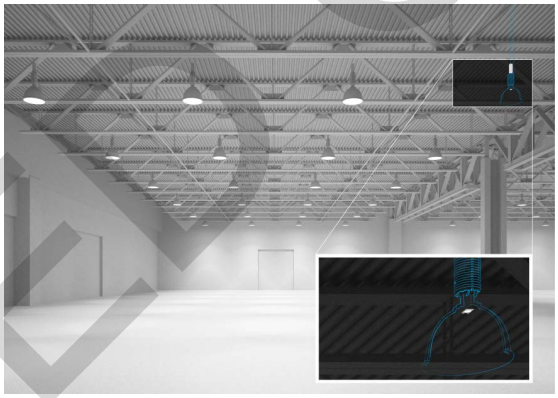
## TALEXmodule STARK FLE GEN1

TALEXmodule FLE



**Product description**

- Luminous flux up to 18,550 lm at tp = 65 °C
- High efficacy up to 142 lm/W for the LED module at tp = 25 °C
- High system efficacy up to 115 lm/W at tp = 65 °C
- High colour consistency (MacAdams 3)
- Excellent thermal management by COB technology
- KTY 82/210 for temperature control, compatible with ECO and TOP (up to 35 W) LED Driver
- Uniform radiation with Dam&Fill technology
- Fixing holes for M3 screws
- Built-in LED module
- Cooling required
- Flexible operating modes
- 5-year guarantee

→

**Standards**, page 4

**Colour temperatures and tolerances**, page 7

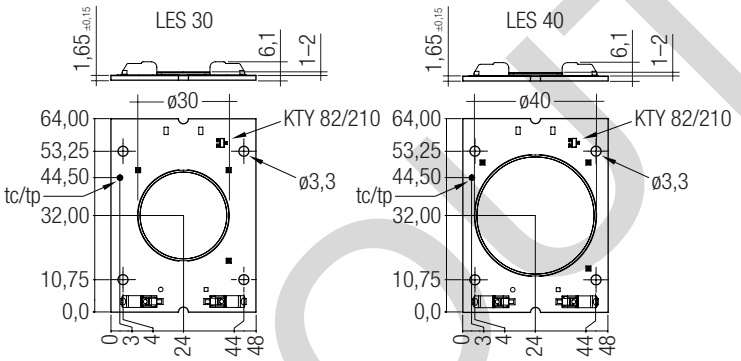
EAC CE RoHS

## TALEXmodule STARK FLE GEN1

TALEXmodule FLE

### Technical data

| | |
|---|---|
| Beam characteristic | 115° |
| Ambient temperature range | -25 ... +50 °C |
| tp rated | 65 °C |
| tc① | up to 90 °C |
| Max. DC forward current for LES30② | 1,750 mA |
| Max. DC forward current for LES40② | 3,500 mA |
| Max. permissible LF current ripple for LES30 | 2,400 mA |
| Max. permissible LF current ripple for LES40 | 5,000 mA |
| Max. permissible peak current for LES30 | 4,800 mA / max. 10 µs |
| Max. permissible peak current for LES40 | 10,000 mA / max. 10 µs |
| Max. permissible output voltage of LED Driver for LES30③ | 250 V |
| Max. permissible output voltage of LED Driver for LES40③ | 250 V |
| Insulation test voltage for LES30 | 1.5 kV |
| Insulation test voltage for LES40 | 1.5 kV |
| ESD classification | severity level 4 |
| Risk group (EN 62471:2008) | 1 |
| Type of protection | IP00 |




### Ordering data

| Type | Article number | Colour temperature | Packaging | Weight per pc. |
|---|---|---|---|---|
| STARK-FLE-G1-LES30-830-CLA | 89601873 | 3,000 K | 20 pc(s). | 0.014 kg |
| STARK-FLE-G1-LES30-840-CLA | 89601874 | 4,000 K | 20 pc(s). | 0.014 kg |
| STARK-FLE-G1-LES30-765-IND | 89601875 | 6,500 K | 20 pc(s). | 0.014 kg |
| STARK-FLE-G1-LES40-830-CLA | 89601876 | 3,000 K | 20 pc(s). | 0.015 kg |
| STARK-FLE-G1-LES40-840-CLA | 89601877 | 4,000 K | 20 pc(s). | 0.014 kg |
| STARK-FLE-G1-LES40-765-IND | 89601878 | 6,500 K | 20 pc(s). | 0.014 kg |

