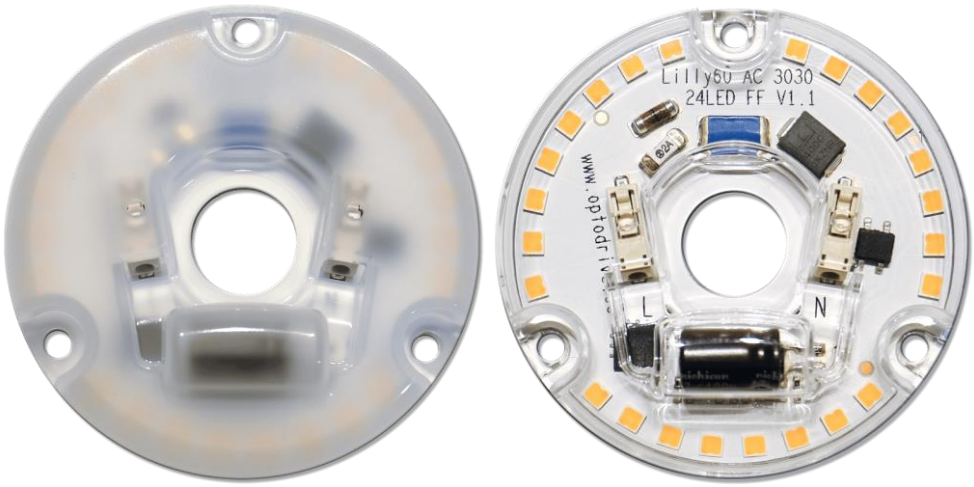
LILLY60 AC



LILLY60 AC

2W | 4W | 6W | 8W | 10 | 15W
Flicker free

Compact round LED-light engine for pendants.

No driver is required!

Key features

Lilly60 is specifically crafted for light fixture manufacturer and their design of downlights and environments where the focus is on creating a welcoming and comfortable ambiance, whether for social interactions or professional tasks. With integrated drivers, these AC LED light engines simplify installation and offer versatile dimming options. Lilly sets a new benchmark for efficiency, delivering outstanding light output tailored for both aesthetic and functional lighting needs.

1. Effortless Connectivity
    - Direct connection to 120VAC or 230VAC with no external drivers required, simplifying installation across different environments.
2. Flicker-Free Dimming
    - Provides smooth, flicker-free dimming using either standard dimmers or smart control protocols for consistent, comfortable lighting.
3. Sustainable Design
    - Compliant with the latest EU circular economy directives, making it both eco-friendly and future-proof.

Content

Introduction

The Lilly60 LED module offers versatile dimming capabilities, working seamlessly with standard dimmers right out of the box. This opens up new possibilities where the distinction between a single fixture and an interconnected system becomes fluid, allowing for highly personalized and intuitive lighting solutions. The only limit is how you choose to control the light from this LED module.

Lilly60 Package

Designed for pendant applications, the Lilly60 is a round LED light engine with a centered hole for easy wire integration. Its plug-in connectors allow for quick and straightforward setup.

Light Quality

Maintaining color stability is a priority, ensuring consistent and even light output throughout the installation's lifespan. Key parameters such as precise binning, long lifetime, and efficient thermal management are carefully controlled to deliver superior performance and longevity.

Dimming Capabilities

Lilly80 stands out with its impressive dimming capabilities. Whether using traditional phase dimmers or advanced communication protocols like DALI or Casambi, this module minimizes flicker and other unwanted effects, ensuring a smooth and pleasant lighting experience.

Short form Characteristics

MODULE CHARACTERISTICS	4W version	6W	10W
Power	4W +/-10% ea.	6W +/-10% ea.	10W +/-10% ea.
Voltage	120V or 230V		
Number of LED's	28 (120VAC) 32 (230VAC)		
Colour Rendering Index	>Ra90		
Colour temperature	2200, 2700K, 3000K, 4000K		
Optics	130°		
MECHANICAL			
Module dimension with cover	Round Ø 60mm		
Inner diameter hole	13mm		
Height	8mm		
Weight	19g		
Assembly holes	3 x 3.5 mm		
Wire connector	Poke in		
ELECTRICAL			
Input voltage range	110-120VAC or 220-240V		
Dimmable	Yes		
Power factor	>0.95		
Total harmonic distortion	<15%		
Peak inrush current	600mA		
Inrush current duration	< 35µs		
Type of power	AC		
Surge protection	1.5kV		
Burst protection	2kV		
Over temp. protection	150°C		
PHOTOMETRICAL			
Flux nominal CRI90	See page 6: Article name and versions		
Efficiency CRI90	85-120lm/W		
SDCM (Mac Adam)	3		
SVM	0.3		
PstLM	0.3		
ENVIRONMENTAL			
Temperature range	-40°C to 85°C (Absolute maximum temp Tc 85°C)		
Relative Humidity	10-75%		
Ambient air pressure	500-1060 HPa		
LIFETIME			
Life length L70B10*	>50 000h (according to TM21 standard)		

