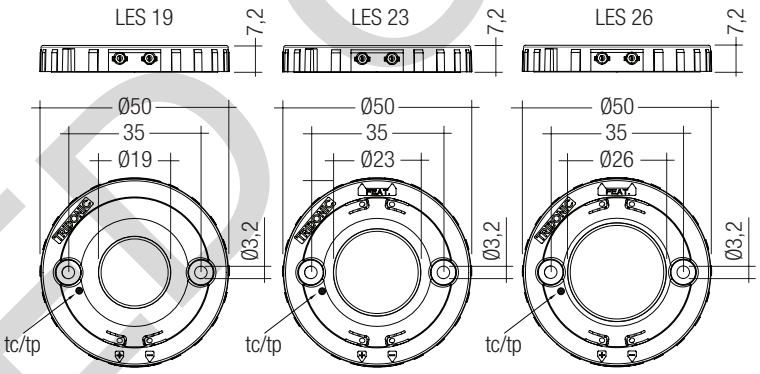
CE RoHS

TALEXmodule STARK SLE GEN2 COI
STARK SLE

Product description
- LED module for hospital and medical tasks
- Fulfills the requirements for Cyanosis observation lighting according to the standard AS/NZS 1680.2.5:1997
- For spotlights and downlights
- High colour rendering index CRI > 90
- High efficiency up to 116 lm/W for the LED module
- High system efficiency up to 90 lm/W at tp = 65 °C
- High colour consistency (MacAdams 3)
- Small LES (light emitting surface) diameter enables small beam angle for spotlights
- Excellent thermal management by COB technology
- NTC for temperature control for type LES23 and LES26
- Uniform radiation with Dam&Fill technology
- Fixing holes for M3 screws
- Integrated LED module
- Cooling required
- Long life-time: up to 80 % luminous flux after 50,000 operating hours
- Flexible operating modes



Technical data

Beam characteristic	140°
Ambient temperature ta	-25 ... +55 °C
tp_rated temperature①	65 °C
Max. tc point temperature①	75 °C
Risk group (EN 62471:2008)	1
Type of protection	IP00

Ordering data

Type	Article number	Colour temperature	Housing	Connection cable	Packaging	Weight per pc.
STARK SLE G2 LES19 4000K COI	89601737	4,000 K	yes	no	15 pc(s).	0.008 kg
STARK SLE G2 LES23 4000K COI	89601738	4,000 K	yes	no	15 pc(s).	0.008 kg
STARK SLE G2 LES26 4000K COI	89601739	4,000 K	yes	no	15 pc(s).	0.008 kg

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Standards, page 3

Colour temperatures and tolerances, page 7

Specific technical data

Type[7]	Photometric code	Forward current[3] [4] [5]	Luminous flux at tp = 25 °C[2]	Luminous flux at tp = 65 °C[2]	Power consumption module[8]	Forward voltage module[6] [8]	Luminous efficacy module at tp = 25 °C	Luminous efficacy module at tp = 65 °C	Luminous efficacy system at tp = 65 °C	Colour rendering index CRI	Energy classification
Operating mode HE											
STARK SLE G2 LES19 4000K COI	940/3x9	350 mA	1,300 lm	1,100 lm	11.6 W	33.2 V	112 lm/W	95 lm/W	86 lm/W	90	A+
STARK SLE G2 LES23 4000K COI	940/3x9	500 mA	1,900 lm	1,650 lm	16.5 W	33.1 V	115 lm/W	100 lm/W	90 lm/W	90	A+
STARK SLE G2 LES26 4000K COI	940/3x9	700 mA	2,600 lm	2,250 lm	23.2 W	33.2 V	116 lm/W	97 lm/W	87 lm/W	90	A+
Operating mode NM											
STARK SLE G2 LES19 4000K COI	940/3x9	500 mA	1,800 lm	1,550 lm	17.1 W	34.2 V	102 lm/W	91 lm/W	82 lm/W	90	A+
STARK SLE G2 LES23 4000K COI	940/3x9	700 mA	2,600 lm	2,250 lm	23.8 W	33.9 V	109 lm/W	95 lm/W	86 lm/W	90	A+
STARK SLE G2 LES26 4000K COI	940/3x9	1,050 mA	3,750 lm	3,250 lm	36.0 W	34.3 V	108 lm/W	89 lm/W	80 lm/W	90	A+

[1] If the max. temperature limits are exceeded. the life of the system will be greatly reduced or the system may be damaged. The temperature of the TALEX(module at the tp-point is to be measured in the thermally stable state with a temperature sensor or or temperature-sensitive sticker as per EN 60598-1. For the precise position of the tp point see the drawing above.

[2] Tolerance range for optical data: ±10 %.

[3] Exceeding the max. operating current leads to an overload on the TALEX(module. This may in turn result in a significant reduction in life-time or even destruction of the TALEX(module.

