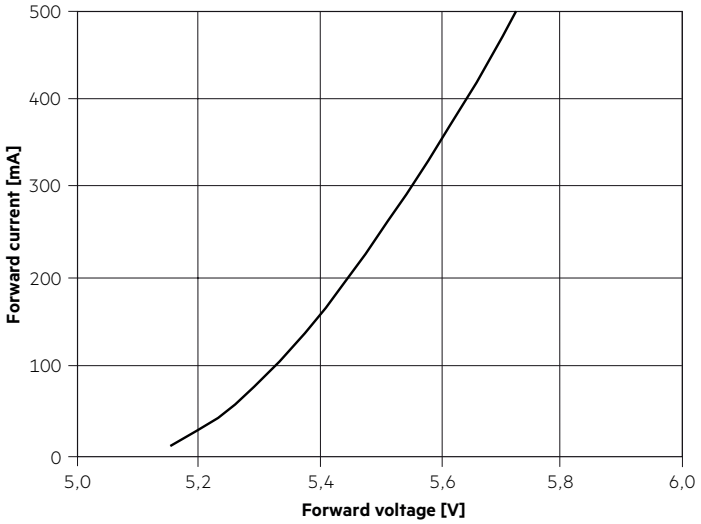
Imax ... Max. permissible continuous operating current incl. The tolerances of the LED driver.

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

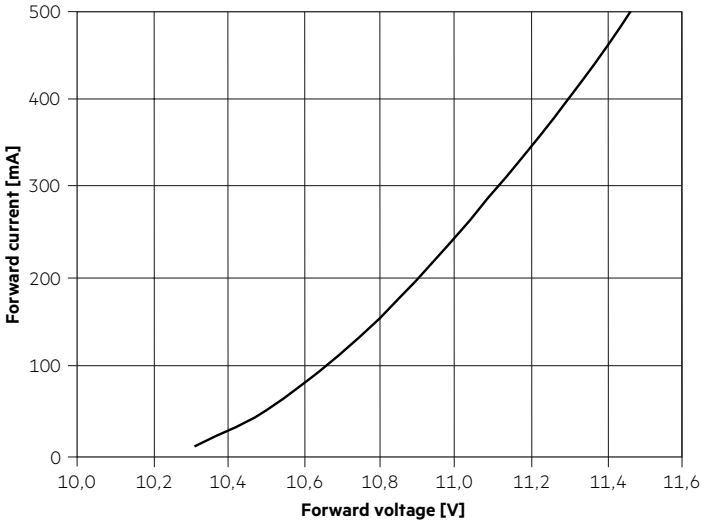
Max. permissible peak current ... The max. output peak current of the LED driver must not exceed this value.