Article number structure

LILLY60 AC.P.230.24.XYY-NN.ZZ

Name	Lilly
Size	60mm
AC	AC= VAC
P	Power (Watt)
V	Voltage: 230VAC or 120VAC
N	Amount of LEDs
X	CRI: 8=Ra>80, 9=Ra>90
YY	CCT: 22 =2200K, 27 =2700K, 30 =3000K, 40 =4000K
NN	130 – cover transperant, D – Cover diffused
ZZ	Variance code FF – Flickerfree, H – Heatpad mounted

Article name and versions 230VAC

ARTICLE NAME	POWER	CURRENT	LEDS	CRI	CCT	LENS	Lumen		Energy Class
							25°C	65°C	
Lilly60 AC.4.230.32.922-130.FF	4	230	32	90	2200	130°	300	280	F
Lilly60 AC.4.230.32.927-130.FF	4	230	32	90	2700	130°	380	350	E
Lilly60 AC.4.230.32.930-130.FF	4	230	32	90	3000	130°	400	380	D
Lilly60 AC.4.230.32.940-130.FF	4	230	32	90	4000	130°	410	390	D
Lilly60 AC.6.230.32.922-130.FF	6	230	32	90	2200	130°	460	430	F
Lilly60 AC.6.230.32.927-130.FF	6	230	32	90	2700	130°	580	550	E
Lilly60 AC.6.230.32.930-130.FF	6	230	32	90	3000	130°	610	575	D
Lilly60 AC.6.230.32.940-130.FF	6	230	32	90	4000	130°	620	590	D
Lilly60 AC.10.230.32.922-130.FF	10	230	32	90	2200	130°	750	710	F
Lilly60 AC.10.230.32.927-130.FF	10	230	32	90	2700	130°	960	920	E
Lilly60 AC.10.230.32.930-130.FF	10	230	32	90	3000	130°	1010	960	D
Lilly60 AC.10.230.32.940-130.FF	10	230	32	90	4000	130°	1030	990	D
Lilly60 AC.4.230.32.922-D.FF	4	230	32	90	2200	130°	270	250	F
Lilly60 AC.4.230.32.927-D.FF	4	230	32	90	2700	130°	330	310	E
Lilly60 AC.4.230.32.930-D.FF	4	230	32	90	3000	130°	370	350	D
Lilly60 AC.4.230.32.940-D.FF	4	230	32	90	4000	130°	375	355	D
Lilly60 AC.6.230.32.922-D.FF	6	230	32	90	2200	130°	420	390	F
Lilly60 AC.6.230.32.927-D.FF	6	230	32	90	2700	130°	510	480	E
Lilly60 AC.6.230.32.930-D.FF	6	230	32	90	3000	130°	540	510	D
Lilly60 AC.6.230.32.940-D.FF	6	230	32	90	4000	130°	550	520	D
Lilly60 AC.10.230.32.922-D.FF	10	230	32	90	2200	130°	670	640	F
Lilly60 AC.10.230.32.927-D.FF	10	230	32	90	2700	130°	870	830	E
Lilly60 AC.10.230.32.930-D.FF	10	230	32	90	3000	130°	920	880	D
Lilly60 AC.10.230.32.940-D.FF	10	230	32	90	4000	130°	930	890	D

