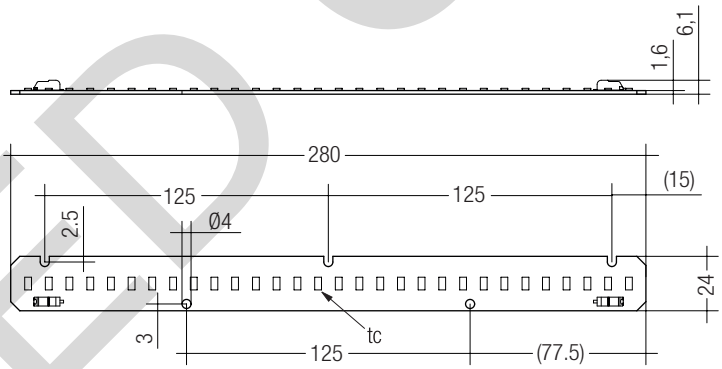
CE RoHS

## TALEXmodule STARK LLE 24-280-2000
STARK LLE



### Product description

- Ideal for linear and panel lights with high luminous flux
- Luminous flux range from 1,580 up to 2,040 lm
- Efficiency of the module up to 129 lm/W
- High colour rendering index CRI > 80
- Small colour tolerance MacAdam 4④
- Small luminous flux tolerances
- Colour temperatures 3,000 K and 4,000 K
- 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
- Simple installation (e.g. screws)
- Long lifetime: 50,000 hours
- 5-year guarantee




### Technical data

| | |
|---|---|
| Beam characteristic | 120° |
| Ambient temperature ta | -30 ... +45 °C |
| Typ. tp point | 65 °C |
| Risk group (EN 62471:2008) | 1 |
| Type of protection | IP00 |

### Ordering data

| Type | Article number | Colour temperature | Packaging carton | Weight per pc. |
|---|---|---|---|---|
| TALEXmodule STARK-LLE-24-280-2000-830-CLA | 89800360 | 3,000 K | 50 pc(s). | 0.024 kg |
| TALEXmodule STARK-LLE-24-280-2000-840-CLA | 89800361 | 4,000 K | 50 pc(s). | 0.024 kg |

### Specific technical data

| Type⑤ | Photometric code | Typ. luminous flux at tp = 25 °C① | Typ. luminous flux at tp = 65 °C① | Typ. forward current①②③ | Min. forward voltage at tp = 65 °C | Max. forward voltage at tp = 25 °C | Typ. power consumption at tp = 65 °C① | Efficacy of the module at tp = 25 °C | Efficacy of the module at tp = 65 °C | Efficacy of the system at tp = 65 °C | Colour rendering index CRI | Energy classification |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Operation mode HE at 300 mA** | | | | | | | | | | | | |
| STARK-LLE-24-280-2000-830-CLA | 830/458 | 1,650 lm | 1,580 lm | 300 mA | 41.6 V | 48.5 V | 13.4 W | 120 lm/W | 118 lm/W | 106 lm/W | > 80 | A+ |
| STARK-LLE-24-280-2000-840-CLA | 840/458 | 1,770 lm | 1,700 lm | 300 mA | 41.6 V | 48.5 V | 13.4 W | 129 lm/W | 127 lm/W | 114 lm/W | > 80 | A+ |
| **Operation mode HO at 350 mA** | | | | | | | | | | | | |
| STARK-LLE-24-280-2000-830-CLA | 830/458 | 1,900 lm | 1,820 lm | 350 mA | 42.4 V | 49.4 V | 15.9 W | 118 lm/W | 114 lm/W | 104 lm/W | > 80 | A+ |
| STARK-LLE-24-280-2000-840-CLA | 840/458 | 2,040 lm | 1,960 lm | 350 mA | 42.4 V | 49.4 V | 15.9 W | 128 lm/W | 122 lm/W | 111 lm/W | > 80 | A+ |

① Tolerance range for optical and electrical data: ±10 %.

② Max. permissible repetitive peak current: 480 mA.

③ Max. permissible surge current: 0.54 A, duration max. 10 µs.

④ Integrated measurement over the whole module.

⑤ HE ... high efficiency, HO ... high output.