## Specific technical data

| Type[7] | Photo-metric code | Forward current | Luminous flux at tp = 25 °C[4] | Luminous flux at tp = 65 °C[4] | Power consumption module[4] [6] | Min. forward voltage at tp = 65 °C | Max. forward voltage at tp = 25 °C | Luminous efficacy module at tp = 25 °C | Luminous efficacy module at tp = 65 °C | Luminous efficacy system at tp = 65 °C[5] | Colour rendering index CRI |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **STARK-FLE-LES30 – Operating mode at 900 mA** | | | | | | | | | | | |
| **STARK-FLE-G1-LES30-830-CLA** | 830/349 | 900 mA | 5,100 lm | 4,500 lm | 44.3 W | 47.5 V | 54.0 V | 113 lm/W | 102 lm/W | 92 lm/W | 80 |
| **STARK-FLE-G1-LES30-840-CLA** | 840/349 | 900 mA | 5,850 lm | 5,150 lm | 44.3 W | 47.5 V | 54.0 V | 129 lm/W | 116 lm/W | 104 lm/W | 80 |
| **STARK-FLE-G1-LES30-765-IND** | 765/349 | 900 mA | 6,400 lm | 5,650 lm | 44.3 W | 47.5 V | 54.0 V | 141 lm/W | 128 lm/W | 115 lm/W | 70 |
| **STARK-FLE-LES30 – Operating mode at 1,400 mA** | | | | | | | | | | | |
| **STARK-FLE-G1-LES30-830-CLA** | 830/349 | 1,400 mA | 7,500 lm | 6,600 lm | 72.4 W | 50.0 V | 56.2 V | 101 lm/W | 91 lm/W | 82 lm/W | 80 |
| **STARK-FLE-G1-LES30-840-CLA** | 840/349 | 1,400 mA | 8,500 lm | 7,500 lm | 72.4 W | 50.0 V | 56.2 V | 115 lm/W | 104 lm/W | 94 lm/W | 80 |
| **STARK-FLE-G1-LES30-765-IND** | 765/349 | 1,400 mA | 9,350 lm | 8,200 lm | 72.4 W | 50.0 V | 56.2 V | 127 lm/W | 113 lm/W | 102 lm/W | 70 |
| **STARK-FLE-LES30 – Operating mode at 1,750 mA** | | | | | | | | | | | |
| **STARK-FLE-G1-LES30-830-CLA** | 830/349 | 1,750 mA | 9,100 lm | 8,000 lm | 93.5 W | 51.7 V | 57.9 V | 95 lm/W | 86 lm/W | 77 lm/W | 80 |
| **STARK-FLE-G1-LES30-840-CLA** | 840/349 | 1,750 mA | 10,200 lm | 8,950 lm | 93.5 W | 51.7 V | 57.9 V | 107 lm/W | 96 lm/W | 86 lm/W | 80 |
| **STARK-FLE-G1-LES30-765-IND** | 765/349 | 1,750 mA | 11,200 lm | 9,850 lm | 93.5 W | 51.7 V | 57.9 V | 117 lm/W | 105 lm/W | 95 lm/W | 70 |
| **STARK-FLE-LES40 – Operating mode at 1,750 mA** | | | | | | | | | | | |
| **STARK-FLE-G1-LES40-830-CLA** | 830/349 | 1,750 mA | 9,800 lm | 8,650 lm | 80.5 W | 44.4 V | 50.3 V | 119 lm/W | 107 lm/W | 96 lm/W | 80 |
| **STARK-FLE-G1-LES40-840-CLA** | 840/349 | 1,750 mA | 10,650 lm | 9,400 lm | 80.5 W | 44.4 V | 50.3 V | 129 lm/W | 117 lm/W | 105 lm/W | 80 |
| **STARK-FLE-G1-LES40-765-IND** | 765/349 | 1,750 mA | 11,700 lm | 10,300 lm | 80.5 W | 44.4 V | 50.3 V | 142 lm/W | 128 lm/W | 115 lm/W | 70 |
| **STARK-FLE-LES40 – Operating mode at 2,600 mA** | | | | | | | | | | | |
| **STARK-FLE-G1-LES40-830-CLA** | 830/349 | 2,600 mA | 13,800 lm | 12,150 lm | 124.5 W | 46.3 V | 52.1 V | 109 lm/W | 98 lm/W | 88 lm/W | 80 |
| **STARK-FLE-G1-LES40-840-CLA** | 840/349 | 2,600 mA | 15,000 lm | 13,200 lm | 124.5 W | 46.3 V | 52.1 V | 118 lm/W | 106 lm/W | 95 lm/W | 80 |
| **STARK-FLE-G1-LES40-765-IND** | 765/349 | 2,600 mA | 16,500 lm | 14,500 lm | 124.5 W | 46.3 V | 52.1 V | 130 lm/W | 116 lm/W | 104 lm/W | 70 |
| **STARK-FLE-LES40 – Operating mode at 3,500 mA** | | | | | | | | | | | |
| **STARK-FLE-G1-LES40-830-CLA** | 830/349 | 3,500 mA | 17,600 lm | 15,500 lm | 174.7 W | 48.3 V | 54.2 V | 99 lm/W | 89 lm/W | 80 lm/W | 80 |
| **STARK-FLE-G1-LES40-840-CLA** | 840/349 | 3,500 mA | 19,100 lm | 16,800 lm | 174.7 W | 48.3 V | 54.2 V | 107 lm/W | 96 lm/W | 86 lm/W | 80 |
| **STARK-FLE-G1-LES40-765-IND** | 765/349 | 3,500 mA | 21,100 lm | 18,550 lm | 174.7 W | 48.3 V | 54.2 V | 118 lm/W | 106 lm/W | 95 lm/W | 70 |