Article name and versions 120VAC

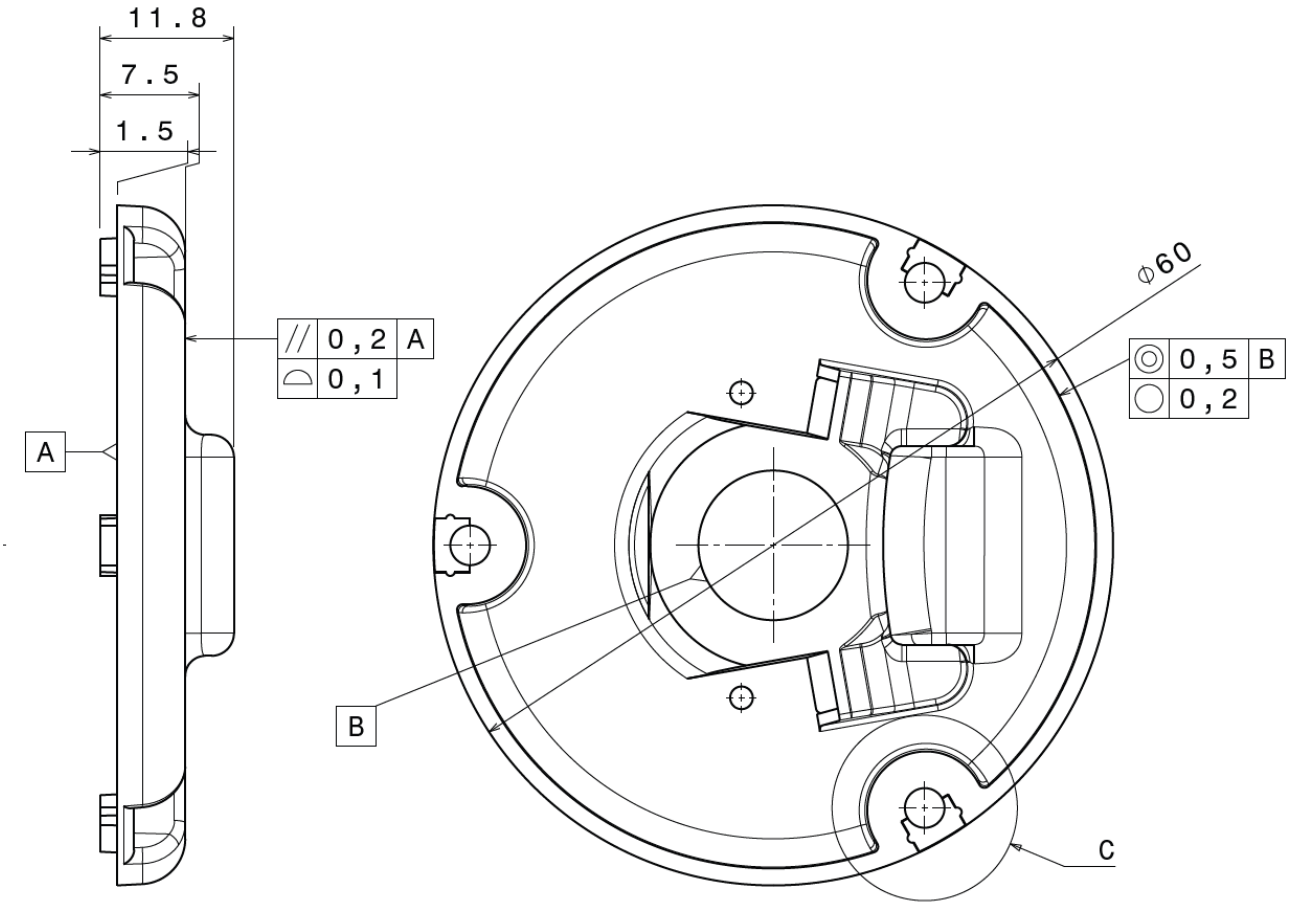
ARTICLE NAME	POWER	CURRENT	LEDS	CRI	CCT	LENS	Lumen	
							25°C	65°C
Lilly60 AC.4.120.28.922-130.FF	4	120	28	90	2200	130°	300	280
Lilly60 AC.4.120.28.927-130.FF	4	120	28	90	2700	130°	380	350
Lilly60 AC.4.120.28.930-130.FF	4	120	28	90	3000	130°	400	380
Lilly60 AC.4.120.28.940-130.FF	4	120	28	90	4000	130°	410	390
Lilly60 AC.6.120.28.922-130.FF	6	120	28	90	2200	130°	460	430
Lilly60 AC.6.120.28.927-130.FF	6	120	28	90	2700	130°	580	550
Lilly60 AC.6.120.28.930-130.FF	6	120	28	90	3000	130°	610	575
Lilly60 AC.6.120.28.940-130.FF	6	120	28	90	4000	130°	620	590
Lilly60 AC.10.120.28.922-130.FF	10	120	28	90	2200	130°	750	710
Lilly60 AC.10.120.28.927-130.FF	10	120	28	90	2700	130°	960	920
Lilly60 AC.10.120.28.930-130.FF	10	120	28	90	3000	130°	1010	960
Lilly60 AC.10.120.28.940-130.FF	10	120	28	90	4000	130°	1030	990
Lilly60 AC.4.120.28.922-D.FF	4	120	28	90	2200	130°	270	250
Lilly60 AC.4.120.28.927-D.FF	4	120	28	90	2700	130°	330	310
Lilly60 AC.4.120.28.930-D.FF	4	120	28	90	3000	130°	370	350
Lilly60 AC.4.120.28.940-D.FF	4	120	28	90	4000	130°	375	355
Lilly60 AC.6.120.28.922-D.FF	6	120	28	90	2200	130°	420	390
Lilly60 AC.6.120.28.927-D.FF	6	120	28	90	2700	130°	510	480
Lilly60 AC.6.120.28.930-D.FF	6	120	28	90	3000	130°	540	510
Lilly60 AC.6.120.28.940-D.FF	6	120	28	90	4000	130°	550	520
Lilly60 AC.10.120.28.922-D.FF	10	120	28	90	2200	130°	670	640
Lilly60 AC.10.120.28.927-D.FF	10	120	28	90	2700	130°	870	830
Lilly60 AC.10.120.28.930-D.FF	10	120	28	90	3000	130°	920	880
Lilly60 AC.10.120.28.940-D.FF	10	120	28	90	4000	130°	930	890

Ordering data

Lilly AC – Packaging information

Description	Qty (pcs)	Dimension (cm)			GW (kg)
		Length	Width	Height	
Inner box	40	35,6	27,7	9,6	1,45
Outer box	320	46,5	37,5	39,6	11,40

