ADA60 AC

ADA60 AC IoT

5 and 10W
FlickerFree

Round LED-module for spotlights and downlights.

No driver is required

Introduction

The ADA60 LED module is designed for use in spotlights and downlights in medium to small lighting fixtures. It is equipped with high-performance optics, ensuring even light distribution and brightness.

Key Features

- Efficient optics for optimal light output
- Uniform light distribution for a smooth, consistent appearance
- Direct connection to mains power at 230VAC, eliminating the need for a separate driver
- Straightforward integration into existing lighting systems
- IoT compatibility, supporting DALI and other communication protocols

Benefits

The ADA60 LED module offers numerous benefits to both installers and end-users. Its compact design and high-performance optics make it ideal for a wide range of lighting applications. Additionally, its direct connection to mains power eliminates the need for a separate driver, reducing installation time and costs. The IoT compatibility also enables convenient remote control and monitoring of the lighting system.

Content

Introduction

LED lighting technology has come a long way since the days of analog wall dimmers. Today's lighting systems must be able to work seamlessly with a variety of communication systems to meet the demands of modern installations. Our LED module, ADA60, has been designed to accommodate both traditional dimming systems and modern, connected solutions. Whether you want to use traditional dimmers or prefer a more advanced, IOT-enabled solution, ADA60 can accommodate your needs.

With the rise of the IoT, the boundary between what constitutes a luminaire and a lighting system has become blurred. The control systems behind these lighting solutions are becoming increasingly sophisticated, offering personal and intuitive lighting experiences. There are virtually no limits to what can be achieved with the LED modules in our IoT package. That's why our new LED modules can work with both traditional dimmers as well as modern communication systems such as DALI and Casambi.

ADA IoT Package

Our IoT package is designed to make it easy for designers and engineers to develop new light fittings. The integrated and flicker-free driver eliminates the need for additional components, making installation fast and simple. The electrical insulated heat pad included with all of our IoT LED modules ensures that they can be safely and flexibly mounted, even in Class II light fitting installations.

Light Output

Consistent color stability is essential for achieving uniform light output in any installation. To that end, our LED modules are carefully engineered to ensure that parameters like binning, lifetime, and thermal control are carefully managed to deliver optimal results.

Dimming

When it comes to dimming, you have a few options. If you choose to use traditional LED dimmers, make sure that the dimmer you choose has the capacity to handle the low power consumption of the LEDs. Alternatively, you can opt for our DimIn solution, which is designed to work within the regulatory range of the latest EPREL standard. This ensures that the dimming sequence is smooth and controlled, delivering optimal results every time.

For more information on our DimIn solution, see the DimIn section of this document.

Short form Characteristics

MODULE CHARACTERISTICS		5W	10W
Power		5 W +/-10% ea.	10 W +/-10% ea.
Voltage		230VAC	
Number of LED's		32	
Colour Rendering Index		>Ra90	
Colour temperature		2700K, 3000K, 4000	
Optics		25-150°	
MECHANICAL			
Module dimension		Ø 59.5 mm	
Diameter lens		Ø 35mm	
Height		11.6 mm	
Weight			
Assembly holes		2 x 3.5 mm	
Wire connector		Push in	
ELECTRICAL			
Input voltage range		220-240V (max 264VAC)	
Dimmable		Yes (phase cut, DALI, Casambi etc)	
Power factor		> 0.80	
Total harmonic distortion		< 15%	
Peak inrush current		30mA	
Surge protection		1.5kV	
Burst protection		2kV	
Over temp. protection		150°C	
Energy class	2700K	G	G
	3000K	G	G
	4000K	G	G
PHOTOMETRICAL			
Flux		450-500 lm	900-1100 lm
Efficiency		85lm/W	85-100lm/W
SDCM (Mac Adam)		3	
Flicker percent		10%	8%
Flicker index		0.0275	0.0275
SVM		0.5	0.5
PstLM		0.6	0.6
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	

*Specifications are valid for >Ra95.

Article number structure

ADA60 AC.P.230.32.9yy-OH.IOT	
AC	AC= 230VAC, ED=External Driver required, ID=Internal Driver
P	Power (Watt) 5 or 10
V	Voltage: 230VAC
N	Amount of LEDs
8	CRI: 8=Ra>80, 9=Ra>90
YY	CCT: 27 =2700K, 30 =3000K, 40 =4000K
OH	Code: Optical Holder
IoT	IoT interface, Flickerfree (below 10%)

Article name and versions

ADA LED Engine Article description

ARTICLE NAME	POWER	CURRENT	CRI	CCT	LENS
ADA60 AC.5.230.34.927-OH.IOT	5	230	90	2700	Optic Holder
ADA60 AC.5.230.34.930-OH.IOT	5	230	90	3000	Optic Holder
ADA60.AC.5.230.34.840-OH.IOT	5	230	90	4000	Optic Holder
ADA60 AC.10.230.34.927-OH.IOT	10	230	90	2700	Optic Holder
ADA60 AC.10.230.34.930-OH.IOT	10	230	90	3000	Optic Holder
ADA60 AC.10.230.34.940-OH.IOT	10	230	90	4000	Optic Holder