### Standards
EN 62031
EN 62471
EN 61000-4-2

### 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 | McAdams initial | McAdams after 25% of the lifetime (max.6000h) | Lumen maintanance after 25% of the lifetime (max.6000h) | |
| | | | | | Code | Remaining lumen |
| 7 | 67 – 76 | | | | 7 | ≥ 70 % |
| 8 | 77 – 86 | | | | 8 | ≥ 80 % |
| 9 | 87 – ≥90 | | | | 9 | ≥ 90 % |

### 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 LLE will be greatly reduced or the TALEXmodule STARK LLE may be destroyed.

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

For TALEXmodule STARK LLE 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 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.

### Mounting instruction

None of the components of the TALEXmodule STARK 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 5 screws per module. In order not to damage the modules only rounded head screws and an additional plastic flat washer should be used.

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.

### 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/com/en/technical-data.asp

### Heat sink values

**TALEXmodule STARK LLE**

| ta | tp | Forward current | $R_{th,\ hs\text{-}a}$ | Cooling area |
|---|---|---|---|---|
| 25 °C | 65 °C | 300 mA | 4.57 K/W | 146 cm² |
| 25 °C | 65 °C | 350 mA | 3.80 K/W | 176 cm² |
| 35 °C | 65 °C | 300 mA | 3.49 K/W | 191 cm² |
| 35 °C | 65 °C | 350 mA | 2.90 K/W | 230 cm² |
| 45 °C | 65 °C | 300 mA | 2.33 K/W | 287 cm² |
| 45 °C | 65 °C | 350 mA | 1.97 K/W | 345 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.

### Thermal behaviour

| | |
|---|---|
| storage temperature | -30 ... +80 °C |
| operating temperature ta | -30 ... +45 °C |
| tp (at typ. current) | 65 °C |
| tc max. (at typ. current) | 75 °C |
| max. humidity* | 0 ... 80 % |

* not condensed

### Life time, 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 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.

### Lumen maintenance for TALEXmodule STARK LLE-24-280-2000

| Operating current | tp temperature | L70 / F50 |
|---|---|---|
| 350 mA | 65 °C | 45,000 h |

### Selection of the LED control gear

TALEXmodule STARK LLE can be operated either from LED control gears or from LED control gears with LV output voltage.

TALEXmodule STARK LLE are basic isolated up to 450 V against ground and can be mounted directly on earthed metal parts of the luminaire.
If the max. output voltage of the led control gear (also against earth) is above 450 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. by means of a non removable light distributor over the module.

### Electrical supply/choice of LED control gear

TALEXmodule STARK LLE 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 control gear which complies with the relevant standards. The use of TALEXconverter from Tridonic in combination with TALEXmodule STARK LLE guarantees the necessary protection for safe and reliable operation.

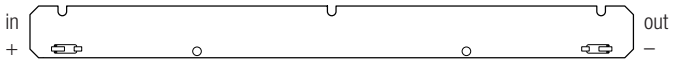
If a LED control gear other than Tridonic TALEXconverter is used, it must provide the following protection:
- Short-circuit protection
- Overload protection
- Overtemperature protection

TALEXmodule STARK LLE must be supplied by a constant current LED control gear.
Operation with a constant voltage LED control gear will lead to an irreversible damage of the module.

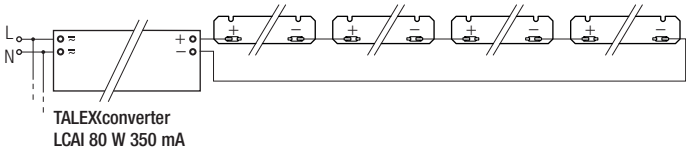
Wrong polarity can damage the TALEXmodule STARK LLE.

If TALEXmodules LLE are wired in parallel and a wire breaks or a complete module fails then the current passing through the other module increases. This may reduce its life considerably. In addition there can be slight differences in light output caused by tolerances.