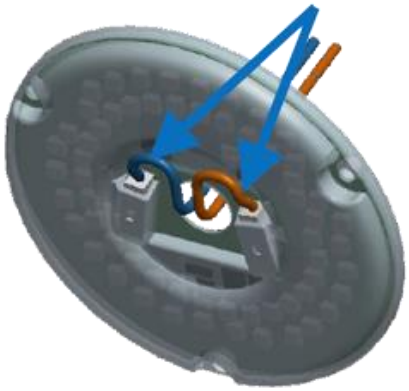
Dimensions LED Module



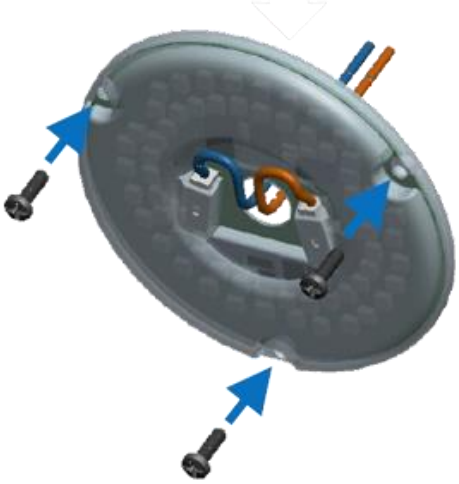
Mounting instructions

Mounting

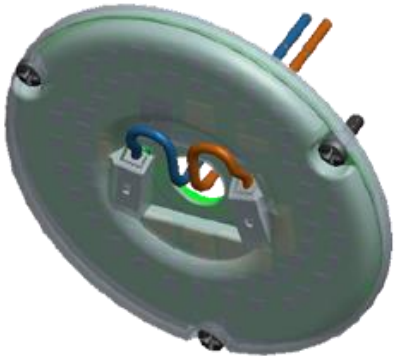
1 Insert the AC wire into the cover hole.



2 Slot in AC cable into AC connector.



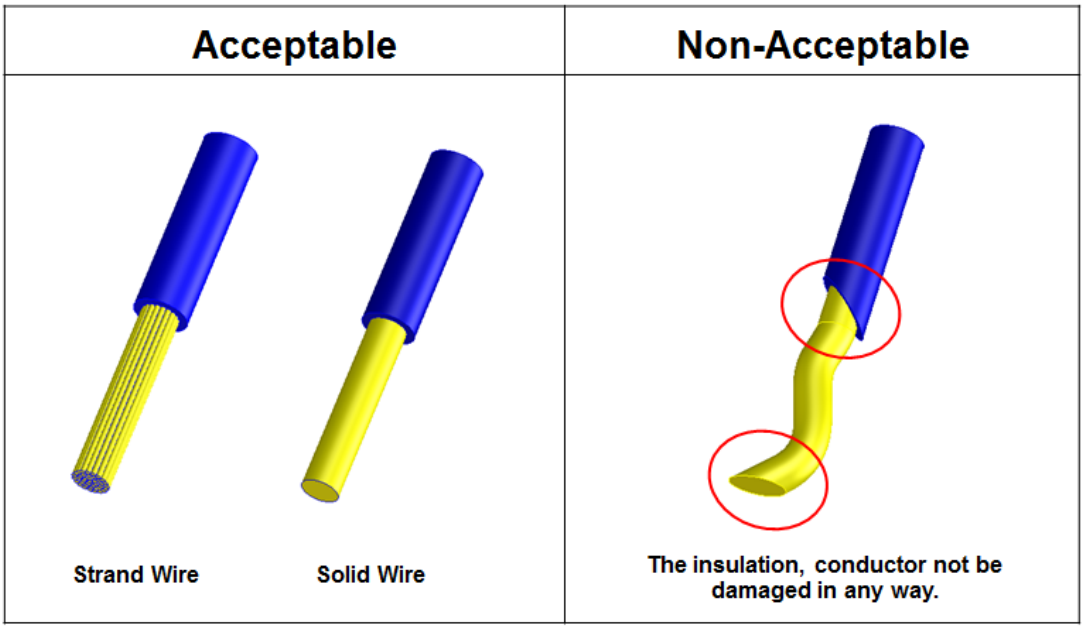
3 Mount the screws to fixate module.