[4] Max. permissible surge current: 3 A. duration max. 10 µs.

[5] Ripple max. 50 % of typ. forward current.

[6] Tolerance range voltage: ±10 %.

[7] HE ... high efficiency. NM ... nominal mode.

[8] All values at tp = 65 °C.

Standards
EN 62031
EN 62471
EN 61547
EN 55015
IEC 62717
AS/NZS 1680.2.5:1997

Glow wire test
according to EN 62031 with increased temperature of 960 °C passed.

Photometric code

Key for photometric code, e. g. 940 / 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 life-time (max.6000h)	Lumen maintanance after 25% of the life-time (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 SLE G2 will be greatly reduced or the TALEXmodule STARK SLE G2 may be destroyed.

Therefore the TALEXmodule STARK SLE G2 needs to be mounted onto a heat sink.

Tridonic's excellent thermal design for the TALEXmodule STARK SLE G2 products provides the lowest thermal resistance and therefore allowing new compact designs without sacrificing quality, safety and life-time.

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 SLE G2 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.

Mounting instruction

TALEXmodule STARK SLE G2 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 TALEX modules to remove all dirt, dust and grease.

None of the components of the TALEXmodule STARK SLE G2 (substrate, LED, electronic components etc.) may be exposed to tensile or compressive stresses.

Max. torque for fixing: 0.5 Nm.

The PURE modules are mounted with 2 screws per module.
In order not to damage the modules only rounded head screws and an additional plastic flat washer should be used.

For further information please refer to to the brochure entitled "Technical Design-In-Guide SLE GEN2".

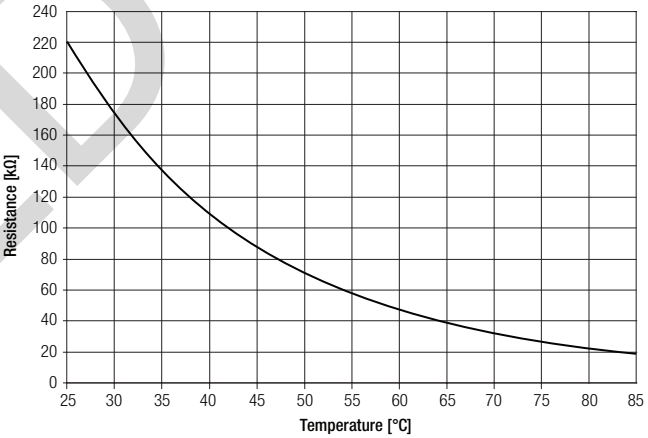
Chemical substance may harm the LED module. Chemical reactions could lead to colour shift, reduced luminous flux or a total failure of the module caused by corrosion of electrical connections.

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/esd-protection

Temperature control for LES23 and LES26
An NTC resistor is on the board of the TALEXmodule STARK SLE G2 to control the tp temperature during the operation with a resistor value of 220 kΩ NTC.



Electrical supply/choice of LED control gear
TALEXmodule STARK SLE G2 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 TALEX LED control gears from Tridonic in combination with TALEXmodule STARK SLE G2 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 SLE G2 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 SLE G2.

Heat sink values

TALEXmodule STARK SLE G2 LES19 4000K COI

ta	tp	If	$R_{th, hs-a}$
25 °C	65 °C	350 mA	4.43 K/W
30 °C	65 °C	350 mA	3.87 K/W
40 °C	65 °C	350 mA	2.75 K/W
50 °C	65 °C	350 mA	1.63 K/W
25 °C	65 °C	500 mA	2.87 K/W
30 °C	65 °C	500 mA	2.50 K/W
40 °C	65 °C	500 mA	1.78 K/W
50 °C	65 °C	500 mA	1.05 K/W

TALEXmodule STARK SLE G2 LES23 4000K COI

ta	tp	If	$R_{th, hs-a}$
25 °C	65 °C	500 mA	3.29 K/W
30 °C	65 °C	500 mA	2.87 K/W
40 °C	65 °C	500 mA	2.04 K/W
50 °C	65 °C	500 mA	1.21 K/W
25 °C	65 °C	700 mA	2.19 K/W
30 °C	65 °C	700 mA	1.91 K/W
40 °C	65 °C	700 mA	1.35 K/W
50 °C	65 °C	700 mA	0.79 K/W

TALEXmodule STARK SLE G2 LES26 4000K COI

ta	tp	If	$R_{th, hs-a}$
25 °C	65 °C	700 mA	2.30 K/W
30 °C	65 °C	700 mA	2.01 K/W
40 °C	65 °C	700 mA	1.42 K/W
50 °C	65 °C	700 mA	0.83 K/W
25 °C	65 °C	1050 mA	1.40 K/W
30 °C	65 °C	1050 mA	1.22 K/W
40 °C	65 °C	1050 mA	0.86 K/W
50 °C	65 °C	1050 mA	0.50 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 SLE G2 and heat sink with heat-conducting paste or heat conducting adhesive film is absolutely necessary.
Additionally the TALEXmodule STARK SLE G2 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.