[1] See Derating curves in data sheet section 2.3.

[2] Max. DC forward current varies over the temperature of the LED module. See derating curves in data sheet section 2.3.

[3] The detailed explanation, see data sheet section 3.1.

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

[5] Assumed efficiency for the LED Driver is 0.9.

[6] All values at tp = 65 °C.

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

## 1. Standards

EN 62031
EN 62471
EN 61547
EN 55015
IEC 62717

### 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 | McAdam initial | McAdam 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

| Type | Forward current | Energy classification |
|---|---|---|
| FLE-G1-LES30-830-CLA | 900 mA | A+ |
| | 1,400 mA | A+ |
| | 1,750 mA | A |
| FLE-G1-LES30-840-CLA | 900 mA | A+ |
| | 1,400 mA | A+ |
| | 1,750 mA | A+ |
| FLE-G1-LES30-765-IND | 900 mA | A+ |
| | 1,400 mA | A+ |
| | 1,750 mA | A+ |
| FLE-G1-LES40-830-CLA | 1,750 mA | A+ |
| | 2,600 mA | A+ |
| | 3,500 mA | A+ |
| FLE-G1-LES40-840-CLA | 1,750 mA | A+ |
| | 2,600 mA | A+ |
| | 3,500 mA | A+ |
| FLE-G1-LES40-765-IND | 1,750 mA | A+ |
| | 2,600 mA | A+ |
| | 3,500 mA | A+ |

## 2. Thermical details

### 2.1 tp point, ambient temperature and life-time

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

For TALEXmodule STARK FLE a tp temperature of 65 °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 tp 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.

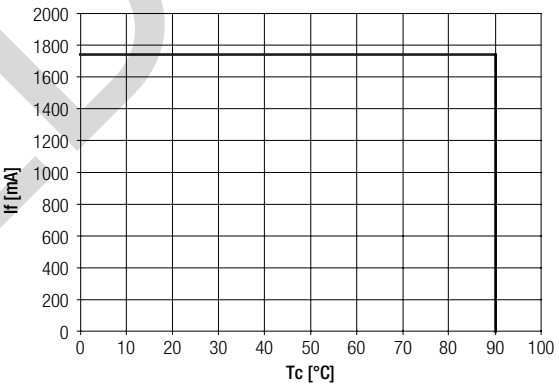
### 2.2 Storage and humidity

| | |
|---|---|
| storage temperature | -30 ... +80 °C |

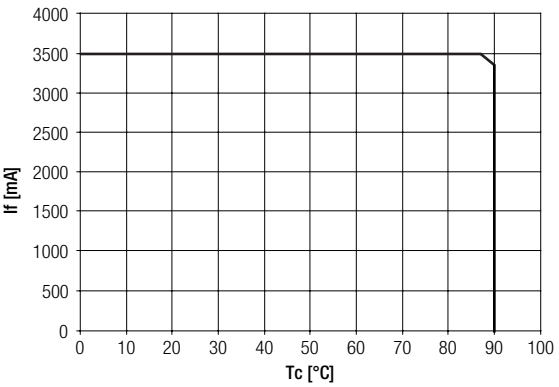
Operation only in non condensing environment.
Humidity during processing of the module should be between 30 to 70 %.