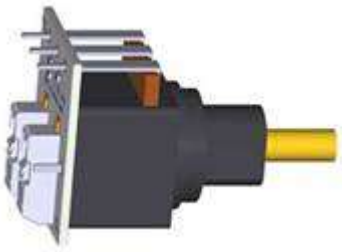
Optics for ADA LED engine

ARTICLE NAME	BEAM ANGLE	LUX Value @ 1 meter (10W)
Lens 35/S	25°	
Lens 35/M	30°	
Lens 35/W	31°	
Lens 35/WW	58°	
Lens Zorya	150°	

The optics are to be ordered separately

DimIn (IoT Interface)

ARTICLE NAME	Eco System	Information
DimIn DALI DT8	DALI type 2	Wire
DimIn Casambi	Casambi	Wireless
DimIn Switch	Internal dimming	Wire (Together with a regular momentary switch)
DimIn POT	Internal dimming	Wire
- **DimIn Potentiometer**	Internal dimming	Wire together with DimIn POT



See mounting instructions. All of them is mounted as a snap-in solution. As long as the IoT module isn't mounted or with out access to its Eco-System it runs on 100%.

IoT area for Smart Lighting

The integration of DALI and Casambi with our LED modules takes your lighting design to the next level, providing a flexible, immersive, and interactive lighting experience. The small DimIn device functions as a module that fits into our IoT interface and is interchangeable between different devices. The device is connected to the main power supply (230VAC) and two additional wires, which can either be DALI or connected to a potentiometer, switch, or similar.

Platform	Table- or freestanding light 	Downlight 	Spotlight 	Pendent 	Medium size Opaque glass 	Medium size Opaque glass HCL/TW 	Big size Opaque glass 
Lilly80 AC IoT	X	X		X	X		
ADA AC IoT	X	X	X	X			
Sanna158 IoT	X			X	X		
Sanna158 AC IoT HCL				X		X	
Sanna290 IoT				X			X

DALI

The DALI system is bus-powered and operates with the Eco-System DALI-2.

Casambi

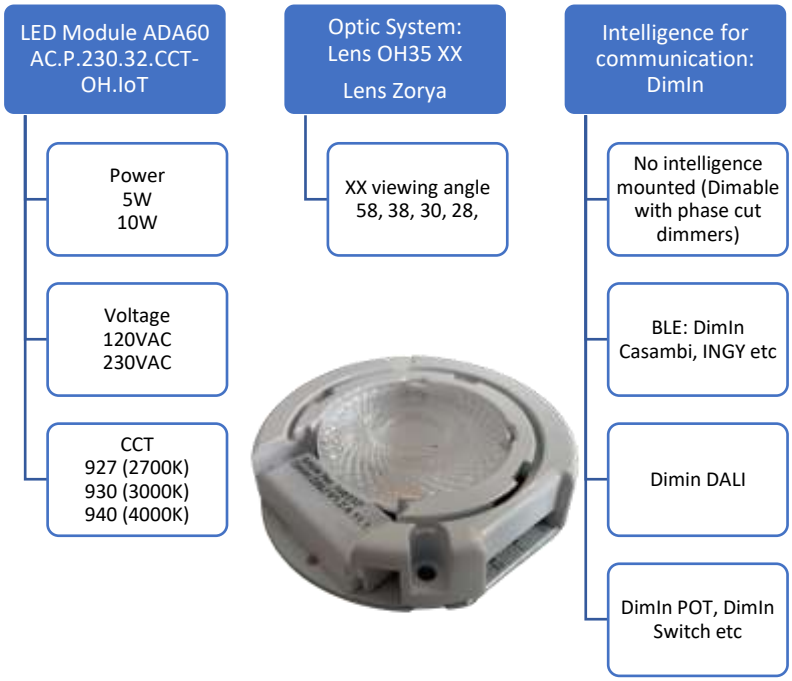
Casambi offers more than just dimming or wireless on/off capabilities. It is a connected and intelligent system that allows for dynamic and responsive lighting, energy savings, and "human-centered lighting" that promotes well-being. Scientific evidence suggests that this type of lighting can increase productivity in workplaces and schools.

POT (Rotary Potentiometer)

The DimIn system also includes a rotary potentiometer for independent units that need local dimming. The potentiometer is easily mounted and can be used for dimming, turning on/off, and adjusting brightness. It is connected to the same output as the DALI wires and is integrated into the LED module. This feature is ideal for freestanding light fixtures, work lighting, or light fixtures that require dimmability.

Ordering and Packaging information

To make it work easily and smoothly, first choose which module to use next, power and which CCT you want. Then choose between different optical solutions such as our hybrid lenses and last but not least which IoT intelligence you need (which we call DimIn) in your application. All parts are ordered separately from each other to be able to be adapted to the end user's needs.