Thermal behaviour

storage temperature	-30 ... +80 °C
operating temperature ta	+25 ... +55 °C
tp (at typ. current)	65 °C
tc max. (at typ. current)	75 °C
max. humidity	0 ... 80 %

Condensation on the module is not allowed. During the processing of the LED modules in the lamp the humidity has to be between 30 and 70%.

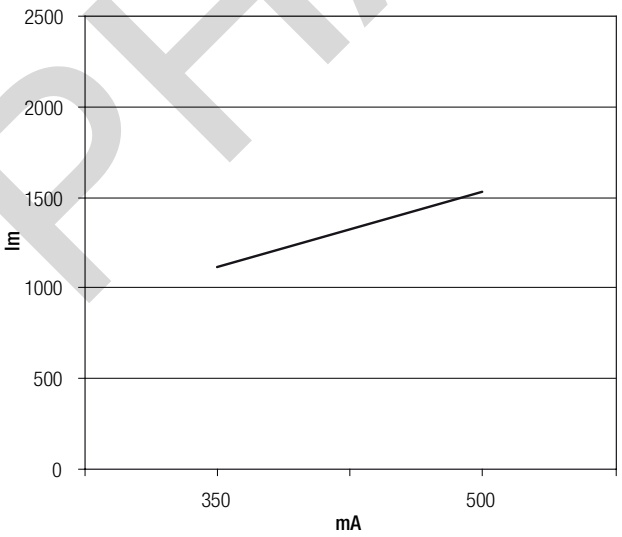
Lumen maintenance for HE operation

tc temperature in °C	luminous flux in %	operating time in h
25	80	> 50,000
	70	> 50,000
	50	> 50,000
55	80	> 50,000
	70	> 50,000
	50	> 50,000
65	80	50,000
	70	> 50,000
	50	> 50,000
75	80	42,000
	70	> 50,000
	50	> 50,000

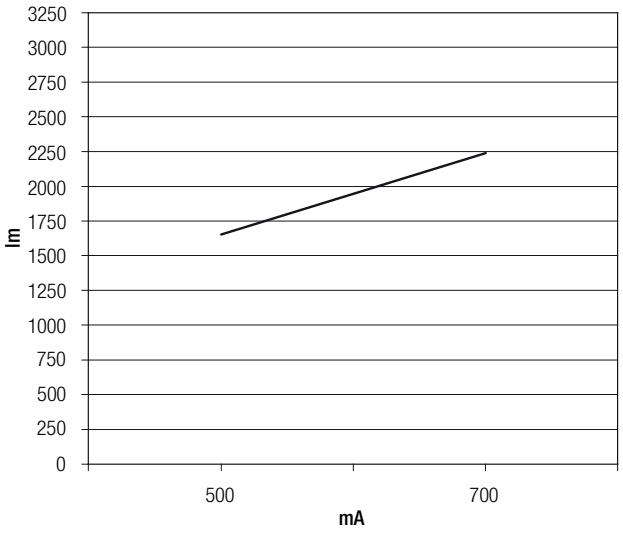
Lumen maintenance for NM operation

tc temperature in °C	luminous flux in %	operating time in h
25	80	> 50,000
	70	> 50,000
	50	> 50,000
55	80	43,000
	70	> 50,000
	50	> 50,000
65	80	37,000
	70	> 50,000
	50	> 50,000
75	80	31,000
	70	50,000
	50	> 50,000

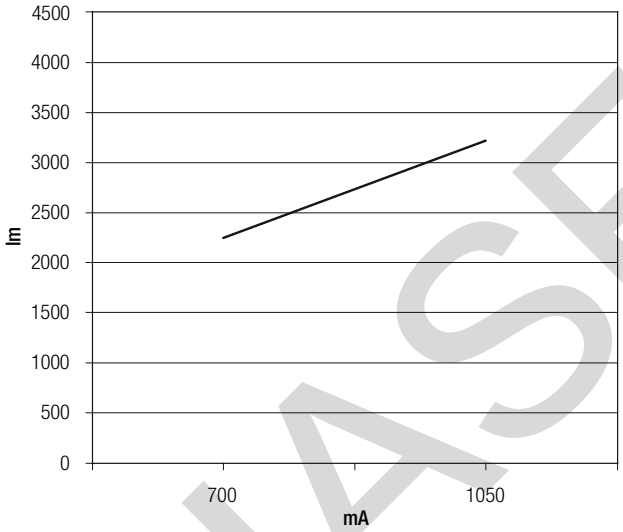
Luminous flux and operating current for LES19 at tp = 65 °C