### 2.3 Derating curves

TALEXmodule STARK FLE-G1-LES30




TALEXmodule STARK FLE G1-LES40



### 2.4 Thermal design and heat sink

The rated life of TALEX products depends to a large extent on the temperature. If the permissible temperature limits are exceeded, the life of the TALEXmodule STARK FLE will be greatly reduced or the TALEXmodule STARK FLE may be destroyed.

### 2.5 Heat sink values

**TALEXmodule STARK-FLE-G1-LES30**

| ta | tp | Operating current | $R_{th,\ hs\text{-}a}$ |
|---|---|---|---|
| 25 °C | 65 °C | 900 mA | 1.20 K/W |
| 30 °C | 65 °C | 900 mA | 1.04 K/W |
| 40 °C | 65 °C | 900 mA | 0.73 K/W |
| 50 °C | 65 °C | 900 mA | 0.42 K/W |
| 25 °C | 65 °C | 1,400 mA | 0.69 K/W |
| 30 °C | 65 °C | 1,400 mA | 0.59 K/W |
| 40 °C | 65 °C | 1,400 mA | 0.41 K/W |
| 50 °C | 65 °C | 1,400 mA | 0.22 K/W |
| 25 °C | 65 °C | 1,750 mA | 0.51 K/W |
| 30 °C | 65 °C | 1,750 mA | 0.44 K/W |
| 40 °C | 65 °C | 1,750 mA | 0.30 K/W |
| 50 °C | 65 °C | 1,750 mA | 0.16 K/W |

**TALEXmodule STARK-FLE-G1-LES40**

| ta | tp | Operating current | $R_{th,\ hs\text{-}a}$ |
|---|---|---|---|
| 25 °C | 65 °C | 1,750 mA | 0.65 K/W |
| 30 °C | 65 °C | 1,750 mA | 0.56 K/W |
| 40 °C | 65 °C | 1,750 mA | 0.38 K/W |
| 50 °C | 65 °C | 1,750 mA | 0.21 K/W |
| 25 °C | 65 °C | 2,600 mA | 0.38 K/W |
| 30 °C | 65 °C | 2,600 mA | 0.33 K/W |
| 40 °C | 65 °C | 2,600 mA | 0.22 K/W |
| 50 °C | 65 °C | 2,600 mA | 0.11 K/W |
| 25 °C | 65 °C | 3,500 mA | 0.25 K/W |
| 30 °C | 65 °C | 3,500 mA | 0.21 K/W |
| 40 °C | 65 °C | 3,500 mA | 0.14 K/W |
| 50 °C | 65 °C | 3,500 mA | 0.06 K/W |

**Notes**
The actual cooling can differ because of the material, the structural shape, outside influences and the installation situation. A thermal connection between TALEXmodule STARK FLE and heat sink with heat-conducting paste or heat conducting adhesive film is absolutely necessary.
Additionally the TALEXmodule STARK FLE has to be fixed on the heat sink with M3 screws to optimise the thermal connection.
Use of thermal interface material with thermal conductivity of l > 1 W/mK and layer thickness of interface material with max. 50 µm or a similar interface material where the quotient of layer thickness and thermal conductivity b < 50 µmmK/W.

## 3. Installation / wiring

### 3.1 Electrical supply/choice of LED Driver

TALEXmodule FLE 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 TALEX LED Drivers from Tridonic in combination with TALEXmodule FLE guarantees the necessary protection for safe and reliable operation.