Ada60 AC – Packaging information

Description	Qty (pcs)	Dimension (cm)			GW (kg)
		Length	Width	Height	
Inner Box	24	35,6	22,7	9,6	1,5
Outer Box	192	46,5	37,5	36,6	13,0

Lens 35/xx – Packaging information

Description	Qty (pcs)	Dimension (cm)			GW (kg)
		Length	Width	Height	
Inner Box	108	30	30	23	TBD
Outer Box	216	62	32	25	TBD

DimIn – Packaging information

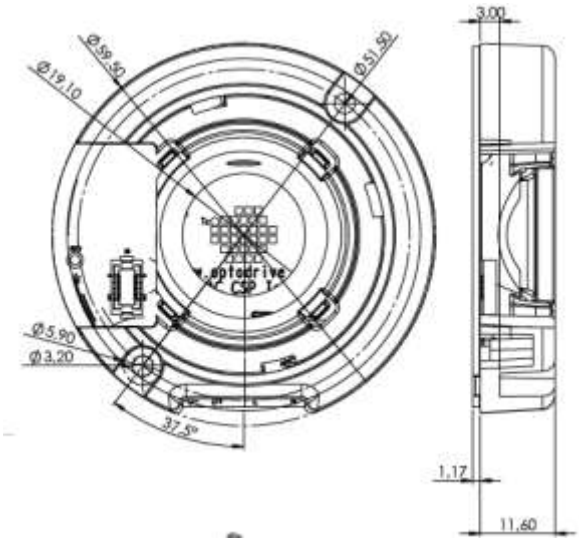
Description	Qty (pcs)	Dimension (cm)			GW (kg)
		Length	Width	Height	
Inner Box	288	35,6	22,7	9,6	
Outer Box	2304	46,5	37,5	39,6	TBD

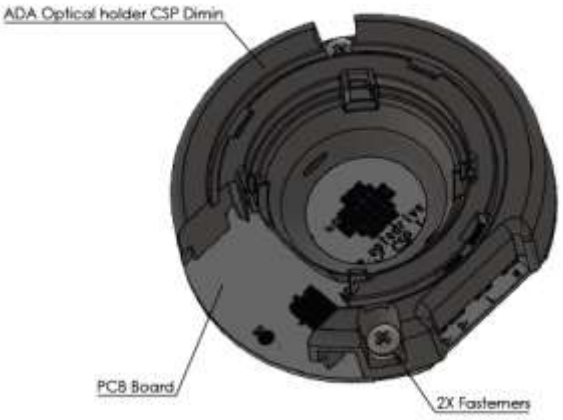
Potentiometer – Packaging information

Description	Qty (pcs)	Dimension (cm)			GW (kg)
		Length	Width	Height	
Inner Box	TBD	35,6	22,7	9,6	
Outer Box	TBD	46,5	37,5	39,6	TBD

Dimensions

LED-module





Lens for Optical Holder

Mounting instructions

The DimIn module itself is the small, sugar-cube sized device that provides the IoT functionality for the LED Module. This module allows the LED Module to be connected to different communication systems, such as DALI or Casambi, and provides additional functionality such as dimming and other smart lighting controls. To install the DimIn module, it needs to be mounted in the IoT interface of the LED Module. The terminal blocks on the LED Module are labeled with N for zero, L for phase, D- and D + for the dimming function, and these can be connected to either DALI, a switch, or a potentiometer. The wiring of the LED Module should be performed carefully and in accordance with the electrical code to ensure safe and efficient operation.

Mounting

Mount the device on heatsink with screws safely

Wiring

The LED module with the nomenclature IoT/DimIn can be expanded with additional functionality, has terminal blocks with the texts N for zero, L for phase, D- and D + for dimming function with either Dali, Switch or a potentiometer.

DimIn

To obtain additional functionality, the LED Module needs to have an additional module mounted in the IoT interface.

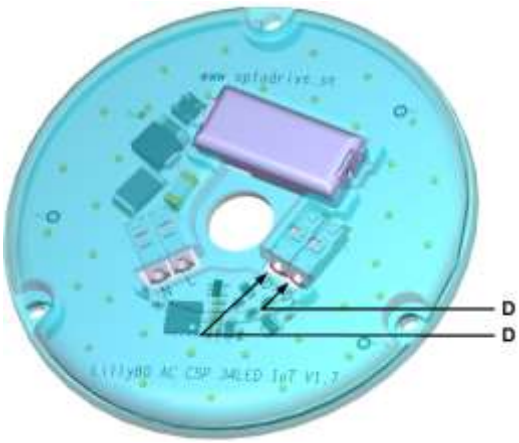
Potentiometer card

The Pot potentiometer board works with the DimIn Pot functionality module. D + or D- play a certain role as they change the dimming direction depending on the connection.

Wire Connections (DALI or other)

Connect BUS control cables from the DALI control unit or Master unit (standard product that Optoga does not supply) or cables from DimIn Pot to D + and D- on the LED module. This depends on whether there is a DALI or DimIn Pot module mounted on the LED module.

DALI is polarity independent so it does not matter which of D + and D- is connected.

