# Module LLE 16mm 650lm CRI90 HV ADV6

Modules LLE advanced

## Product description

- Ideal for compact linear luminaires designs
- Homogenous illumination thanks to small package distance
- 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
- 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 579 lm at Irated and tp = 25 °C
- Efficacy of the LED module 177 lm/W at Irated and tp = 25 °C
- High colour rendering index CRI > 90
- High colour consistency (MacAdam 3)①
- Small luminous flux tolerances

## Mechanical properties

- Module dimension 16 x 140 mm, 16 x 280 mm and 16 x 560 mm
- 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/)

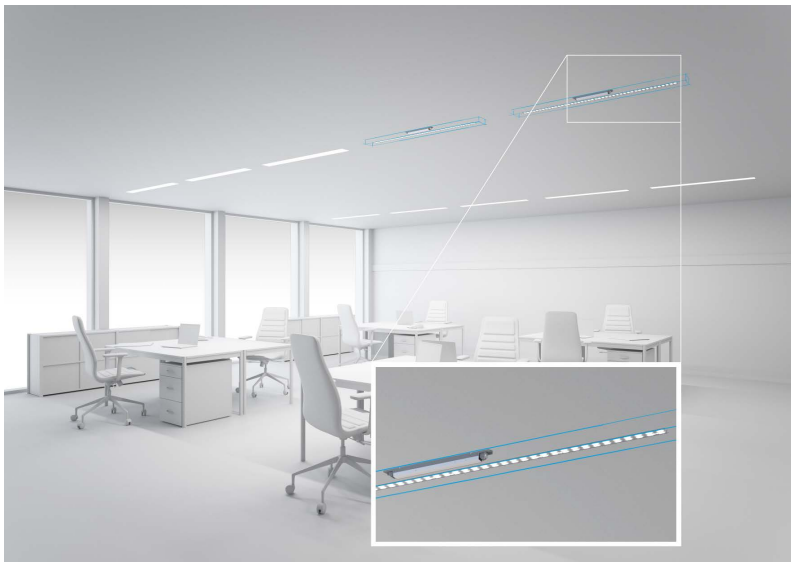
**Standards**, page 8

**Colour temperatures and tolerances**, page 12

LLE 16x140mm 325lm HV ADV6

LLE 16x280mm 650lm HV ADV6

LLE 16x560mm 1300lm HV ADV6



RoHS

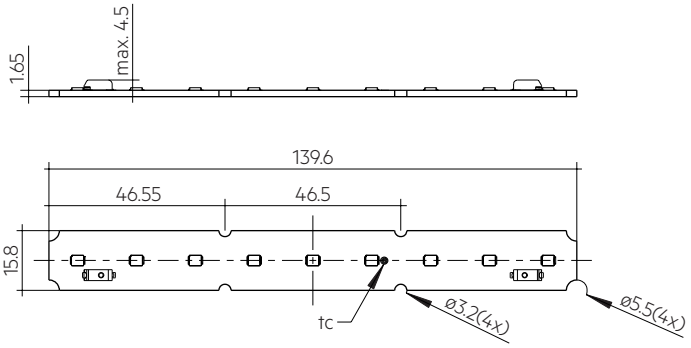
## Module LLE 16mm 650lm CRI90 HV ADV6

Modules LLE advanced

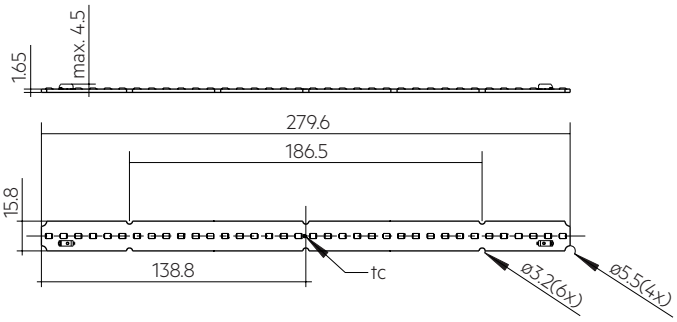
### Technical data

| | |
|---|---|
| Colour consistancy[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) |

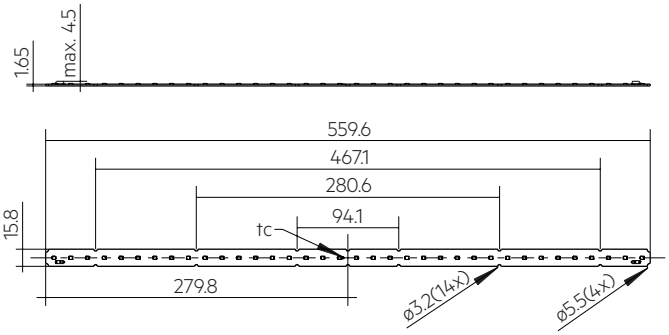
[1] Integral measurement over the complete module.