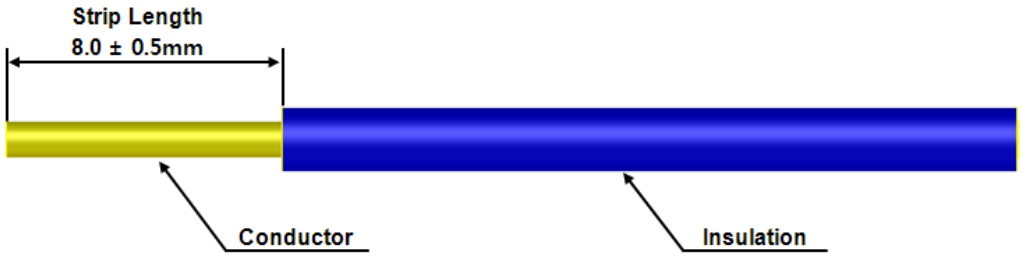


4 Mounted.

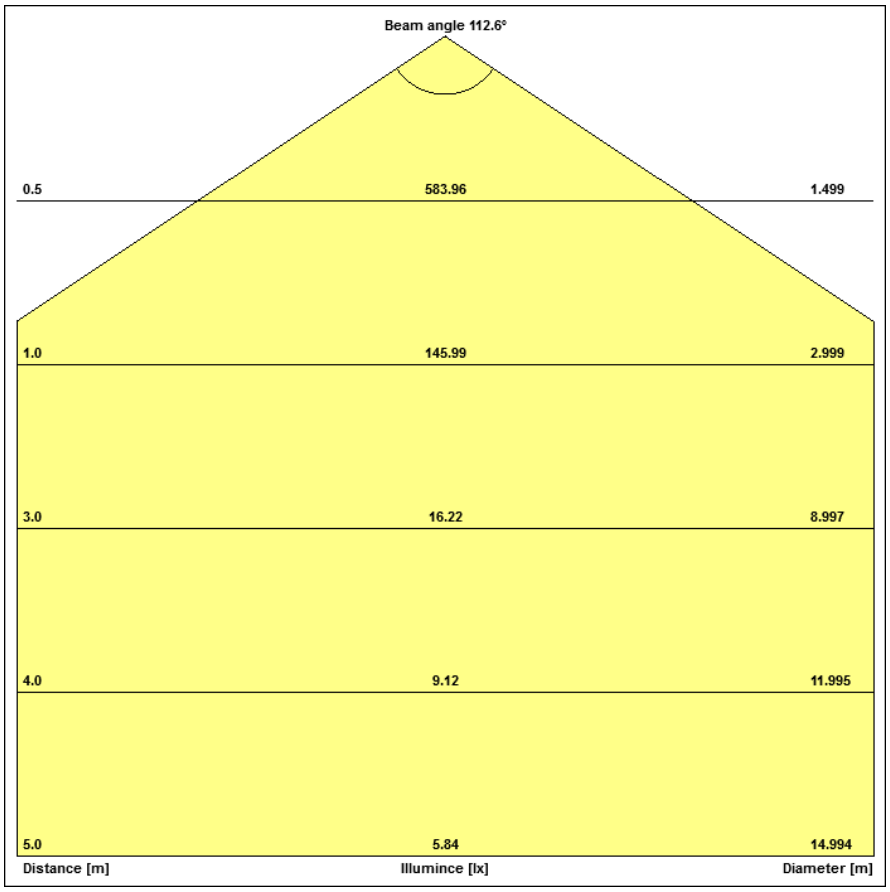
Wiring

Type of wire	AWG	mm²
Stranded	22-18	0.32-0.8mm²
Solid	32-18	0.51-1.02Ø (0.2-0.8mm²)
Insulation diameter	Max 2.1 mm	





Parameters of the lens system



Parameters of the Light Output

LUMEN OUTPUT LILLY AC

Parameter		Symbol	Value			Unit
			Min	Typ	Max	
Luminous Flux (3000K/CRI90)	4W	Φ_V		400		lm
	6W	Φ_V		600		lm
	10W	Φ_V		1000		lm
Correlated Colour Temperature	22*(2)	CCT		2200		K
	27*(2)	CCT		2700		K
	30*(2)	CCT		3000		K
	40*(2	CCT		4000		K
CRI						
		R_a	91	94		
Power		Po	3.6	4,0		W
		Po	5.4	6,0		W
		Po	9,0	10,0		W

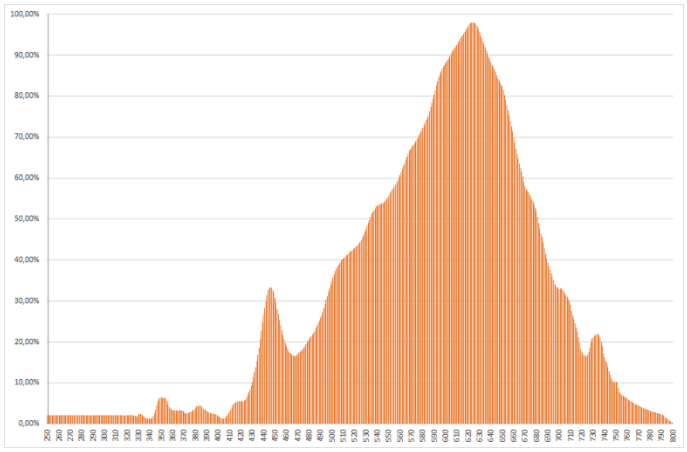
(2)See detailed information in chapter" Binning structure graphical representation"