5.2 Typ. forward voltage vs. forward current

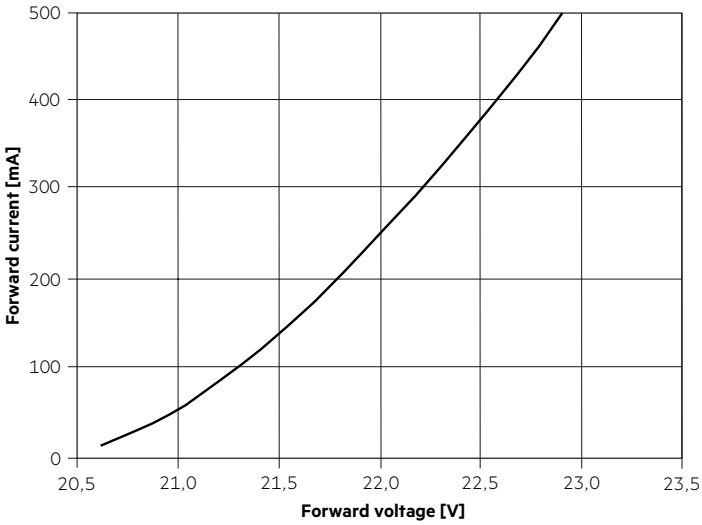
LLE 24x140mm 325lm 9xx HV ADV5



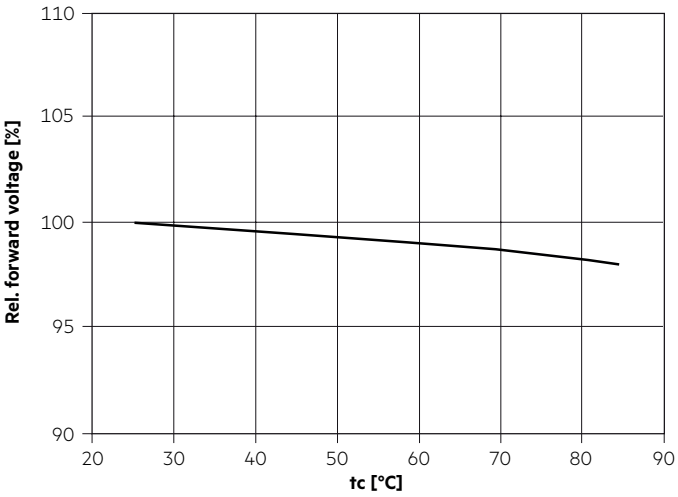
LLE 24x280mm 650lm 9xx HV ADV5



LLE 24x560mm 1300lm 9xx HV ADV5



5.3 Forward voltage vs. tc temperature



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

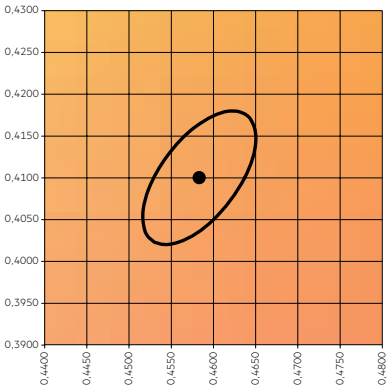
6. Photometric characteristics

6.1 Coordinates and tolerances according to CIE 1931

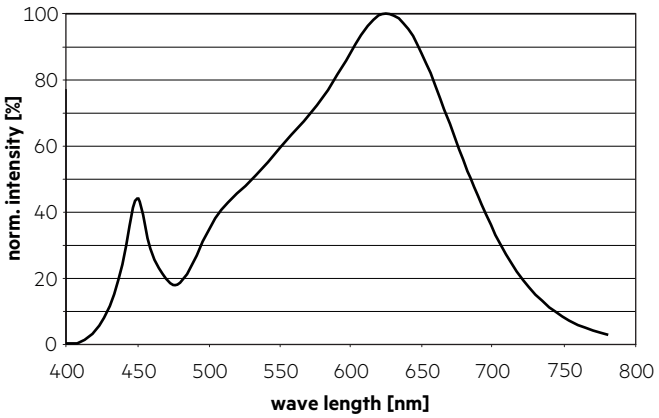
The specified colour coordinates are integral measured by current impulse of 195 mA and a duration of 100 ms.
The ambient temperature of the measurement is ta = 25 °C.
The measurement tolerance of the colour coordinates are ± 0.01.