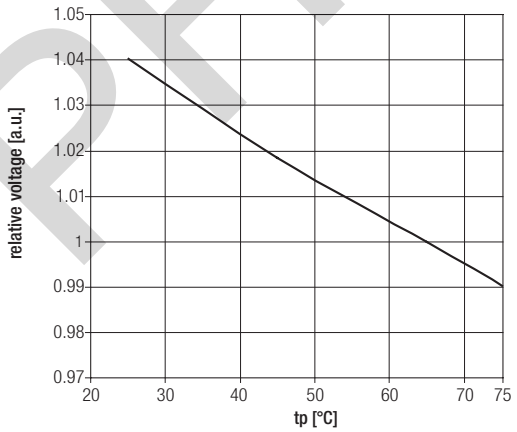
Luminous flux and operating current for LES23 at tp = 65 °C

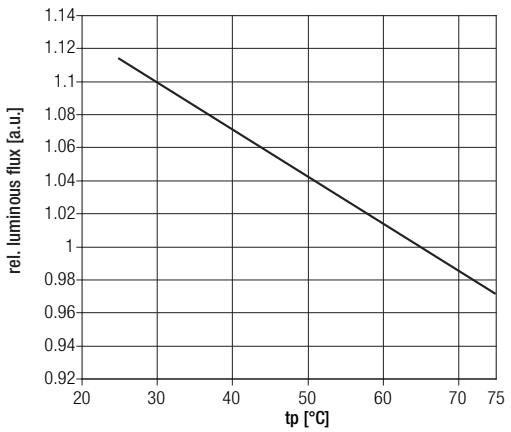


Luminous flux and operating current for LES26 at tp = 65 °C



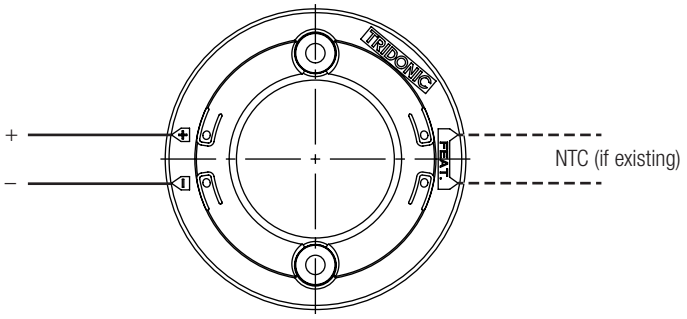
Relative forward voltage and relative luminous flux





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

Wiring with housing

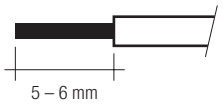


Wiring type and cross section

The wiring has to be solid cable with a cross section of 0.5 to 0.75 mm² or with stranded wire with soldered ends with a cross section of 0.5 mm².
For the push-wire connection you have to strip the insulation (5 – 6 mm).

Removing wires by lightly pressing on the push button.

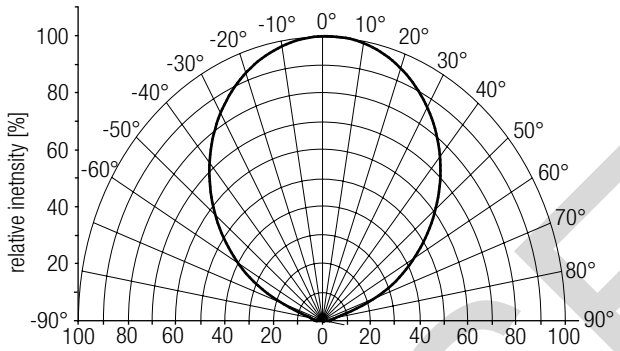
wire preparation:



Optical characteristics TALEX(module STARK SLE G2

The optical design of the TALEX(module STARK SLE G2 product line ensures optimum homogenity for the light distribution.

Light distribution



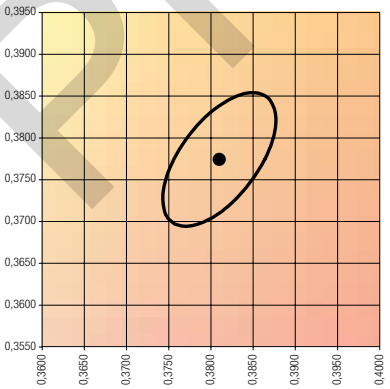
For further information see Design-in Guide, 3D data and photometric data on www.tridonic.com or on request.

Coordinates and tolerances according to CIE 1931

The specified colour coordinates are measured integral by a current impulse with nominal values of module after a settling time of 100 ms.
The ambient temperature of the measurement is ta = 25 °C.
The measurement tolerance of the colour coordinates are ± 0.01.

4,000 K

	x0	y0
Centre	0.3804	0.3767



MacAdam ellipse: 3SDCM