EPREL Measurement and Control

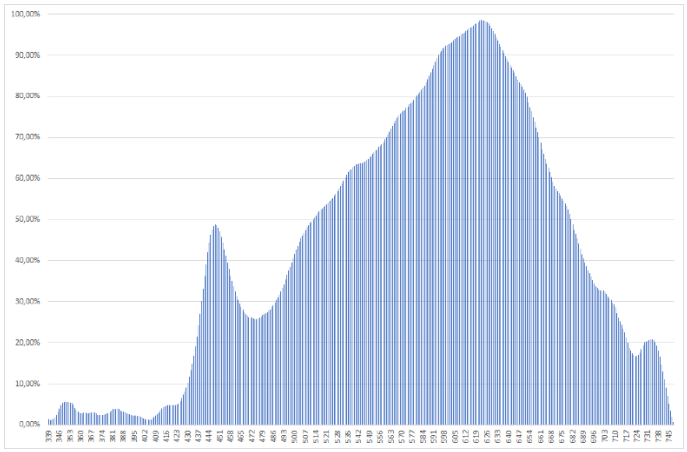
All measurement for EPREL (EU 2019/2015) is done with the cover removed. All light output measurements are taken without the cover as per the standard and all other measurements included in this document are taken with the cover fitted in place. All EPREL numbers are available from Optoga or their distributors.

Colour Spectrum

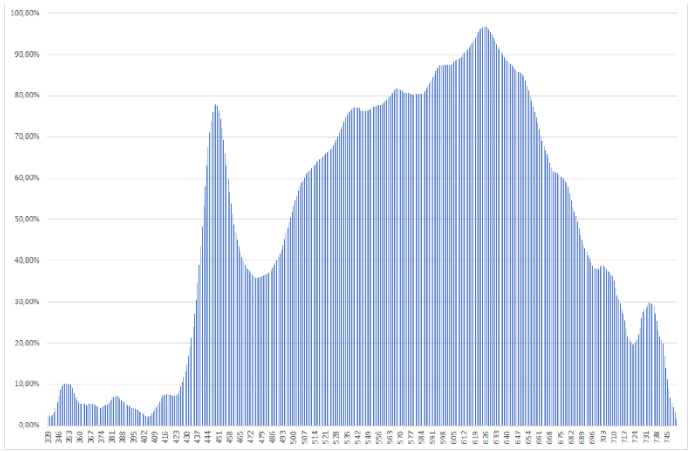
2700K



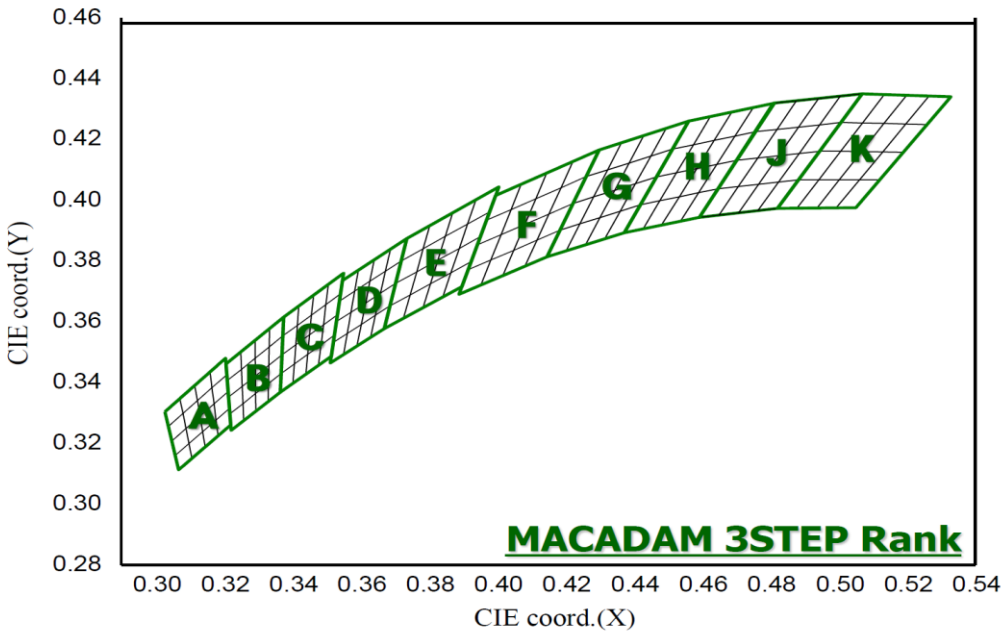
3000K



4000K



CCT structure graphical representation



Short form in diagram	Colour Code	CCT
K	22	2200K
H	27	2700K
G	30	3000K
E	40	4000K

Colour Rendering Index (CRI)