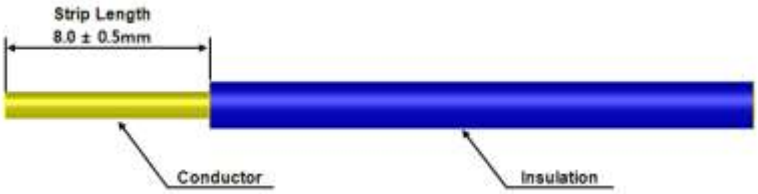


Connector

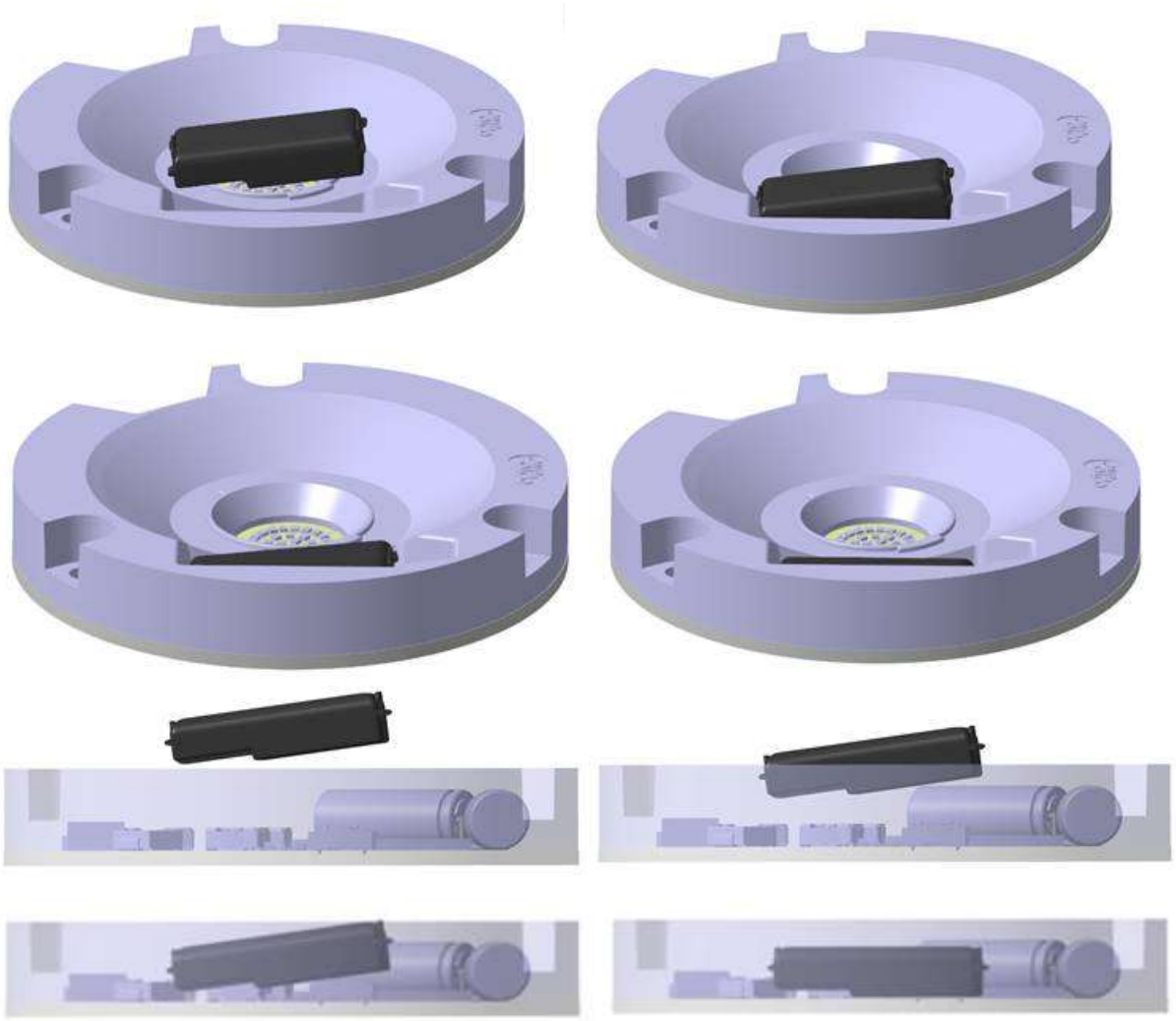
Type	Push In type

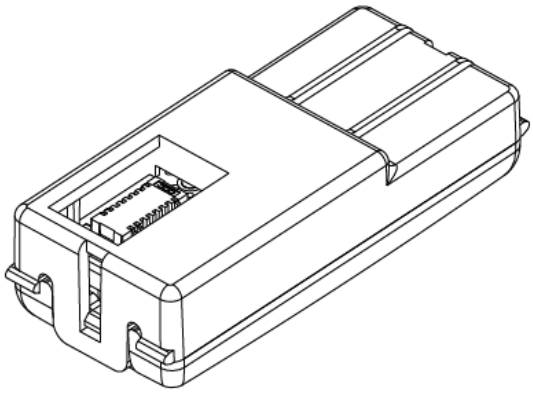
Wire (Recommended)

Type of wire	AWG	mm²
Stranded	22-20	0.32-0.5mm²
Solid	24-18	0.51-1.02Ø (0.2-0.8mm²)
Insulation diameter	Max 2.1 mm	