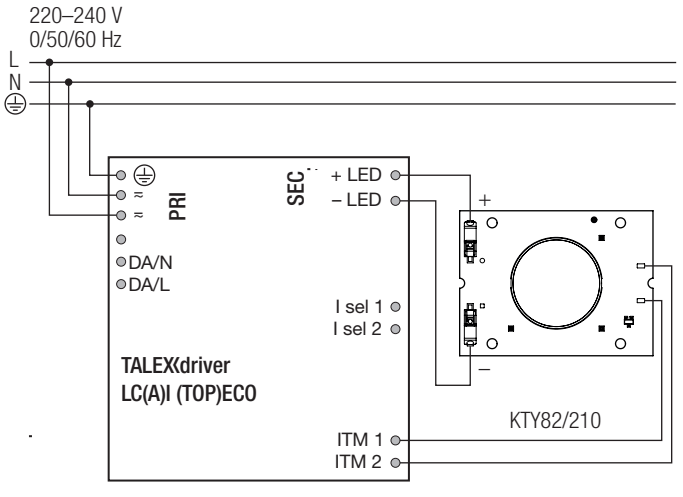
If a LED Driver other than Tridonic TALEXconverter is used, it must provide the following protection:
- Short-circuit protection
- Overload protection
- Overtemperature protection

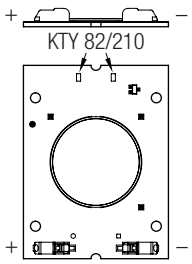
TALEXmodule FLE must be supplied by a constant current LED Driver. Operation with a constant voltage LED Driver will lead to an irreversible damage of the module.
Wrong polarity can damage the TALEXmodule FLE.

TALEXmodule FLE are basic isolated up to 250 V 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 250 V, an additional isolation between LED module and heat sink is required (for example by isolated 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

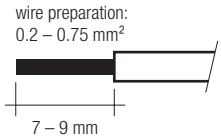
The temperature monitoring is available with Tridonic LED Driver series TOP (up to 35 W) and ECO with the ITM feature in combination with the thermal sensor KTY 82/210.
If the temperature monitoring function want to be used it has to be wired as shown below in the wiring diagram.



### 3.3 Wiring type and cross section

The wiring can be solid cable with a cross section of 0.2 to 0.75 mm². For the push-wire connection you have to strip the insulation (7–9 mm).




Inserting stranded wires / removing wires by lightly pressing on the push button.

### 3.4 Mounting instruction

TALEXmodule STARK FLE from Tridonic which have to be installed on a heat sink have to be connected with heat-conducting paste or heat conducting adhesive film and fixed with M3 screws.

The fixing/cooling surface must be cleaned before installing the TALEXmodules to remove all dirt, dust and grease.

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

Max. torque for fixing: 0.5 Nm.

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 maintenace 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 inital luminous flux, respectivly 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

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

| Operating mode | tp temperature | L90 / F10 | L90 / F50 | L80 / F10 | L80 / F50 | L70 / F10 | L70 / F50 |
|---|---|---|---|---|---|---|---|
| HE | 65 °C | 51,000 h | 60,000 h | 60,000 h | 60,000 h | 60,000 h | 60,000 h |
| | 75 °C | 38,000 h | 57,000 h | 60,000 h | 60,000 h | 60,000 h | 60,000 h |
| | 85 °C | 29,000 h | 43,000 h | 60,000 h | 60,000 h | 60,000 h | 60,000 h |
| NM | 65 °C | 40,000 h | 60,000 h | 60,000 h | 60,000 h | 60,000 h | 60,000 h |
| | 75 °C | 30,000 h | 44,000 h | 60,000 h | 60,000 h | 60,000 h | 60,000 h |
| | 85 °C | 22,000 h | 33,000 h | 47,000 h | 60,000 h | 60,000 h | 60,000 h |
| HO | 65 °C | 32,000 h | 48,000 h | 60,000 h | 60,000 h | 60,000 h | 60,000 h |
| | 75 °C | 24,000 h | 36,000 h | 50,000 h | 60,000 h | 60,000 h | 60,000 h |
| | 85 °C | 18,000 h | 27,000 h | 38,000 h | 57,000 h | 60,000 h | 60,000 h |