CRI Code	CRI (min) Ra
8	>80
9	>90

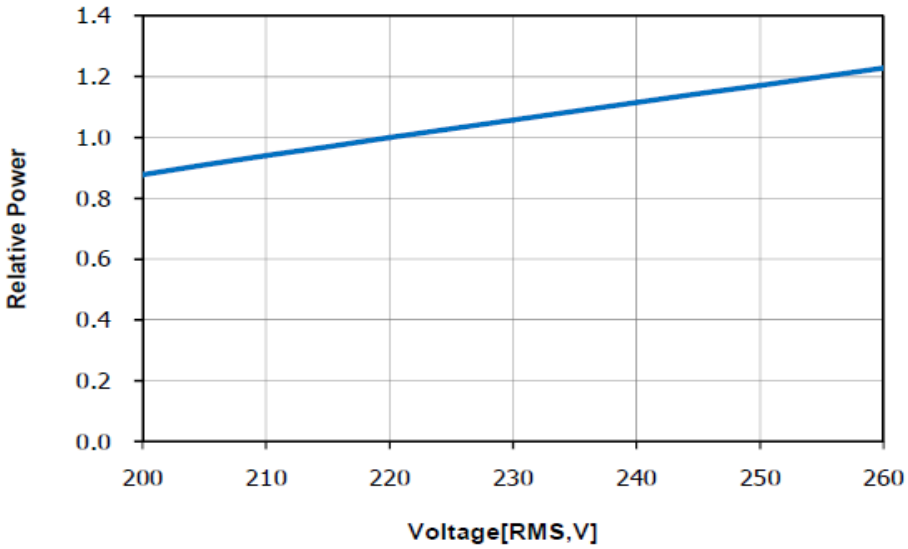
Short form letters for CCT (K)

Colour Code	CCT
22	2200K
27	2700K
30	3000K
40	4000K

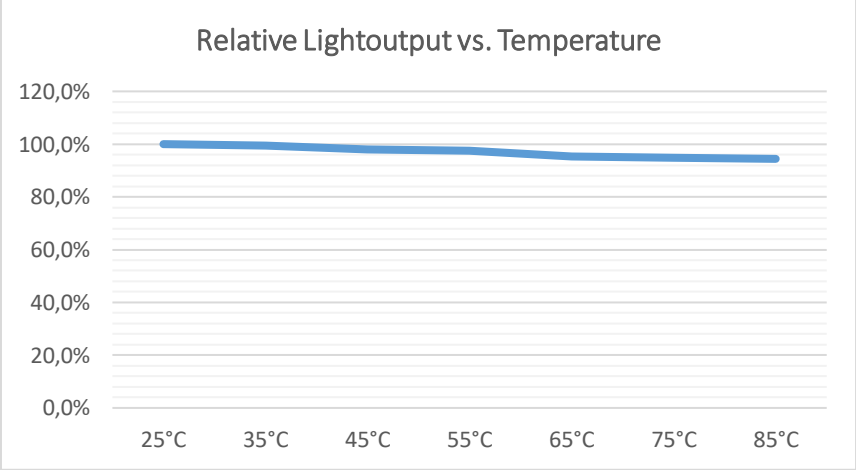
Electro Optical data

Current vs. Voltage

With increasing voltage the light output and the heat increases.



Temperature Characteristics



Consider the thermal capabilities of where the LED module is to be fitted. The temperature is an important factor for light output as well as for long time light output degradation.

Lifetime (Calculated)

Measurement points

When the measurement takes place you verify that the temperature on the marked measurement points is satisfying. Pending on the result you know what lifetime to expect from the module. This step will be implemented after the heat sink has been connected properly!

The lifetime is calculated at the maximum temperature recommended at the Tc (measuring point). It is important not to exceed this recommendation.

Projected lifetime based on TM-21

The power load used with the LED module is according to the “lumen maintenance projection”. It is a LM80 projected lifetime based on discreet LEDs tested in the stated temperature environment at a 30mA power load.

	55°C	65°C	75°C	85°C
L70B10	>50 000h	>50 000h	>50 000h	>50 000h
L80B10	>50 000h	47 000h	38 000h	33 000h
L90B10	28 000h	32 000h	20 000h	18 000h

Measurement Control

The recommended maximum value is 85°C on Tc or measuring point. If this value is exceeded we cannot guarantee the function and the lifetime of the product. The purpose of the measurement is to control the Junction (Tj) temperature of the LED and also in order to control the performance on the complete setup. By measuring the junction temperature (Tj) the average lifetime of the product is known.

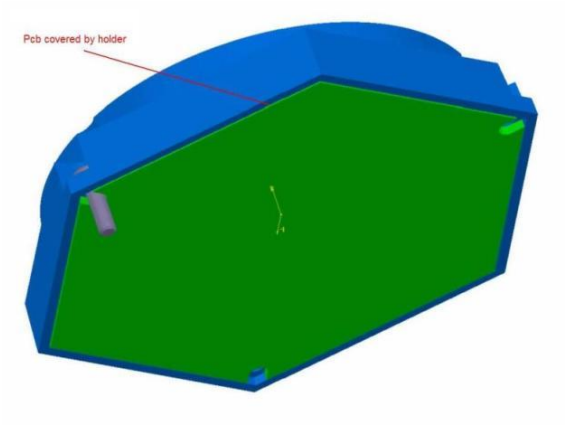
The thermal connection is measured in temperature vs. Power.