2,700 K

	x0	y0
Centre	0.4578	0.4101

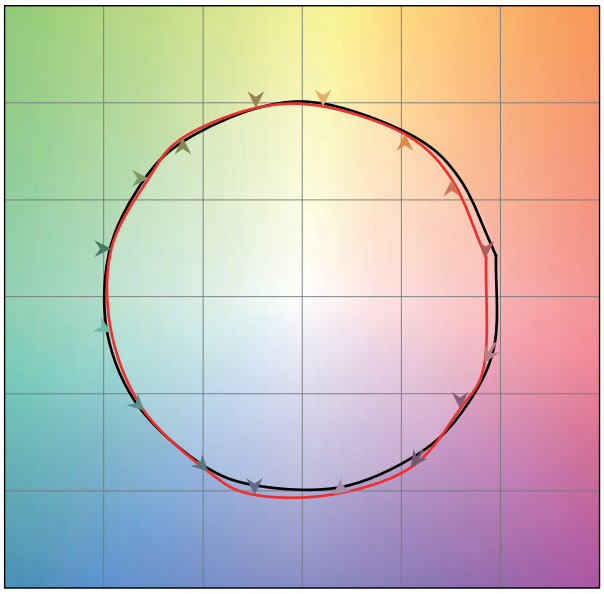


MacAdam Ellipse: 3SDCM

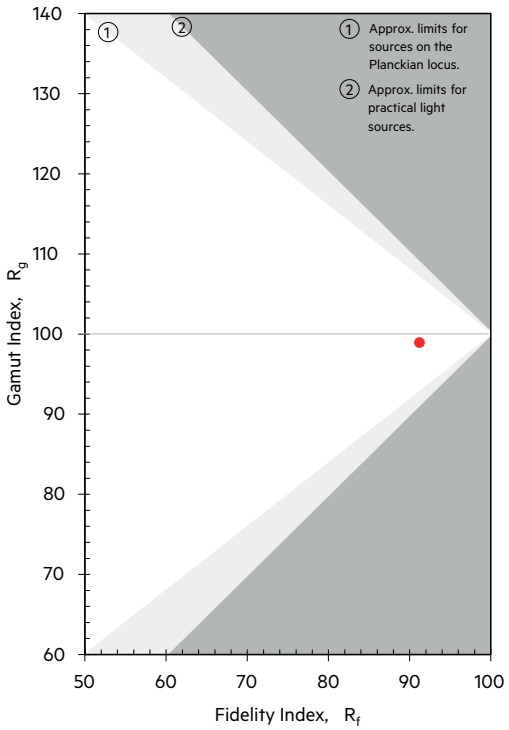


TM30		CRI	
Rf	Rg	Ra	R9
91	99	93	57

Colour vector graphic

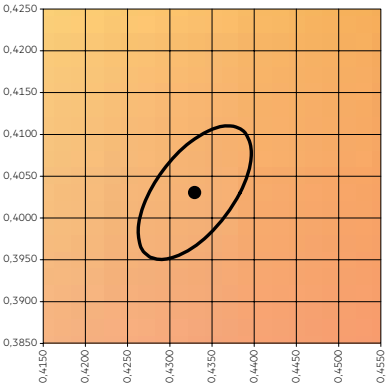


Reference source
Test source

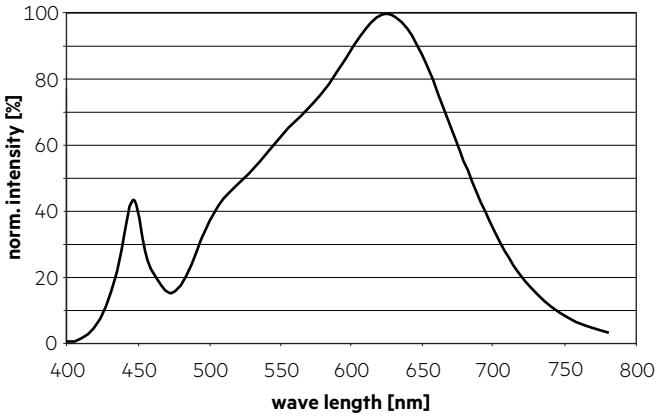


3,000 K

	x0	y0
Centre	0.4338	0.4030

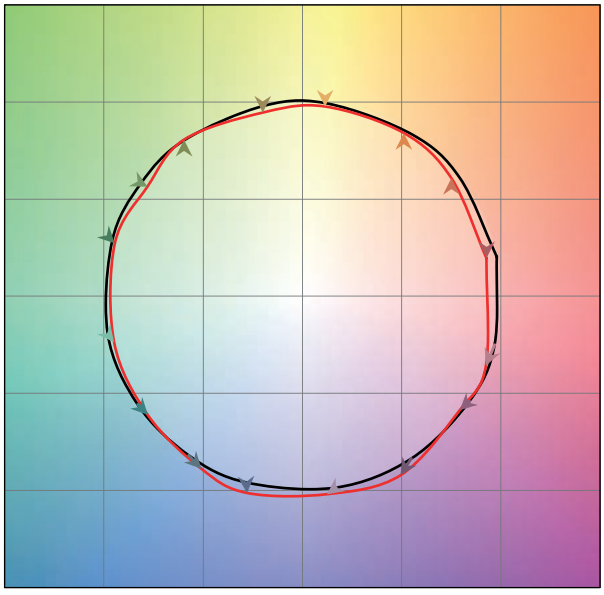


MacAdam Ellipse: 3SDCM

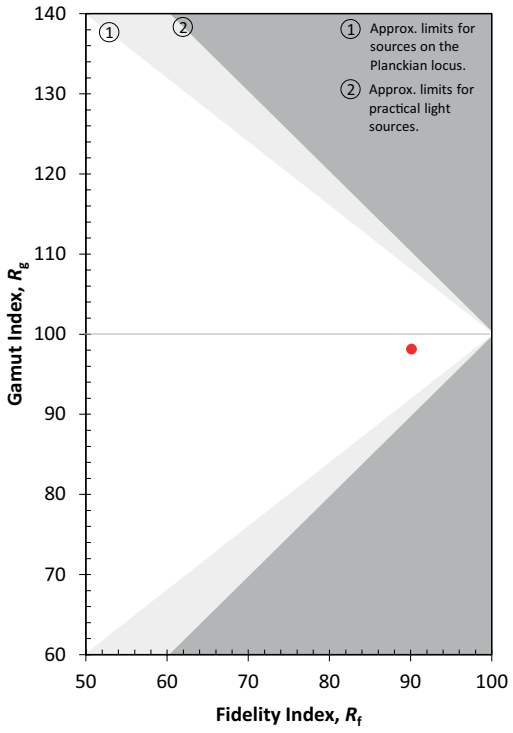


TM30		CRI	
Rf	Rg	Ra	R9
90	98	92	57

Colour vector graphic

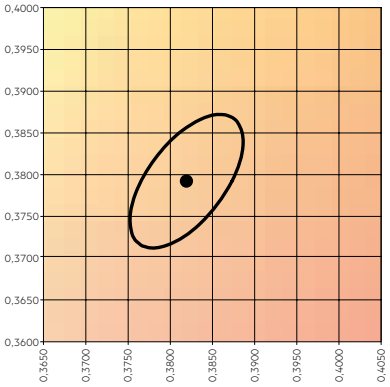