LLE 16x140mm 325lm HV ADV6




LLE 16x280mm 650lm HV ADV6




LLE 16x560mm 1300lm HV ADV6

### Ordering data

| Type | Article number | Article status | Packaging carton | Weight per pc. |
|---|---|---|---|---|
| **LLE 16x140mm 325lm 927 HV ADV6** | **28004953** | Standard | 144 pc(s). | 0.007 kg |
| **LLE 16x140mm 325lm 930 HV ADV6** | **28004954** | Standard | 144 pc(s). | 0.007 kg |
| **LLE 16x140mm 325lm 935 HV ADV6** | **28004955** | Standard | 144 pc(s). | 0.007 kg |
| **LLE 16x140mm 325lm 940 HV ADV6** | **28004956** | Standard | 144 pc(s). | 0.007 kg |
| **LLE 16x280mm 650lm 927 HV ADV6** | **28004963** | Standard | 144 pc(s). | 0.014 kg |
| **LLE 16x280mm 650lm 930 HV ADV6** | **28004964** | Standard | 144 pc(s). | 0.014 kg |
| **LLE 16x280mm 650lm 935 HV ADV6** | **28004965** | Standard | 144 pc(s). | 0.014 kg |
| **LLE 16x280mm 650lm 940 HV ADV6** | **28004966** | Standard | 144 pc(s). | 0.014 kg |
| **LLE 16x560mm 1300lm 927 HV ADV6** | **28004976** | Standard | 144 pc(s). | 0.028 kg |
| **LLE 16x560mm 1300lm 930 HV ADV6** | **28004977** | Standard | 144 pc(s). | 0.028 kg |
| **LLE 16x560mm 1300lm 935 HV ADV6** | **28004978** | Standard | 144 pc(s). | 0.028 kg |
| **LLE 16x560mm 1300lm 940 HV ADV6** | **28004979** | Standard | 144 pc(s). | 0.028 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 16x140mm 325lm 927 HV ADV6** | 2,700 K | 927/359 | – | 117 lm | 130 lm | 143 lm | – | 164 lm/W | 360° | >90 |
| **LLE 16x140mm 325lm 930 HV ADV6** | 3,000 K | 930/359 | – | 120 lm | 134 lm | 147 lm | – | 169 lm/W | 360° | >90 |
| **LLE 16x140mm 325lm 935 HV ADV6** | 3,500 K | 935/359 | – | 123 lm | 137 lm | 151 lm | – | 173 lm/W | 360° | >90 |
| **LLE 16x140mm 325lm 940 HV ADV6** | 4,000 K | 940/359 | – | 125 lm | 139 lm | 153 lm | – | 175 lm/W | 360° | >90 |
| **LLE 16x280mm 650lm 927 HV ADV6** | 2,700 K | 927/359 | – | 233 lm | 259 lm | 285 lm | – | 164 lm/W | 360° | >90 |
| **LLE 16x280mm 650lm 930 HV ADV6** | 3,000 K | 930/359 | – | 240 lm | 267 lm | 294 lm | – | 169 lm/W | 360° | >90 |
| **LLE 16x280mm 650lm 935 HV ADV6** | 3,500 K | 935/359 | – | 247 lm | 274 lm | 302 lm | – | 173 lm/W | 360° | >90 |
| **LLE 16x280mm 650lm 940 HV ADV6** | 4,000 K | 940/359 | – | 250 lm | 278 lm | 306 lm | – | 175 lm/W | 360° | >90 |
| **LLE 16x560mm 1300lm 927 HV ADV6** | 2,700 K | 927/359 | – | 466 lm | 518 lm | 570 lm | – | 164 lm/W | 360° | >90 |
| **LLE 16x560mm 1300lm 930 HV ADV6** | 3,000 K | 930/359 | – | 481 lm | 534 lm | 588 lm | – | 169 lm/W | 360° | >90 |
| **LLE 16x560mm 1300lm 935 HV ADV6** | 3,500 K | 935/359 | – | 493 lm | 548 lm | 603 lm | – | 173 lm/W | 360° | >90 |
| **LLE 16x560mm 1300lm 940 HV ADV6** | 4,000 K | 940/359 | – | 500 lm | 555 lm | 611 lm | – | 175 lm/W | 360° | >90 |
| **Operating mode NM** | | | | | | | | | | |
| **LLE 16x140mm 325lm 927 HV ADV6** | 2,700 K | 927/359 | 270 lm | 233 lm | 259 lm | 285 lm | 165 lm/W | 160 lm/W | 360° | >90 |
| **LLE 16x140mm 325lm 930 HV ADV6** | 3,000 K | 930/359 | 279 lm | 241 lm | 267 lm | 294 lm | 170 lm/W | 165 lm/W | 360° | >90 |
| **LLE 16x140mm 325lm 935 HV ADV6** | 3,500 K | 935/359 | 286 lm | 247 lm | 274 lm | 302 lm | 175 lm/W | 170 lm/W | 360° | >90 |
| **LLE 16x140mm 325lm 940 HV ADV6** | 4,000 K | 940/359 | 290 lm | 250 lm | 278 lm | 306 lm | 177 lm/W | 172 lm/W | 360° | >90 |
| **LLE 16x280mm 650lm 927 HV ADV6** | 2,700 K | 927/359 | 540 lm | 467 lm | 519 lm | 571 lm | 165 lm/W | 160 lm/W | 360° | >90 |
| **LLE 16x280mm 650lm 930 HV ADV6** | 3,000 K | 930/359 | 557 lm | 481 lm | 535 lm | 588 lm | 170 lm/W | 165 lm/W | 360° | >90 |
| **LLE 16x280mm 650lm 935 HV ADV6** | 3,500 K | 935/359 | 572 lm | 494 lm | 549 lm | 604 lm | 175 lm/W | 169 lm/W | 360° | >90 |
| **LLE 16x280mm 650lm 940 HV ADV6** | 4,000 K | 940/359 | 579 lm | 500 lm | 556 lm | 612 lm | 177 lm/W | 172 lm/W | 360° | >90 |
| **LLE 16x560mm 1300lm 927 HV ADV6** | 2,700 K | 927/359 | 1,081 lm | 934 lm | 1,037 lm | 1,141 lm | 165 lm/W | 160 lm/W | 360° | >90 |
| **LLE 16x560mm 1300lm 930 HV ADV6** | 3,000 K | 930/359 | 1,114 lm | 962 lm | 1,069 lm | 1,176 lm | 170 lm/W | 165 lm/W | 360° | >90 |
| **LLE 16x560mm 1300lm 935 HV ADV6** | 3,500 K | 935/359 | 1,144 lm | 988 lm | 1,098 lm | 1,207 lm | 175 lm/W | 170 lm/W | 360° | >90 |
| **LLE 16x560mm 1300lm 940 HV ADV6** | 4,000 K | 940/359 | 1,158 lm | 1,001 lm | 1,112 lm | 1,223 lm | 177 lm/W | 172 lm/W | 360° | >90 |
| **Operating mode HO** | | | | | | | | | | |
| **LLE 16x140mm 325lm 927 HV ADV6** | 2,700 K | 927/359 | – | 653 lm | 726 lm | 799 lm | – | 141 lm/W | 360° | >90 |
| **LLE 16x140mm 325lm 930 HV ADV6** | 3,000 K | 930/359 | – | 674 lm | 748 lm | 823 lm | – | 145 lm/W | 360° | >90 |
| **LLE 16x140mm 325lm 935 HV ADV6** | 3,500 K | 935/359 | – | 691 lm | 768 lm | 845 lm | – | 149 lm/W | 360° | >90 |
| **LLE 16x140mm 325lm 940 HV ADV6** | 4,000 K | 940/359 | – | 700 lm | 778 lm | 856 lm | – | 151 lm/W | 360° | >90 |
| **LLE 16x280mm 650lm 927 HV ADV6** | 2,700 K | 927/359 | – | 1,307 lm | 1,452 lm | 1,598 lm | – | 141 lm/W | 360° | >90 |
| **LLE 16x280mm 650lm 930 HV ADV6** | 3,000 K | 930/359 | – | 1,347 lm | 1,497 lm | 1,647 lm | – | 145 lm/W | 360° | >90 |
| **LLE 16x280mm 650lm 935 HV ADV6** | 3,500 K | 935/359 | – | 1,383 lm | 1,536 lm | 1,690 lm | – | 149 lm/W | 360° | >90 |
| **LLE 16x280mm 650lm 940 HV ADV6** | 4,000 K | 940/359 | – | 1,401 lm | 1,556 lm | 1,712 lm | – | 151 lm/W | 360° | >90 |
| **LLE 16x560mm 1300lm 927 HV ADV6** | 2,700 K | 927/359 | – | 2,614 lm | 2,904 lm | 3,195 lm | – | 141 lm/W | 360° | >90 |
| **LLE 16x560mm 1300lm 930 HV ADV6** | 3,000 K | 930/359 | – | 2,694 lm | 2,994 lm | 3,293 lm | – | 145 lm/W | 360° | >90 |
| **LLE 16x560mm 1300lm 935 HV ADV6** | 3,500 K | 935/359 | – | 2,766 lm | 3,073 lm | 3,380 lm | – | 149 lm/W | 360° | >90 |
| **LLE 16x560mm 1300lm 940 HV ADV6** | 4,000 K | 940/359 | – | 2,801 lm | 3,113 lm | 3,424 lm | – | 151 lm/W | 360° | >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[1] | Energy classification | Energy consumption | Type of light source |
|---|---|---|---|---|---|---|---|---|
| **Operating mode HE** | | | | | | | | |
| **LLE 16x140mm 325lm 927 HV ADV6** | 100 mA | 7.6 V | 7.9 V | 8.2 V | – | – | – | – |
| **LLE 16x140mm 325lm 930 HV ADV6** | 100 mA | 7.6 V | 7.9 V | 8.2 V | – | – | – | – |
| **LLE 16x140mm 325lm 935 HV ADV6** | 100 mA | 7.6 V | 7.9 V | 8.2 V | – | – | – | – |
| **LLE 16x140mm 325lm 940 HV ADV6** | 100 mA | 7.6 V | 7.9 V | 8.2 V | – | – | – | – |
| **LLE 16x280mm 650lm 927 HV ADV6** | 100 mA | 15.1 V | 15.8 V | 16.5 V | – | – | – | – |
| **LLE 16x280mm 650lm 930 HV ADV6** | 100 mA | 15.1 V | 15.8 V | 16.5 V | – | – | – | – |
| **LLE 16x280mm 650lm 935 HV ADV6** | 100 mA | 15.1 V | 15.8 V | 16.5 V | – | – | – | – |
| **LLE 16x280mm 650lm 940 HV ADV6** | 100 mA | 15.1 V | 15.8 V | 16.5 V | – | – | – | – |
| **LLE 16x560mm 1300lm 927 HV ADV6** | 100 mA | 30.2 V | 31.7 V | 32.9 V | – | – | – | – |
| **LLE 16x560mm 1300lm 930 HV ADV6** | 100 mA | 30.2 V | 31.7 V | 32.9 V | – | – | – | – |
| **LLE 16x560mm 1300lm 935 HV ADV6** | 100 mA | 30.2 V | 31.7 V | 32.9 V | – | – | – | – |
| **LLE 16x560mm 1300lm 940 HV ADV6** | 100 mA | 30.2 V | 31.7 V | 32.9 V | – | – | – | – |
| **Operating mode NM** | | | | | | | | |
| **LLE 16x140mm 325lm 927 HV ADV6** | 200 mA | 7.7 V | 8.1 V | 8.4 V | 1.6 W | D | 2 kWh / 1,000 h | non-directional |
| **LLE 16x140mm 325lm 930 HV ADV6** | 200 mA | 7.7 V | 8.1 V | 8.4 V | 1.6 W | C | 2 kWh / 1,000 h | non-directional |
| **LLE 16x140mm 325lm 935 HV ADV6** | 200 mA | 7.7 V | 8.1 V | 8.4 V | 1.6 W | C | 2 kWh / 1,000 h | non-directional |
| **LLE 16x140mm 325lm 940 HV ADV6** | 200 mA | 7.7 V | 8.1 V | 8.4 V | 1.6 W | C | 2 kWh / 1,000 h | non-directional |
| **LLE 16x280mm 650lm 927 HV ADV6** | 200 mA | 15.5 V | 16.2 V | 16.8 V | 3.3 W | D | 4 kWh / 1,000 h | non-directional |
| **LLE 16x280mm 650lm 930 HV ADV6** | 200 mA | 15.5 V | 16.2 V | 16.8 V | 3.3 W | D | 4 kWh / 1,000 h | non-directional |
| **LLE 16x280mm 650lm 935 HV ADV6** | 200 mA | 15.5 V | 16.2 V | 16.8 V | 3.3 W | C | 4 kWh / 1,000 h | non-directional |
| **LLE 16x280mm 650lm 940 HV ADV6** | 200 mA | 15.5 V | 16.2 V | 16.8 V | 3.3 W | C | 4 kWh / 1,000 h | non-directional |
| **LLE 16x560mm 1300lm 927 HV ADV6** | 200 mA | 30.9 V | 32.4 V | 33.6 V | 6.5 W | D | 7 kWh / 1,000 h | non-directional |
| **LLE 16x560mm 1300lm 930 HV ADV6** | 200 mA | 30.9 V | 32.4 V | 33.6 V | 6.5 W | D | 7 kWh / 1,000 h | non-directional |
| **LLE 16x560mm 1300lm 935 HV ADV6** | 200 mA | 30.9 V | 32.4 V | 33.6 V | 6.5 W | C | 7 kWh / 1,000 h | non-directional |
| **LLE 16x560mm 1300lm 940 HV ADV6** | 200 mA | 30.9 V | 32.4 V | 33.6 V | 6.5 W | C | 7 kWh / 1,000 h | non-directional |
| **Operating mode HO** | | | | | | | | |
| **LLE 16x140mm 325lm 927 HV ADV6** | 600 mA | 8.2 V | 8.6 V | 8.9 V | – | – | – | – |
| **LLE 16x140mm 325lm 930 HV ADV6** | 600 mA | 8.2 V | 8.6 V | 8.9 V | – | – | – | – |
| **LLE 16x140mm 325lm 935 HV ADV6** | 600 mA | 8.2 V | 8.6 V | 8.9 V | – | – | – | – |
| **LLE 16x140mm 325lm 940 HV ADV6** | 600 mA | 8.2 V | 8.6 V | 8.9 V | – | – | – | – |
| **LLE 16x280mm 650lm 927 HV ADV6** | 600 mA | 16.5 V | 17.2 V | 17.8 V | – | – | – | – |
| **LLE 16x280mm 650lm 930 HV ADV6** | 600 mA | 16.5 V | 17.2 V | 17.8 V | – | – | – | – |
| **LLE 16x280mm 650lm 935 HV ADV6** | 600 mA | 16.5 V | 17.2 V | 17.8 V | – | – | – | – |
| **LLE 16x280mm 650lm 940 HV ADV6** | 600 mA | 16.5 V | 17.2 V | 17.8 V | – | – | – | – |
| **LLE 16x560mm 1300lm 927 HV ADV6** | 600 mA | 32.9 V | 34.3 V | 35.6 V | – | – | – | – |
| **LLE 16x560mm 1300lm 930 HV ADV6** | 600 mA | 32.9 V | 34.3 V | 35.6 V | – | – | – | – |
| **LLE 16x560mm 1300lm 935 HV ADV6** | 600 mA | 32.9 V | 34.3 V | 35.6 V | – | – | – | – |
| **LLE 16x560mm 1300lm 940 HV ADV6** | 600 mA | 32.9 V | 34.3 V | 35.6 V | – | – | – | – |