Mounting of DimIn

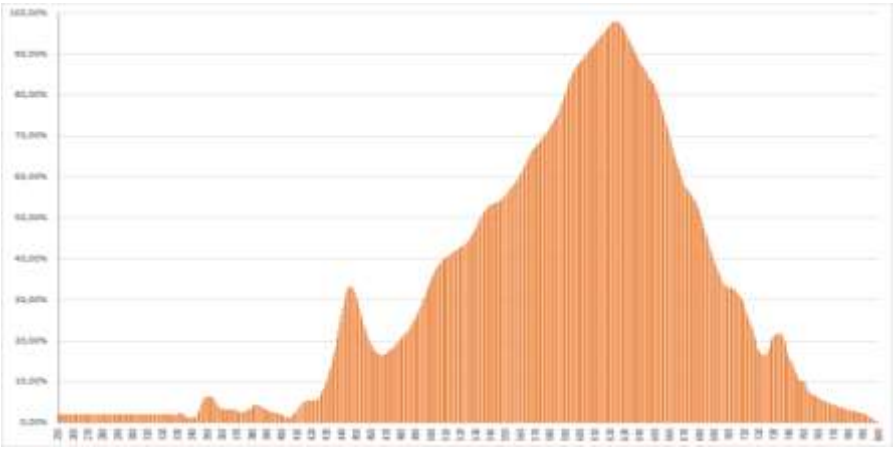




On the left, you can see the DimIn unit from below with its connector attached to the LED module. During assembly, it's crucial to first insert the front end of the unit and then firmly press the rear end and contact into place. The safety cover of the LED module and the protection of the DimIn unit are locked in place by the friction locking mechanism.

Photometrical

Colour Spectrum 2700K



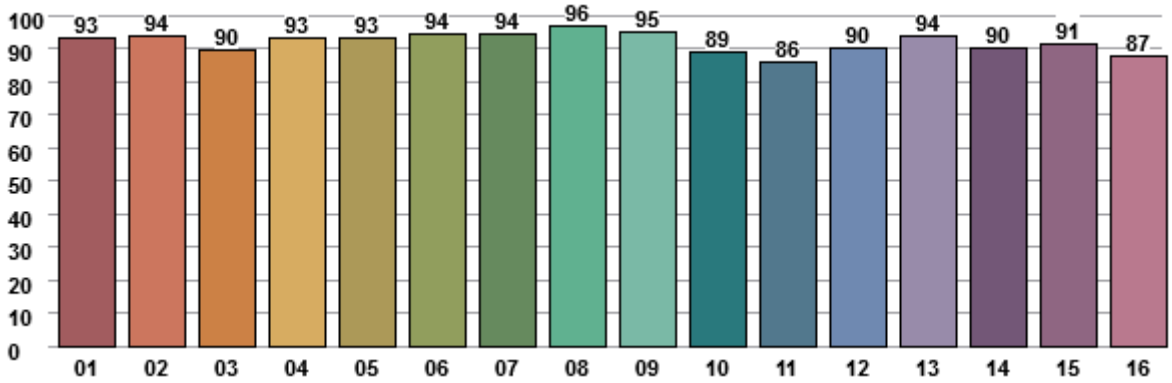
Colour Rendering Index (CRI) 2700K

Ra	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
94.0	95.3	95.4	93.2	94.7	94.2	93.1	95.5	90.6	76.2	87.3	94.4	79.9	95.3	95.3

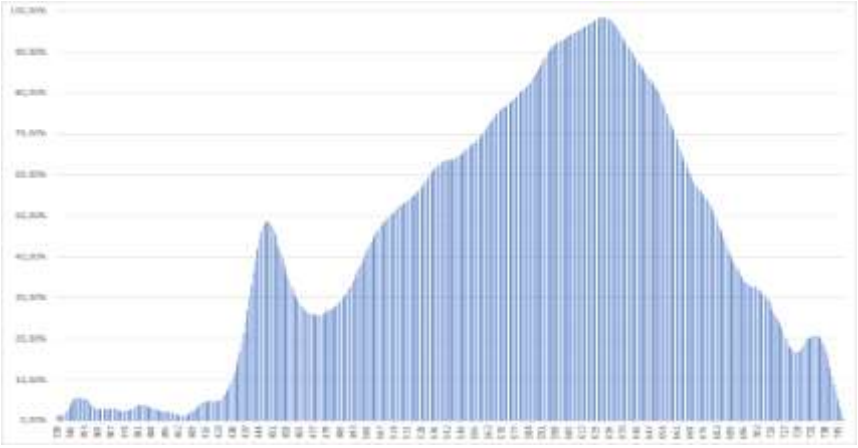
TM-30-15

Main Parameters	
Fi	92
Rg	101
Rfskin	96

Hue Bin Fidelity Index (Rfh,j)



Colour Spectrum 3000K



Colour Spectrum 4000K

Flicker

Intensity	Flicker index	Flicker Percent
100%	0,0317	7 %
50%	0,0373	9 %
20%	0,0374	10 %
5%	0,0320	11 %