### Wiring

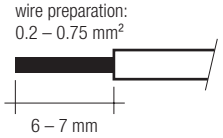



### Wiring examples



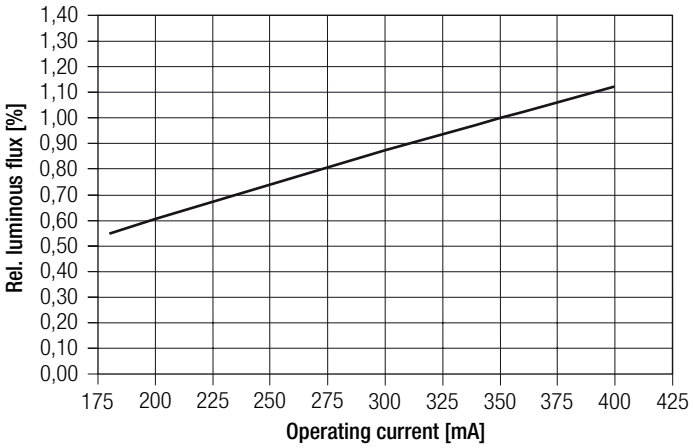

### Wiring type and cross section

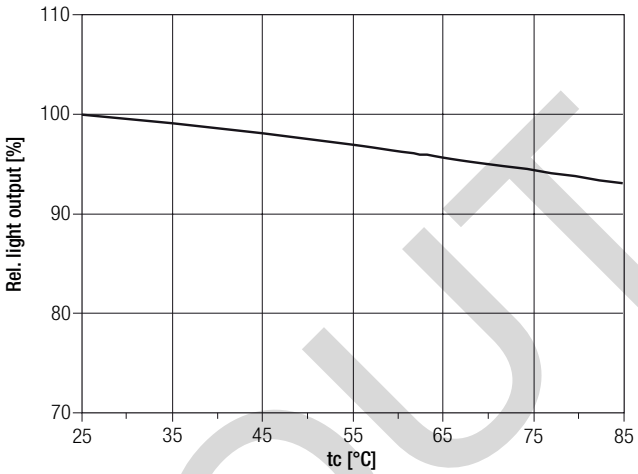
The wiring can be solid cable with a cross section of 0.2 to 0.75 mm². For the push-wire connection you have to strip the insulation (6–7 mm).

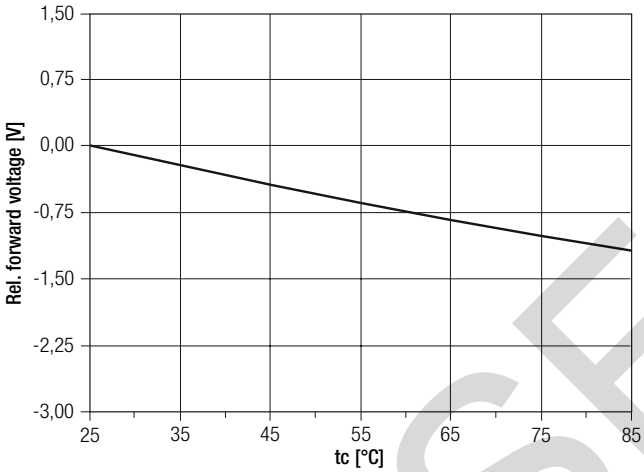


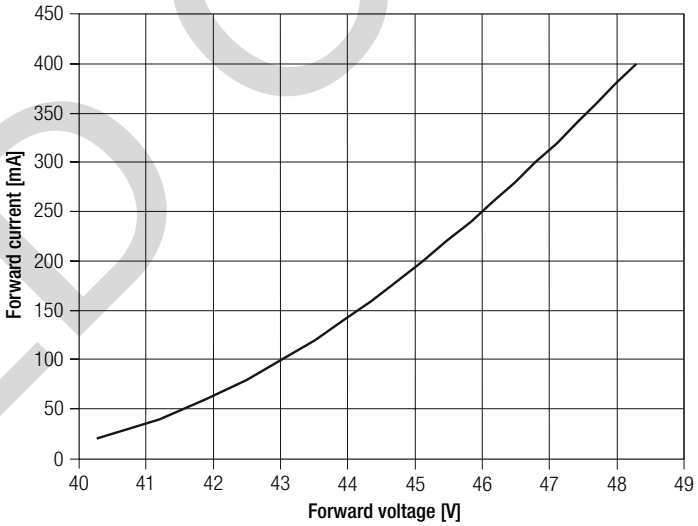

Inserting stranded wires / removing wires by lightly pressing on the push button.