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

## Specific technical data

| Type | Irated | Imax | Max. permissible LF current ripple | Max. permissible peak current / max. pulse width | Max. working voltage for insulation[1] | Electrical strength | ta | tp rated | tc |
|---|---|---|---|---|---|---|---|---|---|
| **LLE 16x140mm 325lm 927 HV ADV6** | 200 mA | 700 mA | 800 mA | 1,350 mA / 10 ms | 440 V | 1.88 kV | -40 … +65 °C | 50 °C | 85 °C |
| **LLE 16x140mm 325lm 930 HV ADV6** | 200 mA | 700 mA | 800 mA | 1,350 mA / 10 ms | 440 V | 1.88 kV | -40 … +65 °C | 50 °C | 85 °C |
| **LLE 16x140mm 325lm 935 HV ADV6** | 200 mA | 700 mA | 800 mA | 1,350 mA / 10 ms | 440 V | 1.88 kV | -40 … +65 °C | 50 °C | 85 °C |
| **LLE 16x140mm 325lm 940 HV ADV6** | 200 mA | 700 mA | 800 mA | 1,350 mA / 10 ms | 440 V | 1.88 kV | -40 … +65 °C | 50 °C | 85 °C |
| **LLE 16x280mm 650lm 927 HV ADV6** | 200 mA | 700 mA | 800 mA | 1,350 mA / 10 ms | 440 V | 1.88 kV | -40 … +65 °C | 50 °C | 85 °C |
| **LLE 16x280mm 650lm 930 HV ADV6** | 200 mA | 700 mA | 800 mA | 1,350 mA / 10 ms | 440 V | 1.88 kV | -40 … +65 °C | 50 °C | 85 °C |
| **LLE 16x280mm 650lm 935 HV ADV6** | 200 mA | 700 mA | 800 mA | 1,350 mA / 10 ms | 440 V | 1.88 kV | -40 … +65 °C | 50 °C | 85 °C |
| **LLE 16x280mm 650lm 940 HV ADV6** | 200 mA | 700 mA | 800 mA | 1,350 mA / 10 ms | 440 V | 1.88 kV | -40 … +65 °C | 50 °C | 85 °C |
| **LLE 16x560mm 1300lm 927 HV ADV6** | 200 mA | 700 mA | 800 mA | 1,350 mA / 10 ms | 440 V | 1.88 kV | -40 … +65 °C | 50 °C | 85 °C |
| **LLE 16x560mm 1300lm 930 HV ADV6** | 200 mA | 700 mA | 800 mA | 1,350 mA / 10 ms | 440 V | 1.88 kV | -40 … +65 °C | 50 °C | 85 °C |
| **LLE 16x560mm 1300lm 935 HV ADV6** | 200 mA | 700 mA | 800 mA | 1,350 mA / 10 ms | 440 V | 1.88 kV | -40 … +65 °C | 50 °C | 85 °C |
| **LLE 16x560mm 1300lm 940 HV ADV6** | 200 mA | 700 mA | 800 mA | 1,350 mA / 10 ms | 440 V | 1.88 kV | -40 … +65 °C | 50 °C | 85 °C |