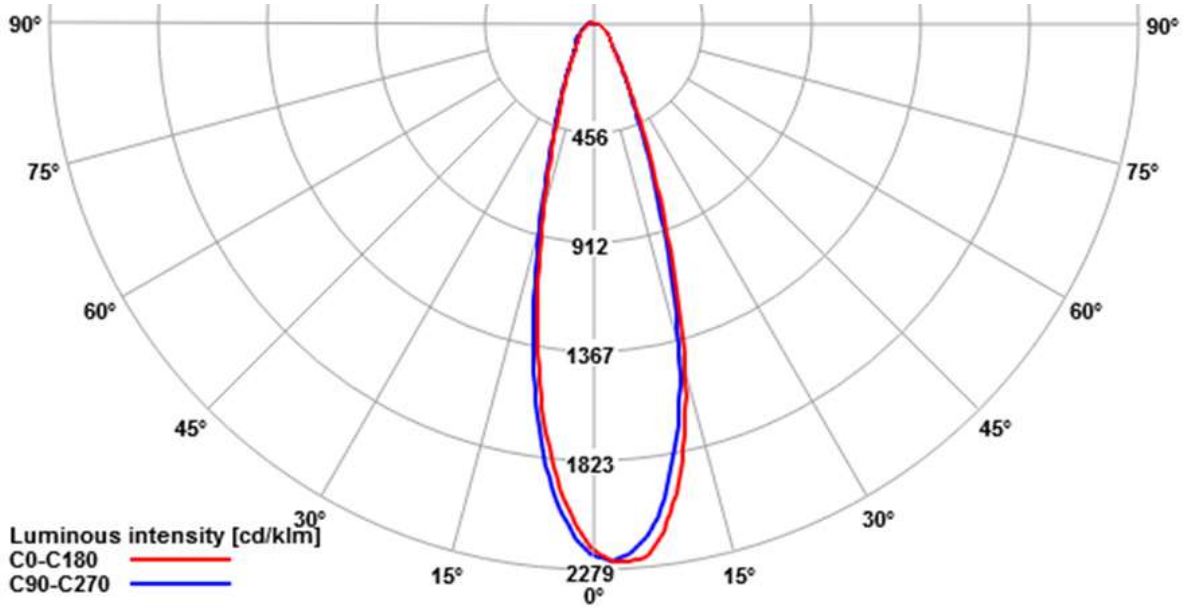
Parameters of the lens system

Lens for Optical Holder

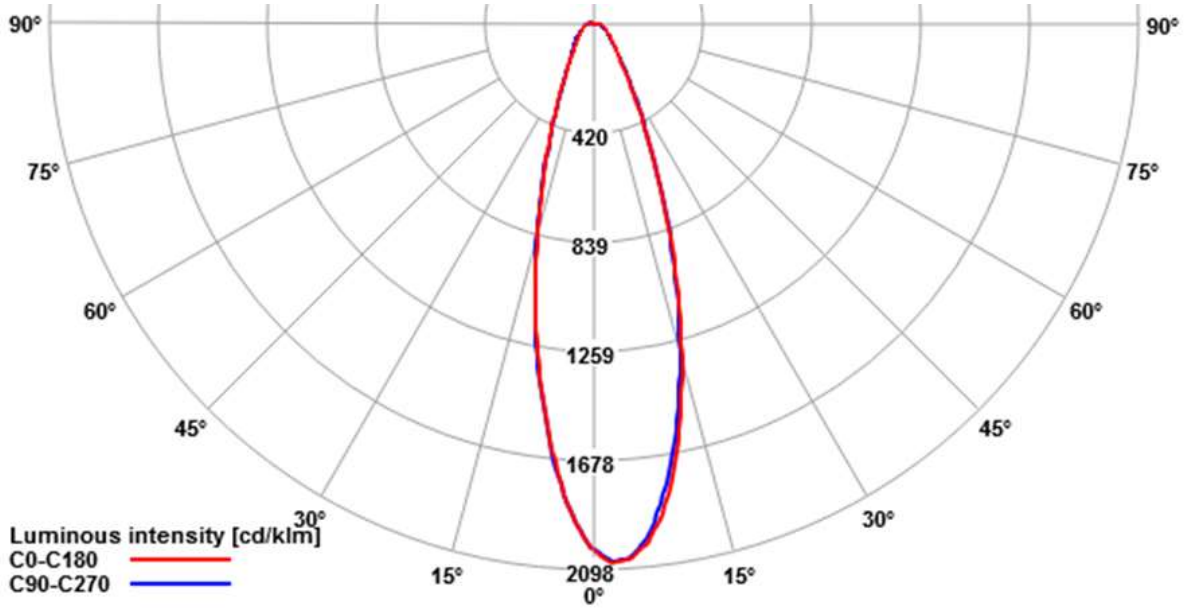
Material

Lens material	TBD
Connector material	TBD
Operating temp. range	-40℃~+110℃(upper limit +120℃)
Storage temp. range	-40℃~+110℃(upper limit +120℃)