### Relative luminous flux



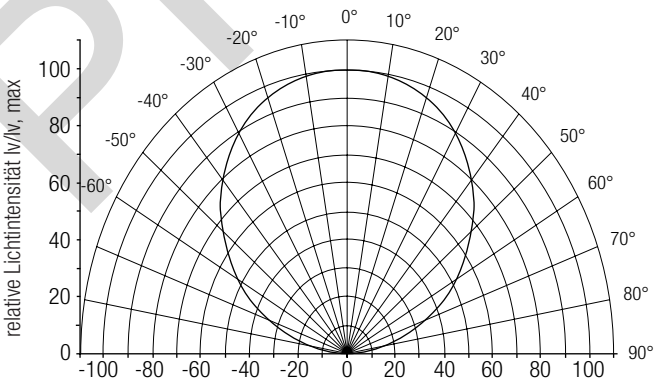




The diagrams are based on statistic values.
The real values can be different.

### Optical characteristics TALEX(module STARK LLE

The optical design of the TALEX(module STARK LLE product line ensures optimum homogenity for the light distribution.

### 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 7.
To ensure an ideal mixture of colours and a homogenious light distribution a suitable optic (e. g. PMMA diffuser) and a sufficient spacing between module and optic (typ. 4 cm) should be used.

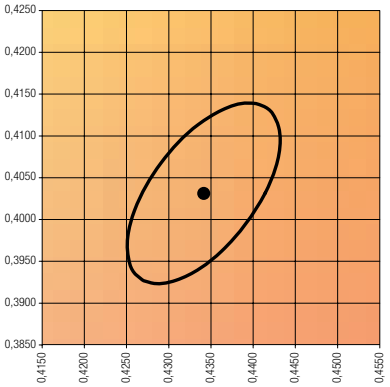
For further information see Design-in Guide, 3D data and photometric data on www.tridonic.com or on request.

### Coordinates and tolerances according to CIE 1931

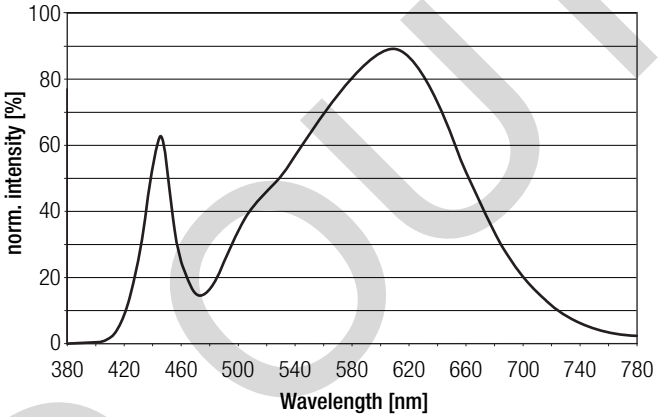
The specified colour coordinates are integrated measured by a current impulse with typical values of module and a duration of 200 ms.
The ambient temperature of the measurement is ta = 25 °C.
The measurement tolerance of the colour coordinates are ± 0.01.

**3,000 K**

| | x0 | y0 |
|---|---|---|
| Centre | 0.4344 | 0.4032 |

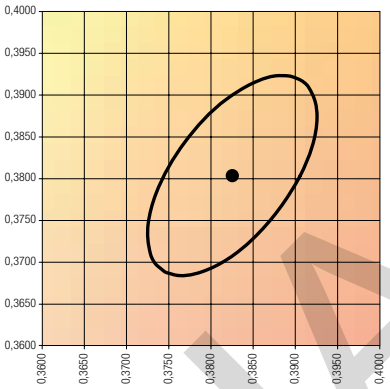



MacAdam Ellipse: 4SDCM




**4,000 K**

| | x0 | y0 |
|---|---|---|
| Centre | 0.3828 | 0.3803 |




MacAdam Ellipse: 4SDCM