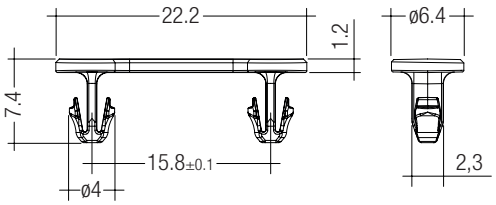
[1] If mounted with M3 screws with 6 mm head diameter and plastic washer.

ACCES-SORIES

## BRIDGE LLE16

**Product description**

- Clip for fixation for LLE16
- Fast snap on mounting (for sheet thickness 0.5 – 1.0 mm)
- For drilling hole 3 mm
- Clip made of polycarbonate
- Minimum sales quantity 200 pcs.




**Ordering data**

| Type | Article number | Colour | Packaging bag | Weight per pc. |
|---|---|---|---|---|
| **ACL BRIDGE LLE16 PUSH-FIX** | **28001035** | White | 200 pc(s). | 0.001 kg |

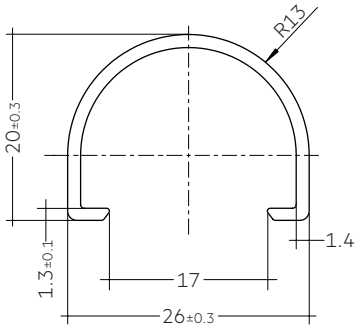
ACCES-SORIES

## ACL LINEAR COVER 16mm

**Product description**

- LINEAR COVER for LLE 16
- Protection against direct touch for non-SELV applications (recommendation: use all fixing points)[1]
- Fast snap on mounting on to LLE 16 with clips or plastic washers
- High transmission: transparent 94 %, semi-transparent 87 %, diffuse 76 %
- Linear lense made of PMMA
- Tolerances LINEAR COVER: + 10 mm for 1,600 / 1,200 mm length (ends raw)






**Ordering data**

| Type | Article number | Colour | Length | Packaging carton | Weight per pc. |
|---|---|---|---|---|---|
| **ACL LINEAR COVER 16x1600mm FROSTED** | **28000950** | Semi-transparent | 1,600 mm | 24 pc(s). | 0.147 kg |
| **ACL LINEAR COVER 16x1200mm FROSTED** | **28002827** | Semi-transparent | 1,200 mm | 24 pc(s). | 0.117 kg |
| **ACL LINEAR COVER 16x1600mm DIFFUSE** | **28000951** | Diffuse | 1,600 mm | 24 pc(s). | 0.147 kg |
| **ACL LINEAR COVER 16x1200mm DIFFUSE** | **28002828** | Diffuse | 1,200 mm | 24 pc(s). | 0.117 kg |

[1] Ends must be covered by the luminaire construction.

## 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

| 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 lifetime (max.6000h) | Luminous flux after 25% of the lifetime (max.6000h) | |
| | | | | | Code | Luminous flux |
| 7 | 70 – 79 | | | | 7 | ≥ 70 % |
| 8 | 80 – 89 | | | | 8 | ≥ 80 % |
| 9 | ≥90 | | | | 9 | ≥ 90 % |

### 1.2 Risk group

| Forward current | Risk group (IEC 62471) |
|---|---|
| ≤ 280 mA | RG0 |
| > 280 – 700 mA (Imax) | RG1 |

### 1.3 Energy classification

| Type | Colour temperature | Forward current | Energy classification | Energy consumption |
|---|---|---|---|---|
| LLE 16x140mm 325lm 927 HV ADV6 | 2,700 K | 200 mA | D | 2 kWh / 1,000 h |
| LLE 16x140mm 325lm 930 HV ADV6 | 3,000 K | 200 mA | C | 2 kWh / 1,000 h |
| LLE 16x140mm 325lm 935 HV ADV6 | 3,500 K | 200 mA | C | 2 kWh / 1,000 h |
| LLE 16x140mm 325lm 940 HV ADV6 | 4,000 K | 200 mA | C | 2 kWh / 1,000 h |
| LLE 16x280mm 650lm 927 HV ADV6 | 2,700 K | 200 mA | D | 4 kWh / 1,000 h |
| LLE 16x280mm 650lm 930 HV ADV6 | 3,000 K | 200 mA | D | 4 kWh / 1,000 h |
| LLE 16x280mm 650lm 935 HV ADV6 | 3,500 K | 200 mA | C | 4 kWh / 1,000 h |
| LLE 16x280mm 650lm 940 HV ADV6 | 4,000 K | 200 mA | C | 4 kWh / 1,000 h |
| LLE 16x560mm 1300lm 927 HV ADV6 | 2,700 K | 200 mA | D | 7 kWh / 1,000 h |
| LLE 16x560mm 1300lm 930 HV ADV6 | 3,000 K | 200 mA | D | 7 kWh / 1,000 h |
| LLE 16x560mm 1300lm 935 HV ADV6 | 3,500 K | 200 mA | C | 7 kWh / 1,000 h |
| LLE 16x560mm 1300lm 940 HV ADV6 | 4,000 K | 200 mA | C | 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 … +85 °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 16x140mm 325lm ADV6**

| ta | tp | Forward current | $R_{th, hs-a}$ | Cooling area |
|---|---|---|---|---|
| 25 °C | 50 °C | 200 mA | self cooling | |
| 25 °C | 50 °C | 600 mA | 8.10 K/W | 82 cm² |
| 35 °C | 50 °C | 200 mA | 22.40 K/W | 30 cm² |
| 35 °C | 50 °C | 600 mA | 4.00 K/W | 167 cm² |
| 40 °C | 50 °C | 200 mA | 14.22 K/W | 47 cm² |
| 40 °C | 50 °C | 600 mA | 1.95 K/W | 341 cm² |
| 45 °C | 50 °C | 200 mA | 6.04 K/W | 110 cm² |

**LLE 16x280mm 650lm ADV6**

| ta | tp | Forward current | $R_{th, hs-a}$ | Cooling area |
|---|---|---|---|---|
| 25 °C | 50 °C | 200 mA | self cooling | |
| 25 °C | 50 °C | 600 mA | 4.05 K/W | 165 cm² |
| 35 °C | 50 °C | 200 mA | 11.20 K/W | 60 cm² |
| 35 °C | 50 °C | 600 mA | 2.00 K/W | 333 cm² |
| 40 °C | 50 °C | 200 mA | 7.11 K/W | 94 cm² |
| 40 °C | 50 °C | 600 mA | 0.98 K/W | 683 cm² |
| 45 °C | 50 °C | 200 mA | 3.02 K/W | 221 cm² |

**LLE 16x560mm 1300lm ADV6**

| ta | tp | Forward current | $R_{th, hs-a}$ | Cooling area |
|---|---|---|---|---|
| 25 °C | 50 °C | 225 mA | self cooling | |
| 25 °C | 50 °C | 600 mA | 2.02 K/W | 329 cm² |
| 35 °C | 50 °C | 200 mA | 5.60 K/W | 119 cm² |
| 35 °C | 50 °C | 600 mA | 1.00 K/W | 666 cm² |
| 40 °C | 50 °C | 200 mA | 3.56 K/W | 188 cm² |
| 40 °C | 50 °C | 600 mA | 0.49 K/W | 1365 cm² |
| 45 °C | 50 °C | 200 mA | 1.51 K/W | 442 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 or operating currents higher than 500 mA, 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.