## 5. Photometric charcteristics

### 5.1 Coordinates and tolerances according to CIE 1931

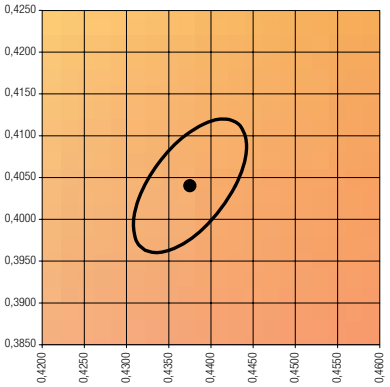
The specified colour coordinates are measured integral after a settling time of 200 ms. The current impuls depends on the module type.

| Module type | Current impulse |
|---|---|
| TALEX(module STARK-FLE-G1-LES30 | 1,400 mA |
| TALEX(module STARK-FLE-G1-LES40 | 2,600 mA |

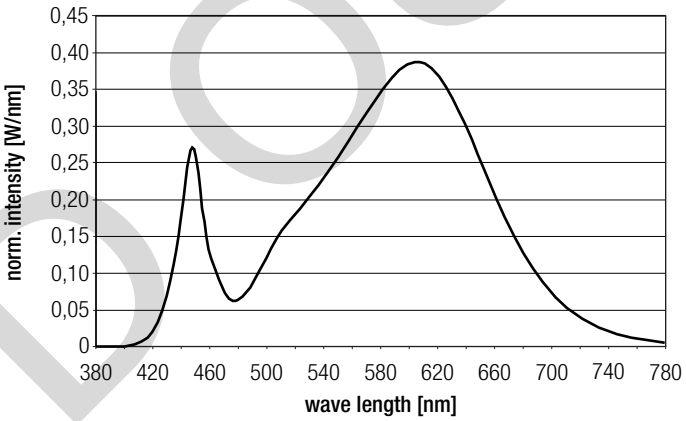
The ambient temperature of the measurement is ta = 25 °C.
The measurement tolerance of the colour coordinates are ± 0.01.