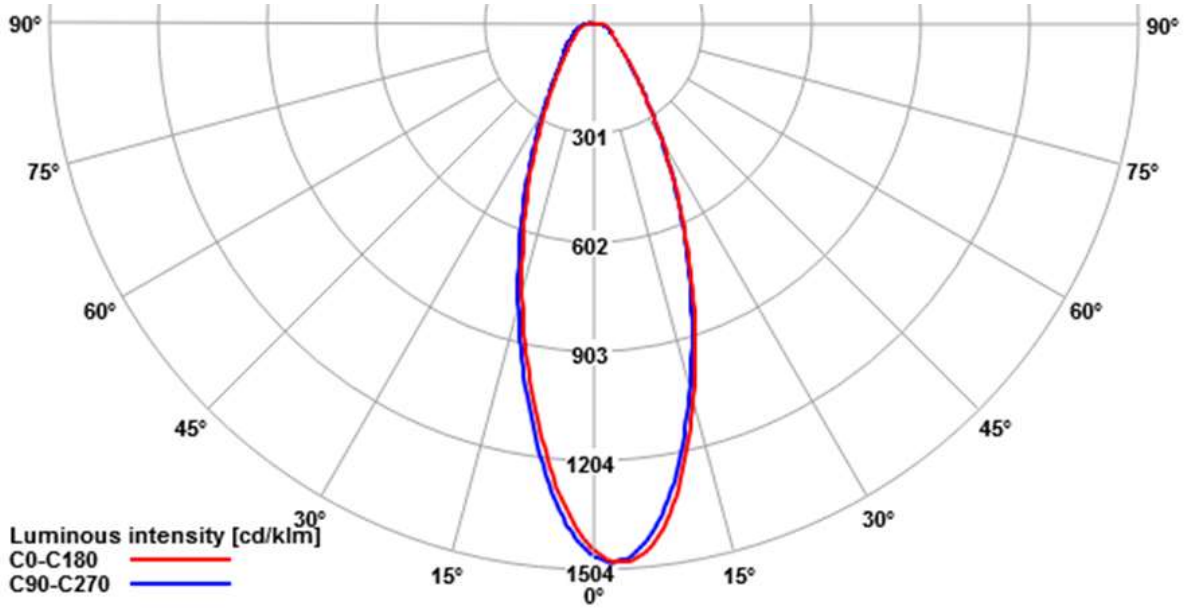
Light intensity distribution 25° Lens 5W



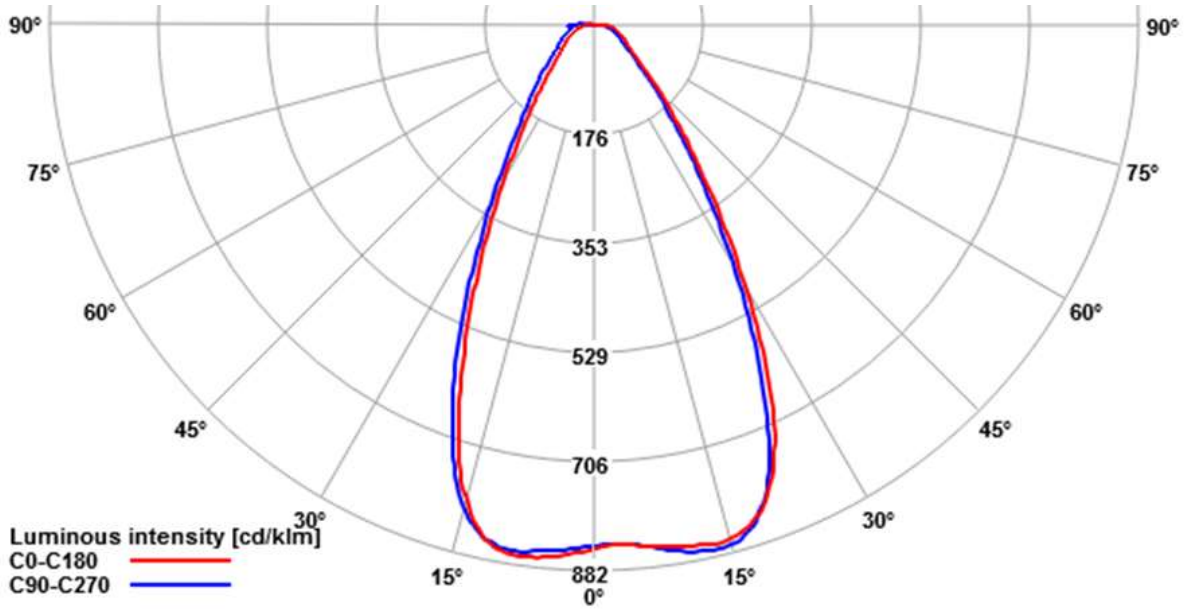
Light intensity distribution 30° Lens 5W



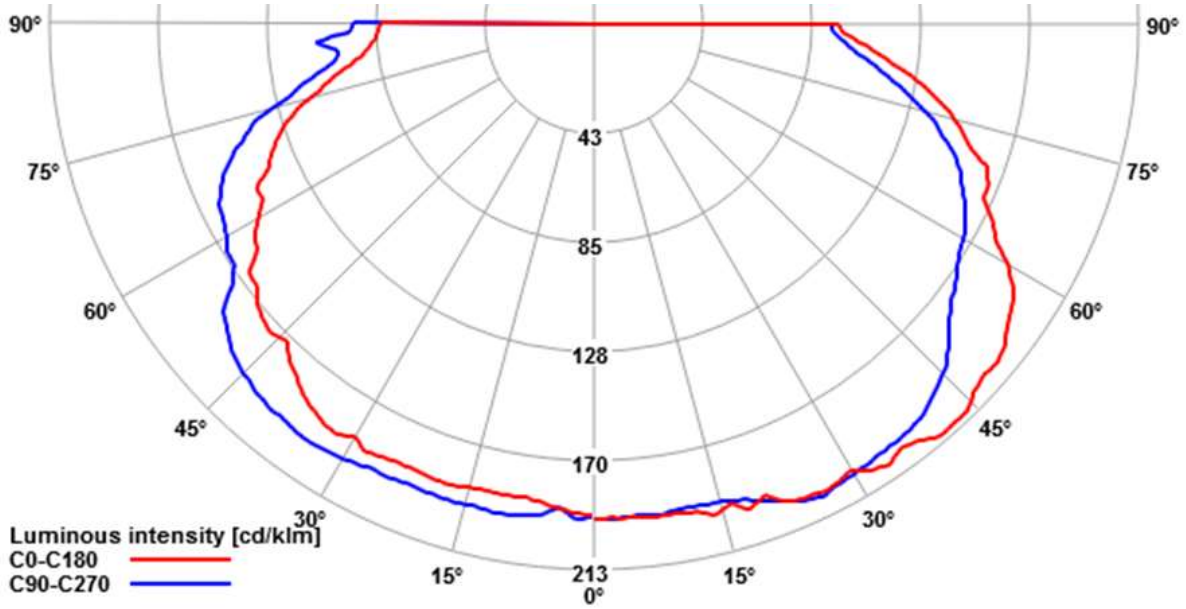
Light intensity distribution 38° Lens 5W