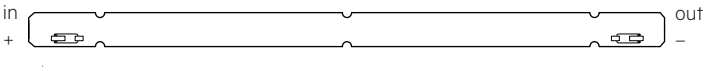
Wrong polarity can damage the LLE.

The LLE module is designed for serial wiring.

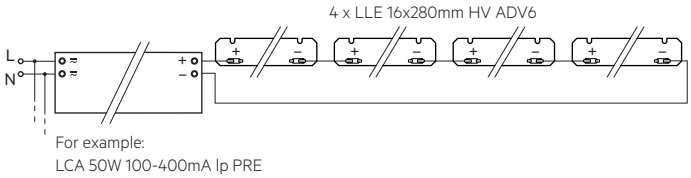
LLE can be operated either from SELV LED drivers or from LED drivers with LV output voltage.

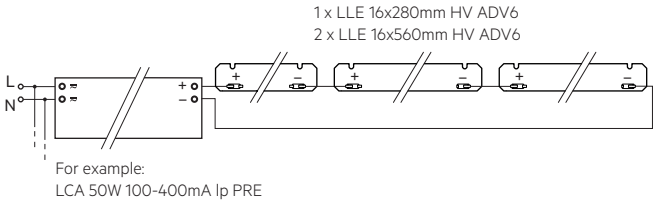
LLE are basic insulated up to 440 V (if mounted with M3 screws with head diameter 6 mm in combination with plastic washers) against ground and can be mounted directly on earthed metal parts of the luminaire. If the max. output voltage of the LED driver (also against earth) is above 440 V, an additional 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



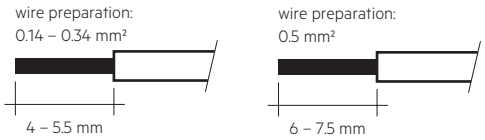

**Wiring examples for serial wiring**




### 3.3 Wiring type and cross section

For wiring use solid wire from 0.14 to 0.5 mm².
No reconnection with smaller diameters possible if used with >0.34 mm².



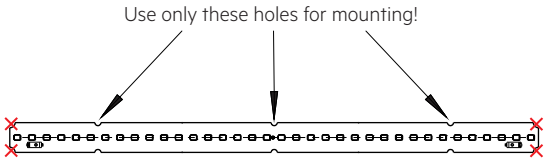

To remove the wires use a suitabel tool (Wago 206-859) or through twist and pull.

### 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 M3 screws with plastic washers or ACL BRIDGE LLE16 PUSH-FIX.
All fastening point must be used for mounting.
The cut-outs on the end faces must not be used for fastening.




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 16mm HV ADV6

| Forward current | tp temperature | L90 / B10 | L90 / B50 | L80 / B10 | L80 / B50 | L70 / B10 | L70 / B50 |
|---|---|---|---|---|---|---|---|
| 100 mA | 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 |
| 275 mA | 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 | 34kh | 44k h | 70k h | >72k h | >72k h | >72k h |
| 700 mA | 40 °C | 48k h | 62k h | >72k h | >72k h | >72k h | >72k h |
| | 50 °C | 45k h | 59k h | >72k h | >72k h | >72k h | >72k h |
| | 60 °C | 42k h | 55k h | >72k h | >72k h | >72k h | >72k h |
| | 70 °C | 40k h | 52k h | >72k h | >72k h | >72k h | >72k h |
| | 80 °C | 37k h | 49k h | >72k h | >72k h | >72k h | >72k h |
| | 85 °C | 36k h | 47k h | >72k h | >72k h | >72k h | >72k h |

L0C10 >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

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

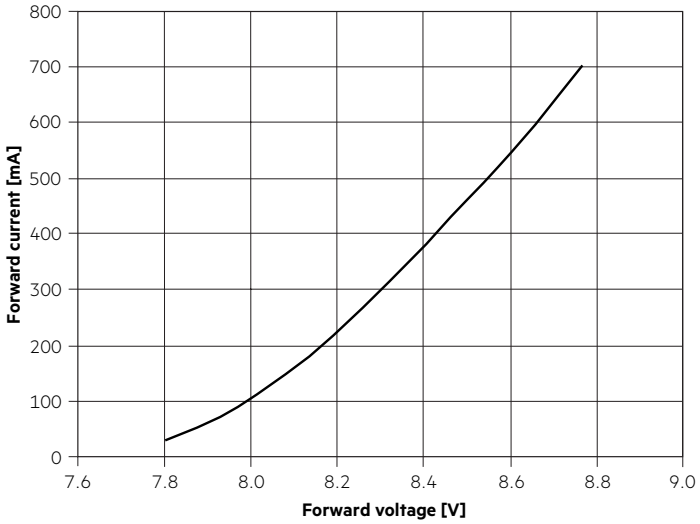
Imax ... Max. permissible continuous operating current incl. The tolerances of the LED driver.

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

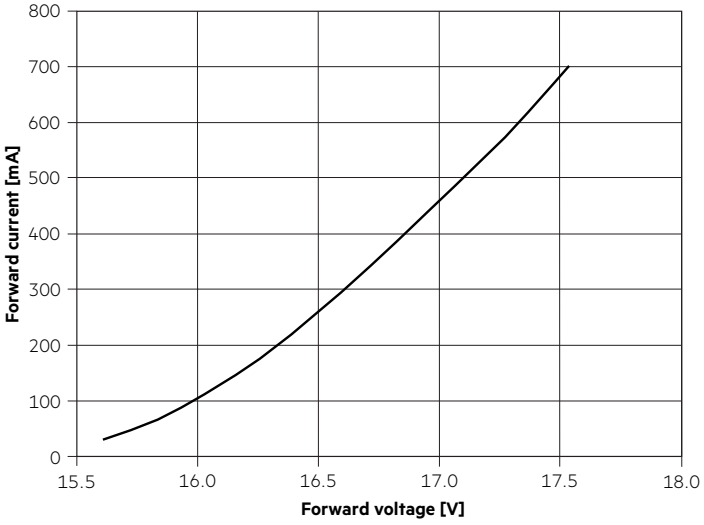
Max. permissible peak current ... The max. output peak current of the LED driver must not exceed this value.