**3,000 K**

| | x0 | y0 |
|---|---|---|
| Centre | 0.4369 | 0.4041 |

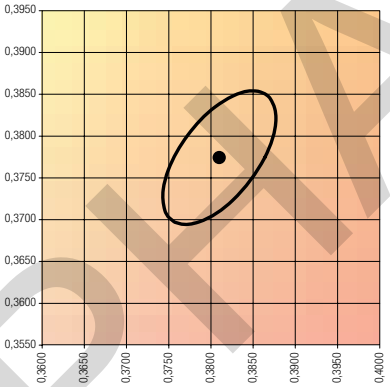



MacAdam ellipse: 3SDCM

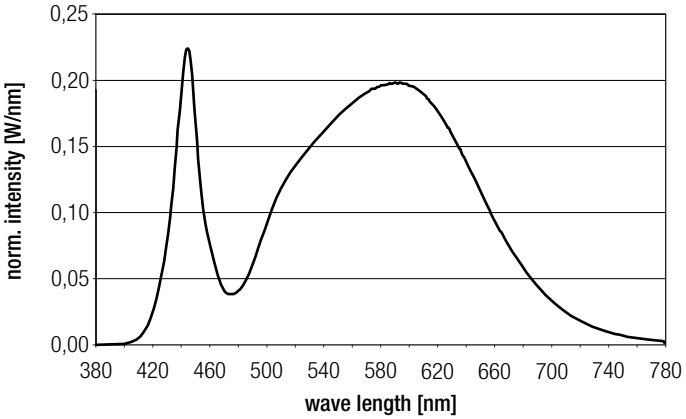



**4,000 K**

| | x0 | y0 |
|---|---|---|
| Centre | 0.3804 | 0.3767 |

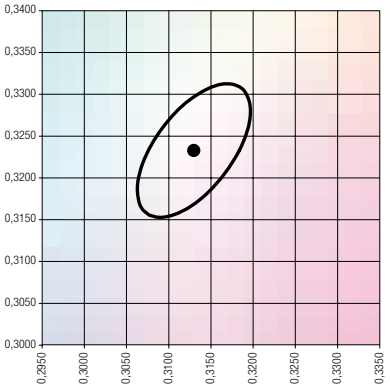



MacAdam ellipse: 3SDCM

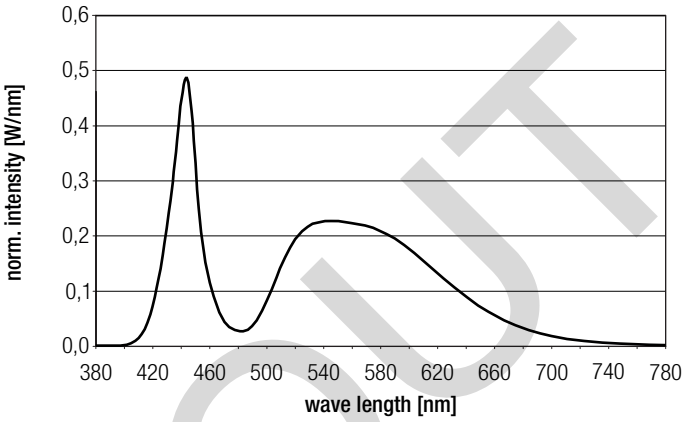


**6,500 K**

| | x0 | y0 |
|---|---|---|
| Centre | 0.3135 | 0.3236 |

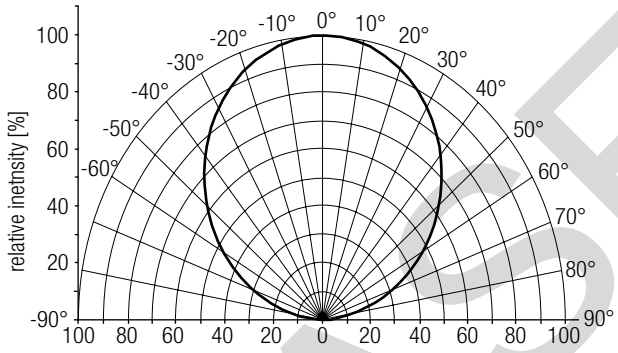



MacAdam ellipse: 3SDCM




### 5.2 Light distribution

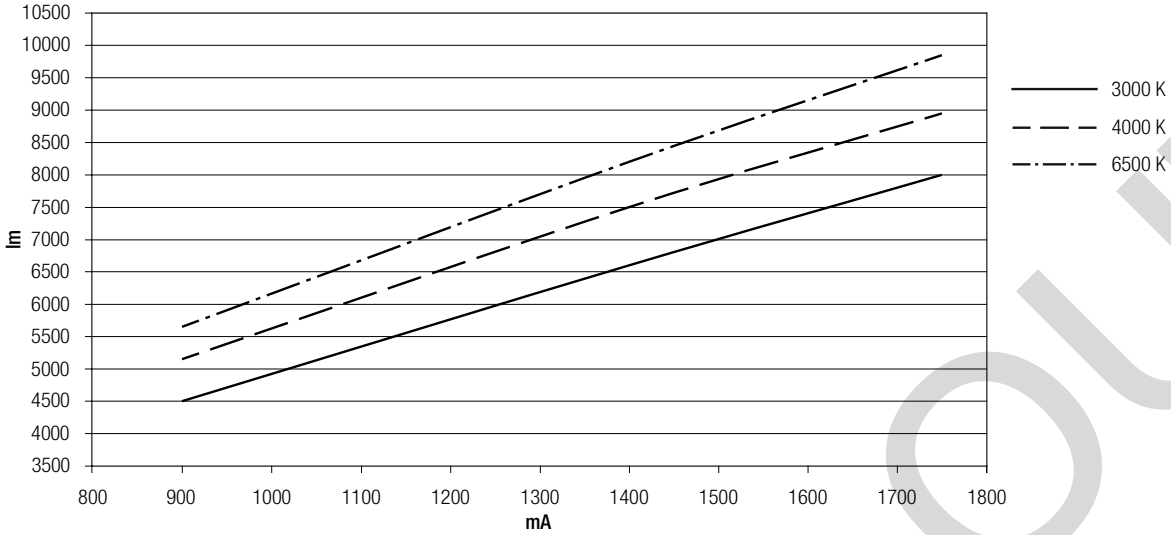
The optical design of the TALEXmodule SLE product line ensures optimum homogenity for the light distribution.




For further information see Design-in Guide, 3D data and photometric data on www.tridonic.com or on request.

### 5.3 Relative luminous flux vs. operating current

**TALEXmodule STARK FLE-G1-LES30 at tp=65°C**




**TALEXmodule STARK FLE-G1-LES40 at tp=65°C**