Reference source
Test source

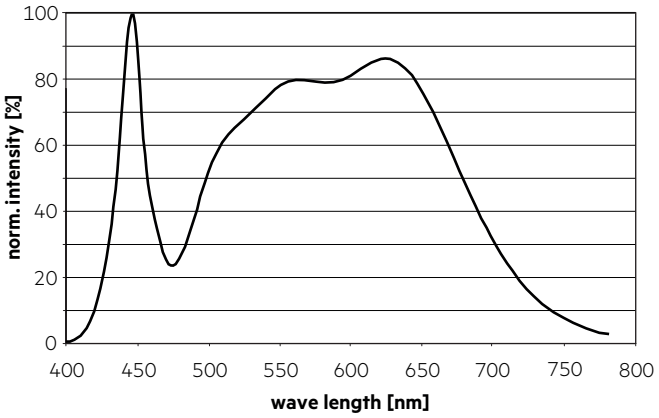


4,000 K

	x0	y0
Center	0.3818	0.3797

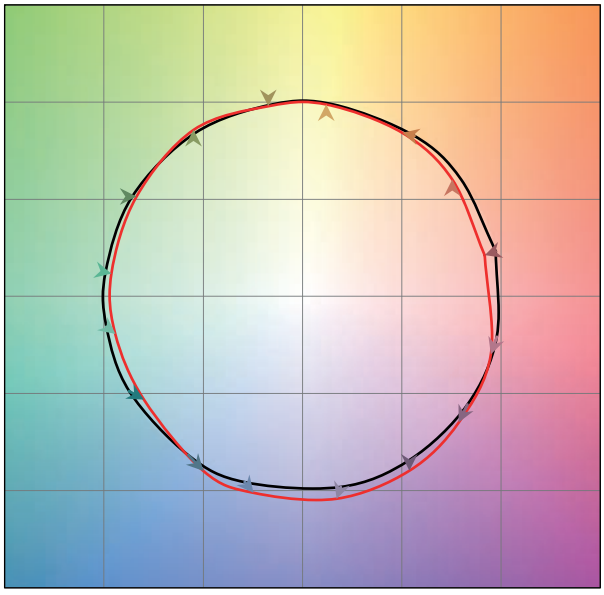


MacAdam Ellipse: 3SDCM

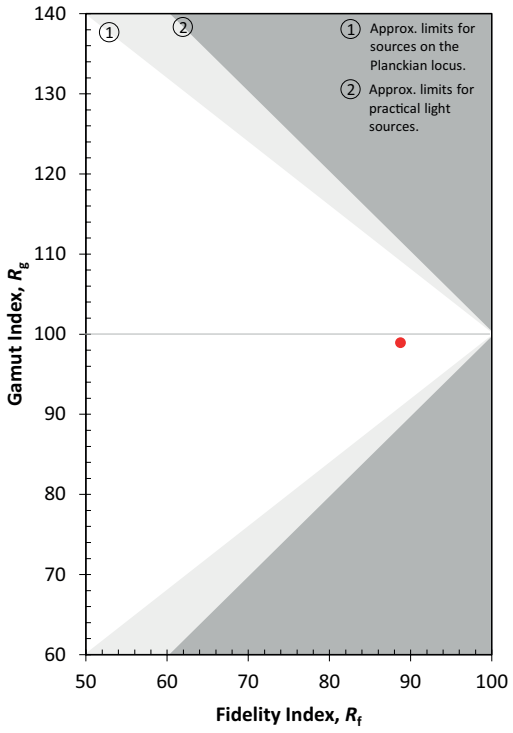


TM30		CRI	
Rf	Rg	Ra	R9
89	99	91	54

Colour vector graphic

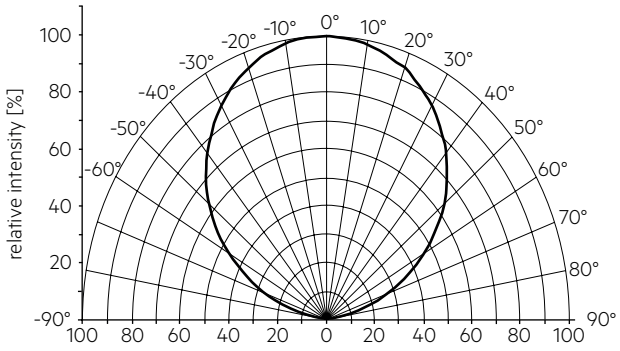


Reference source
Test source



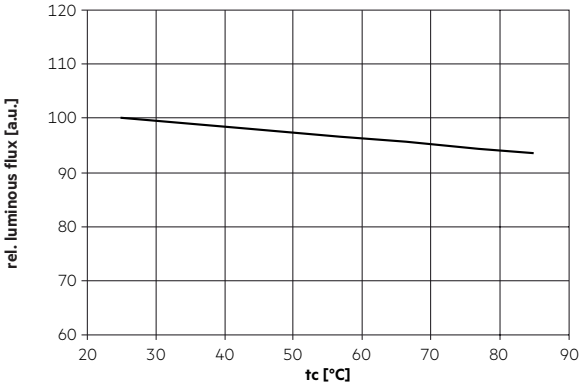
6.2 Light distribution

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

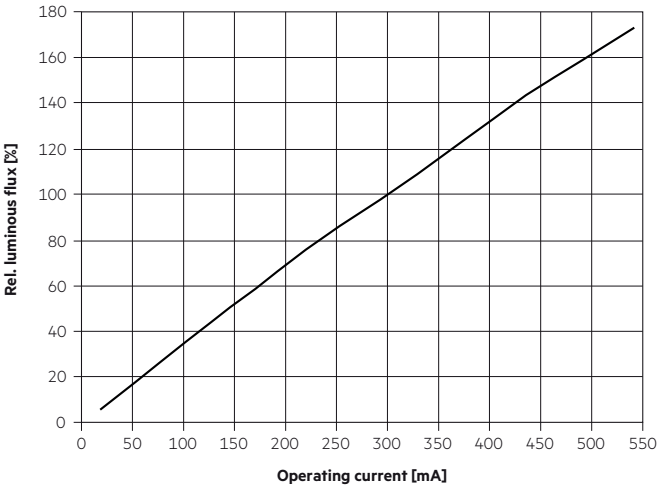


The colour temperature is measured integral over the complete module. The single LED light points can have deviations in the colour coordinates within MacAdam 5.
To ensure an ideal mixture of colours and a homogeneous light distribution a suitable optic (e. g. PMMA diffuser) and a sufficient spacing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



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

7. Miscellaneous

7.1 Additional information

Additional technical information at www.tridonic.com → Technical Data

Guarantee conditions at www.tridonic.com → Services

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