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

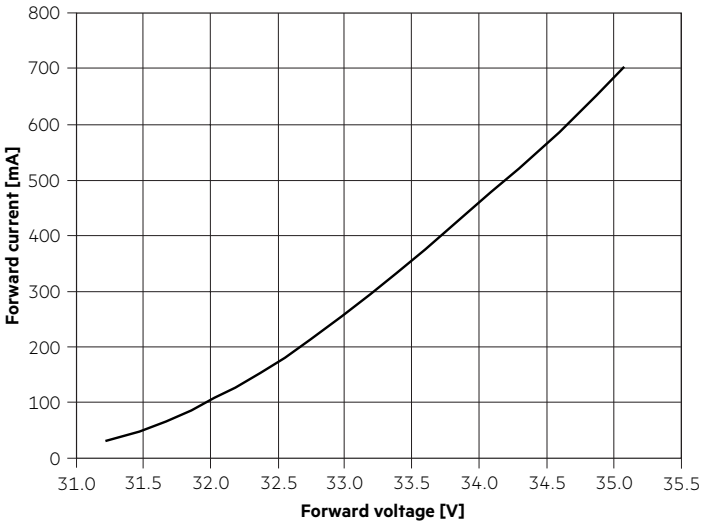
**LLE 16x140mm 325lm 9xx HV ADV6**



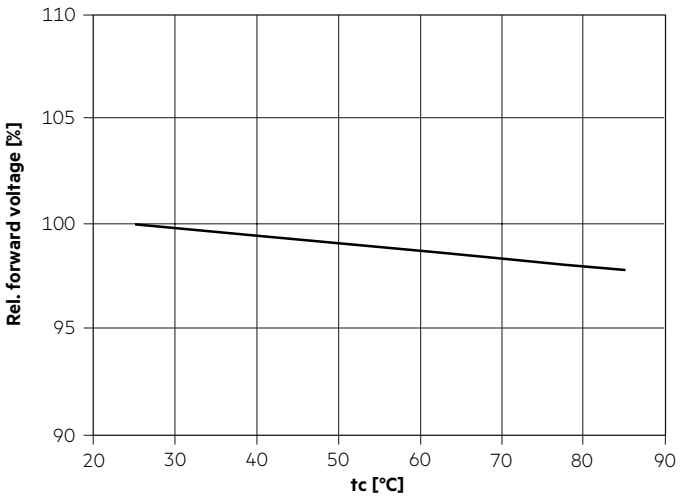

**LLE 16x280mm 650lm 9xx HV ADV6**




**LLE 16x560mm 1300lm 9xx HV ADV6**




### 5.3 Forward voltage vs. tc temperature




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

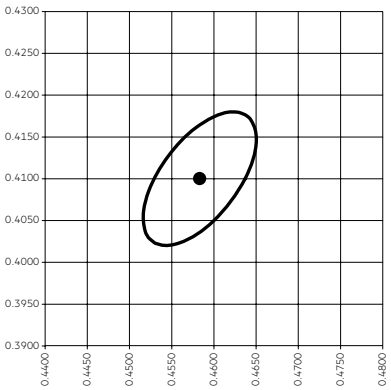
## 6. Photometric characteristics

### 6.1 Coordinates and tolerances according to CIE 1931

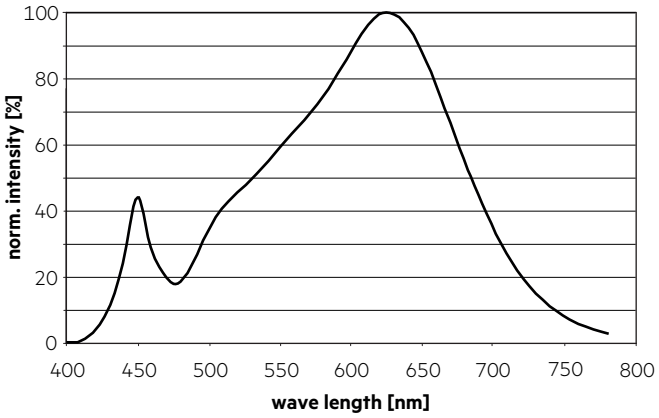
The specified colour coordinates are integral measured by current impulse of 195 mA and a duration of 100 ms.
The ambient temperature of the measurement is ta = 25 °C.
The measurement tolerance of the colour coordinates are ± 0.01.