Thermal information

The thermal area (green) should be properly connected to an even and fine surface of a heat sink. Without this arrangement the unit will be overheated and will not be able to survive.

Maximum Temperature

Secure the temperature in your application not to exceed 85°C. Read more in the section “Measurement control”.



Verification of Conformity

The module are under testing at Intertek Semco according to IEC 62031.

SAFETY (LVD)	IEC 62031:2008	
SURGE	IEC 61000-4-5	1 kv
Fast transient BURST	IEC 61000-4-5	2 kv
ESD*	IEC 61000-4-2	8 kv Air discharge 4 kv Contact discharge
Radio Disturbance	IEC 55015:2006 + A1:2007 + A2:2009	
Photo Biological Safety	IEC 63271:2008	
Flicker	IEC 61547	N/A

** Please consult the document ESD standards on Optodrive ED, ID and AC*

Production Setup

Production in accordance with IPC-6012-B and IPC-A-600G class 2

The LED Module is in accordance to EU Directive 2002/95/EC (ROHS)

The bare PCB is isolation tested with 3000VDC/10mA for 10 seconds

PCB Material Setup

In all questions regarding the bare PCB please use “Material Data sheet Optodrive” as a guideline.

Light fitting routine tests

According to EN/IEC 60598-1 should the routine test be performed as a dielectric strength test or insulation test. Only the insulation test of 500Vdc should be performed according to standard, 1s with min 2MΩ.

No dielectric tests are allowed to be performed on OptoDrive LED Modules.

Precautions for use

- This device should not be used in any type of fluids such as water, oil, organic solvent etc.
- When cleaning is required, use only water together with mild soap on the outside of the lens. Cleaning inside of the LED module is strictly prohibited.
- The appearance and specifications of the product may be modified for improvement without notice.
- Long time exposure of sunlight or occasional UV exposure will cause lens discoloration.
- Opening of the LED module is prohibited due to risk of EMC, dust, grease and other exposures that will damage it.
- The LED Module should always be mounted to a proper heat sink before it's connected with its proper leads.

Handling in regards to static electricity

- The Optodrive products have integrated circuits (IC) on board that may be damaged if exposed to static electricity. Please handle the products only while using equipment that prevents static electricity. Do not handle them without having ESD protection.
- The Optodrive products are not be installed into the end product without proper ESD protection.
- Optodrive LED Modules meet IEC61547:2009 and IEC61000-4-2. We recommend the light fixture manufacturer to take the mentioned standards under consideration.

Storage before use

- Use only properly rated test equipment and tools for the rated voltage and current of the product being tested.
- It is strongly suggested to wear rubber insulated gloves and rubber bottom shoes while handling the product.
- Do not wear any conductive items (such as jewellery) which could accidentally contact electric circuits.
- Faults, lightning, or switching transients can cause voltage surges in excess of the normal ratings.
- Internal component failure can cause excessive voltages.
- Stored or residual electricity in long wire could be hazardous.

ROHS III and TSCA Compliant

All our LED modules meet the Restrictions of Hazardous Substances (RoHS III) and Toxic Substances Control Act (TSCA).

There has been a growing consensus that Lead Free Systems should increase for the safety of our environment. It is a very serious problem that lead and other harmful materials are being used in commercial and industrial products, causing more and more environmental problems. This has led to regulations such as RoHS (Restriction of the use of certain Hazardous Substances) from the EU, the Japan Ministry of Trade and Industry (MITI) and US Environmental Protection Agency under TSCA Section 6(h). All LED module makers providing products to these countries should comply with these restrictions. In order to meet the RoHS III regulation, Optoga is strictly implementing a ban on lead and other hazardous materials in its products according to these mentioned directives. We also manage those required by the Toxic Substances Control Act (TSCA), to reduce exposure to certain Persistent, Bioaccumulative and Toxic (PBT) chemicals.

Design for Environment:

According to the EU-directive (RoHS III) the following substances must not be used in this product

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Chromium VI (Cr^{6+})
- Polybrominated biphenyls PBB
- Polybrominated diphenyl ethers PBDE
- Bis(2-ethylhexyl) phthalate DEPH
- Butyl benzyl phthalate BBP
- Dibutyl phthalate DBP
- Diisobutyl phthalate DIBP

Do you want to know more about benefits of OptoDrive LED?

Read more about OptoDrive at www.optoga.com.
You can contact us via info@optoga.com.
You can also call us on +46 (0)589 490 950.

Optoga AB
Optoga was founded in November 2004 in Arboga, Sweden and has many years of experience in electronics design. The company developes and supplies LEDs and LED-module solutions for the lighting industry, vehicle manufacturers and electronics companies.

With the OptoDrive LED-module, Optoga has taken the initiative to replace strip lights, incandescent and halogen bulbs with LED-based sources.

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