**2,700 K**

| | x0 | y0 |
|---|---|---|
| Centre | 0.4578 | 0.4101 |

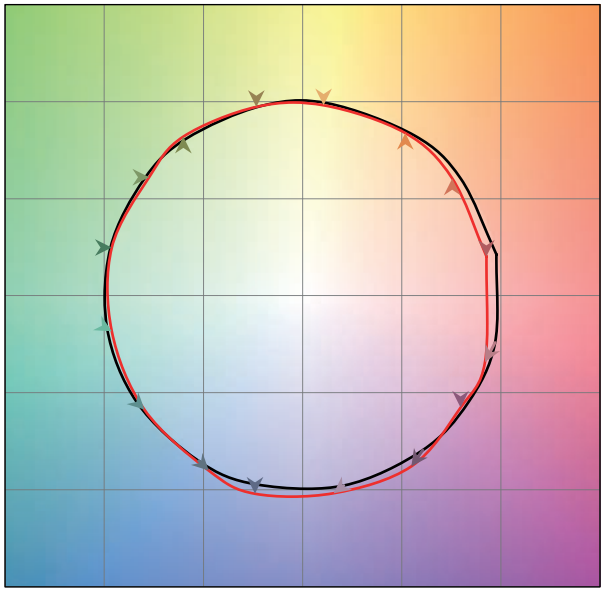



MacAdam Ellipse: 3SDCM

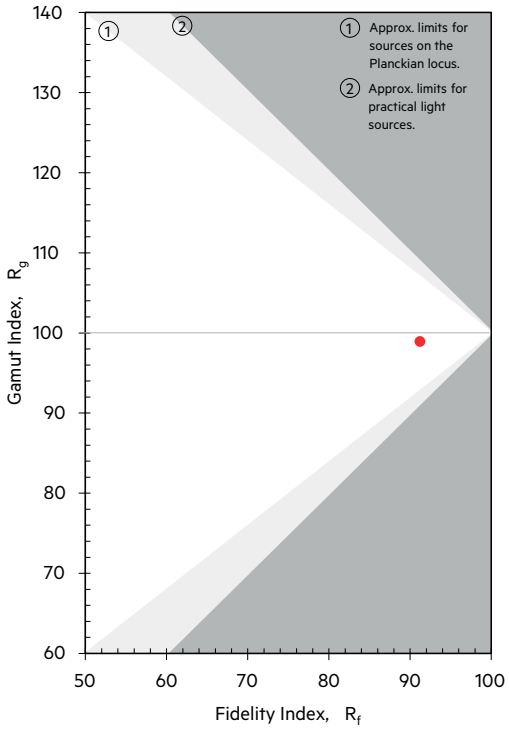



| TM30 | | CRI | |
|---|---|---|---|
| Rf | Rg | Ra | R9 |
| 91 | 99 | 93 | 57 |

Colour vector graphic



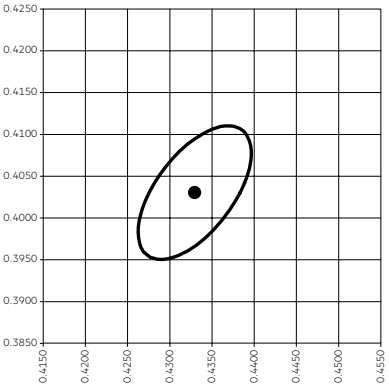
Reference source
Test source



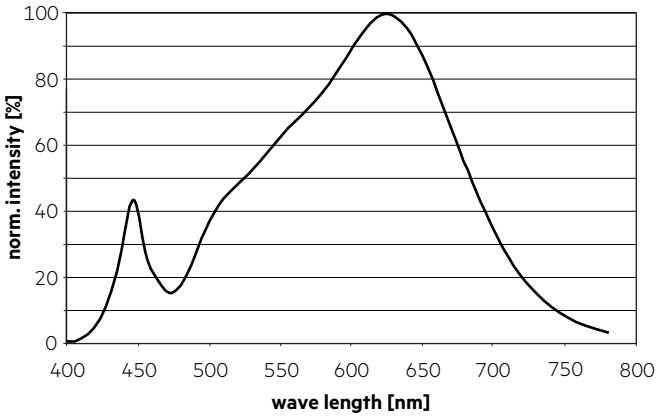

MacAdam Ellipse: 3SDCM

**3,000 K**

| | x0 | y0 |
|---|---|---|
| Centre | 0.4338 | 0.4030 |

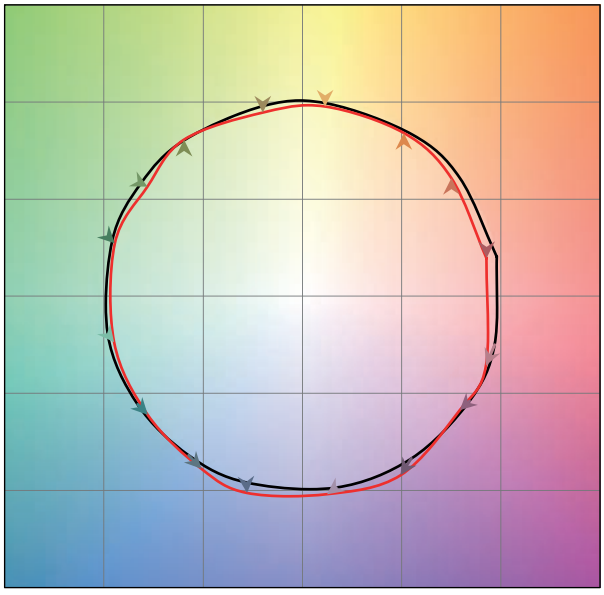



MacAdam Ellipse: 3SDCM

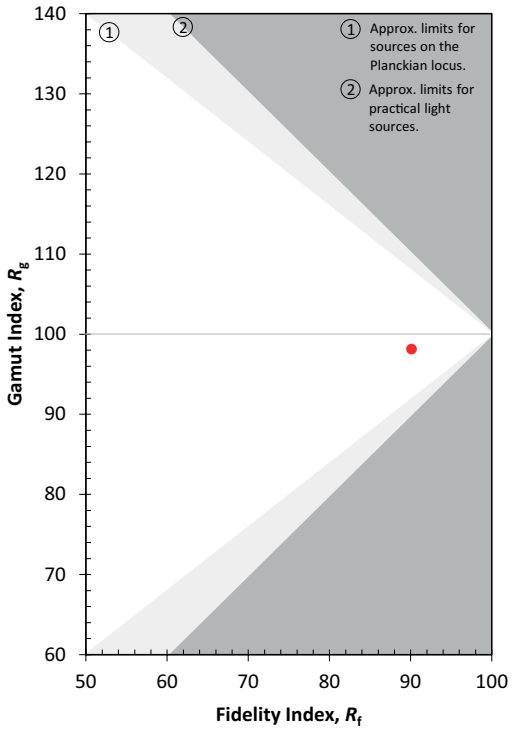



| TM30 | | CRI | |
|---|---|---|---|
| Rf | Rg | Ra | R9 |
| 90 | 98 | 92 | 57 |

Colour vector graphic

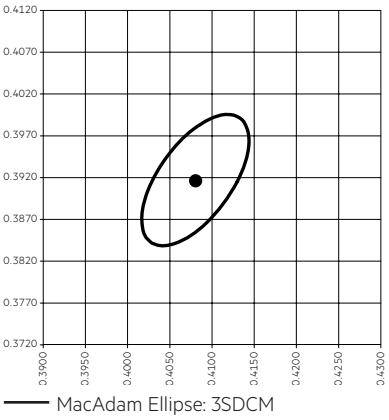


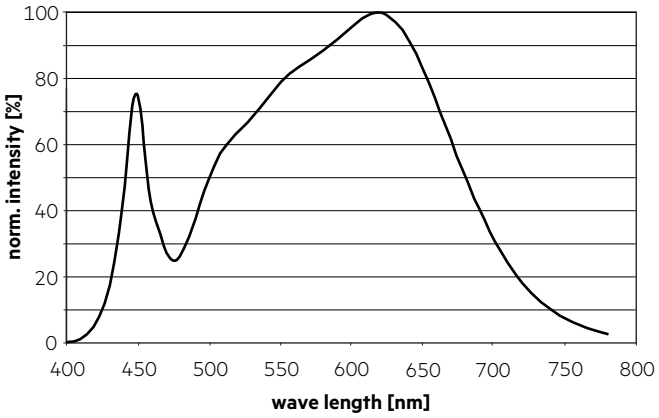
Reference source
Test source



**3,500 K**

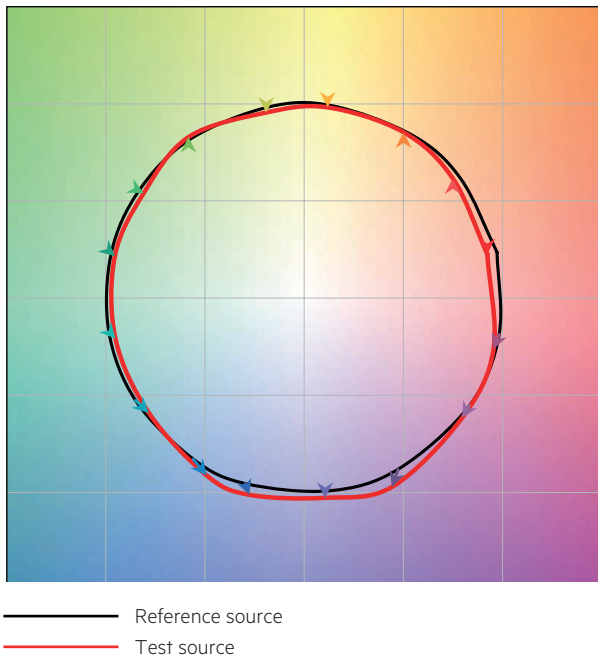
| | x0 | y0 |
|---|---|---|
| Centre | 0.4073 | 0.3917 |

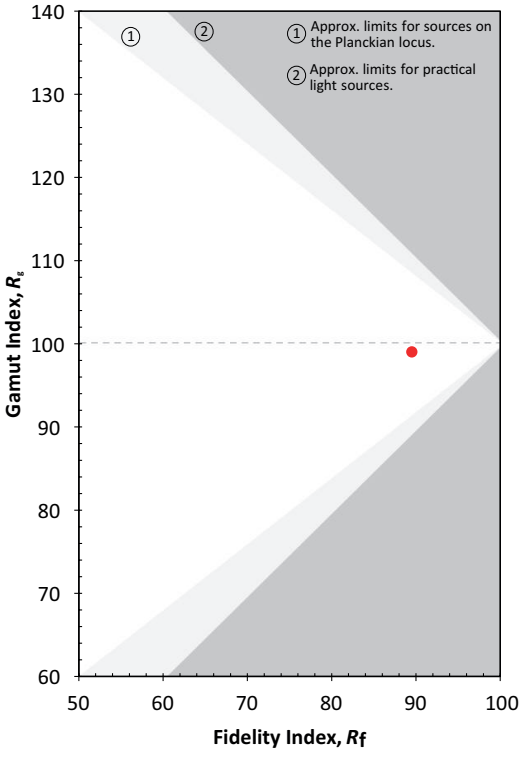



| TM30 | | CRI | |
|---|---|---|---|
| Rf | Rg | Ra | R9 |
| 90 | 99 | 93 | 63 |

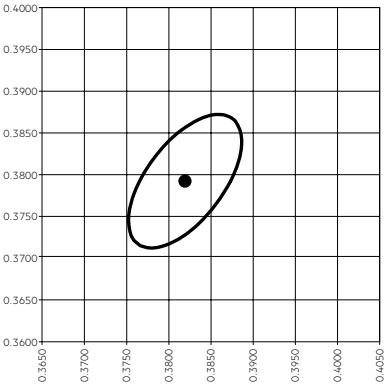
Colour vector graphic



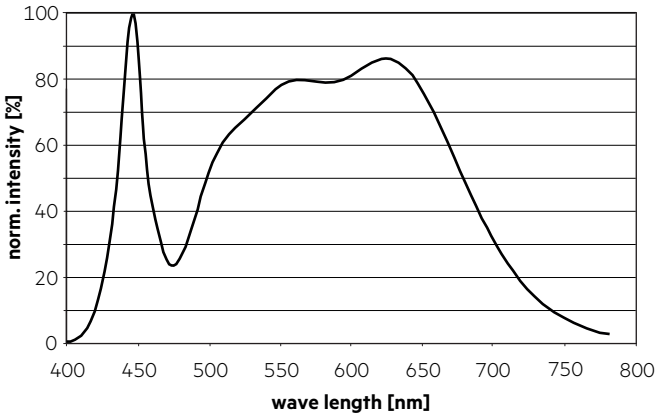



**4,000 K**

| | x0 | y0 |
|---|---|---|
| Center | 0.3818 | 0.3797 |

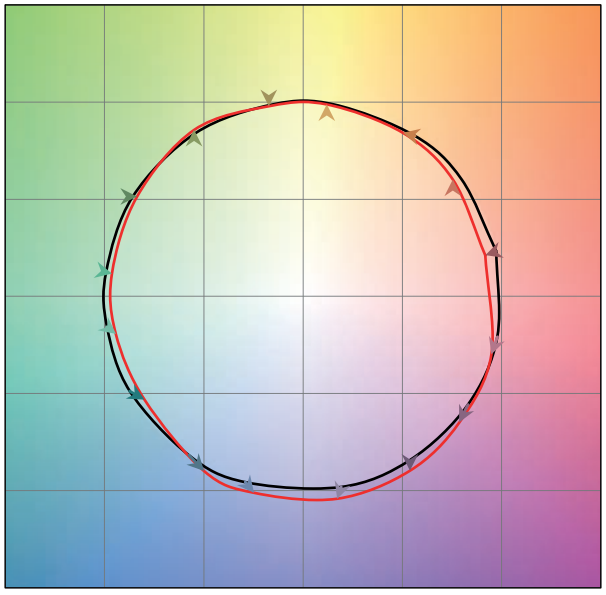



MacAdam Ellipse: 3SDCM

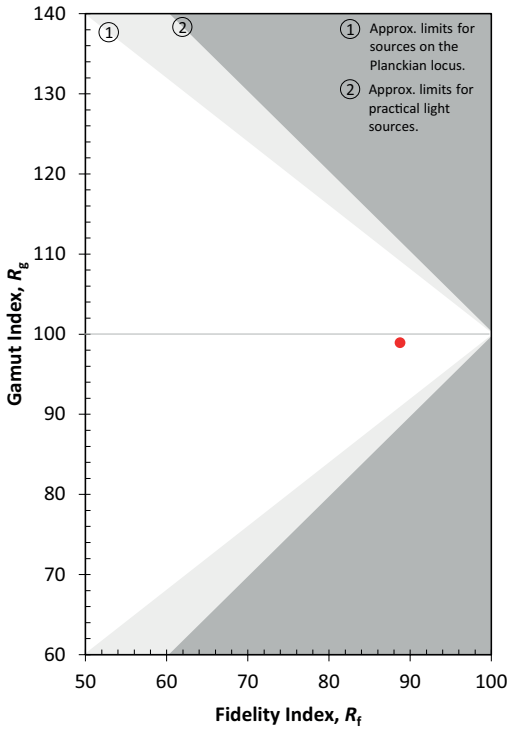



| TM30 | | CRI | |
|---|---|---|---|
| Rf | Rg | Ra | R9 |
| 89 | 99 | 91 | 54 |

Colour vector graphic

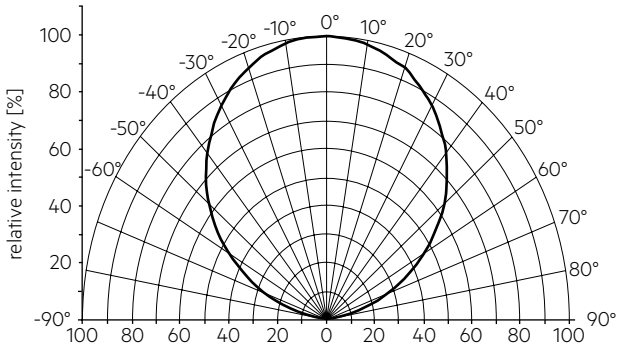


Reference source
Test source



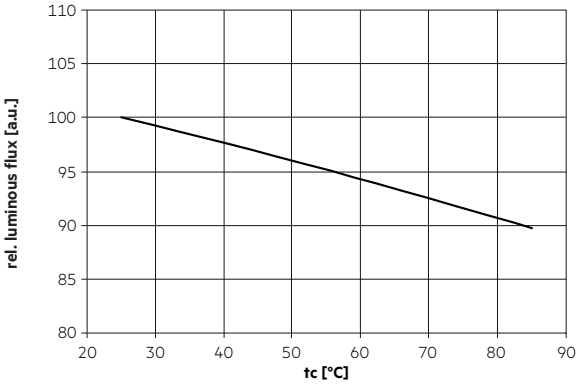
### 6.2 Light distribution

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

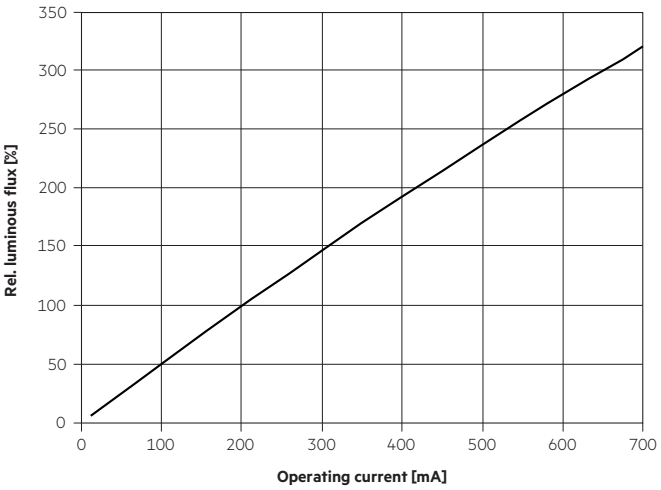



The colour temperature is measured integral over the complete module. The single LED light points can have deviations in the colour coordinates within MacAdam 5.
To ensure an ideal mixture of colours and a homogeneous light distribution a suitable optic (e. g. PMMA diffuser) and a sufficient spacing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

Lifetime declarations are informative and represent no warranty claim.