Light intensity distribution 58° Lens 5W

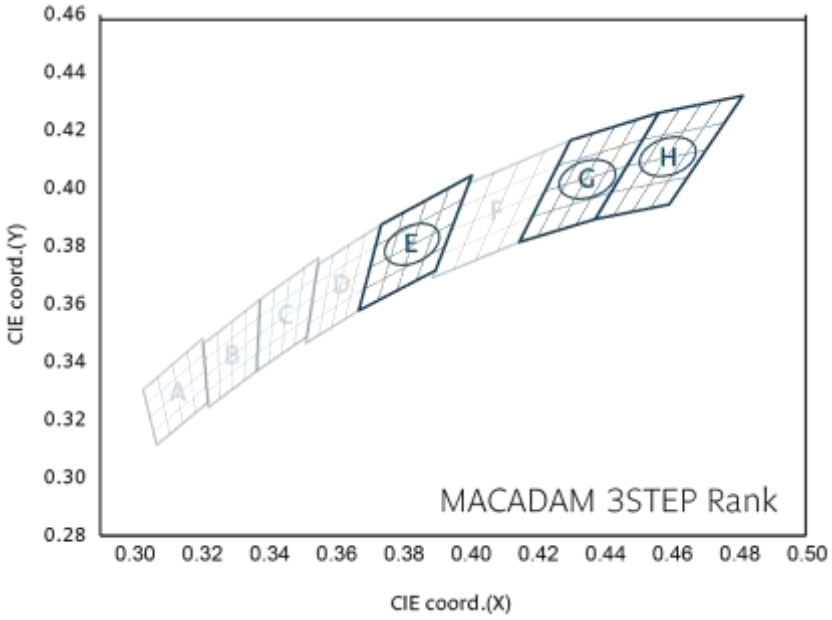


Light intensity distribution 150° Zorya Lens 5W



Binning structure graphical representation

Binning structure graphical representation IEC 1976



* Note that the Blue boxes represent Energy Star Rank

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

Colour Rendering Index (CRI)

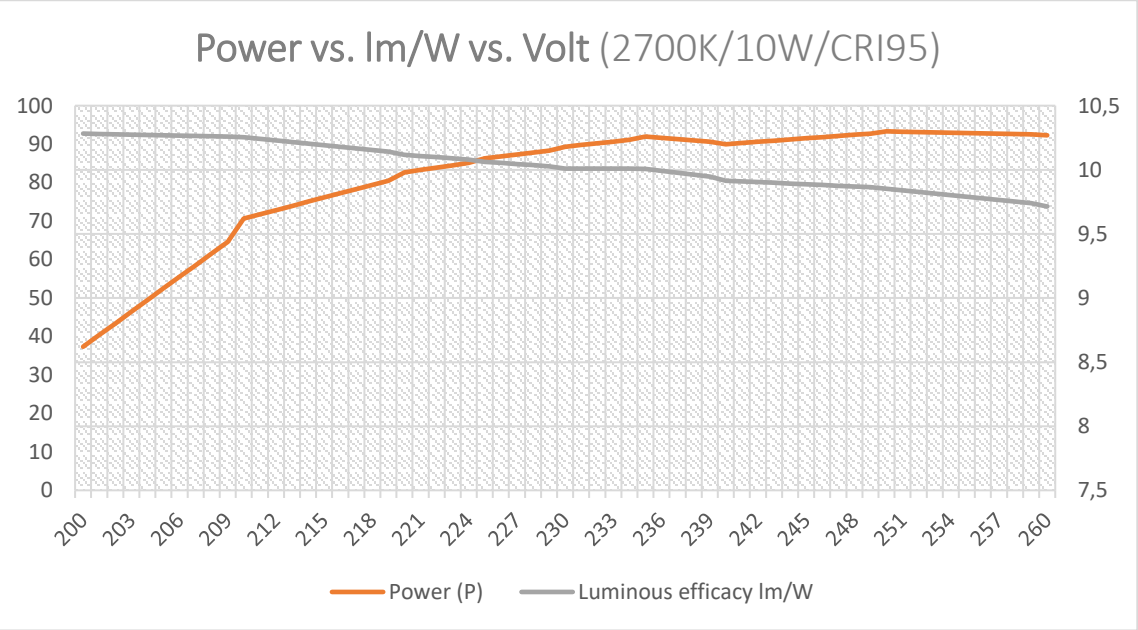
CRI Code	CRI (min) Ra
8	>80
9	>90

Short form letters for CCT (K)

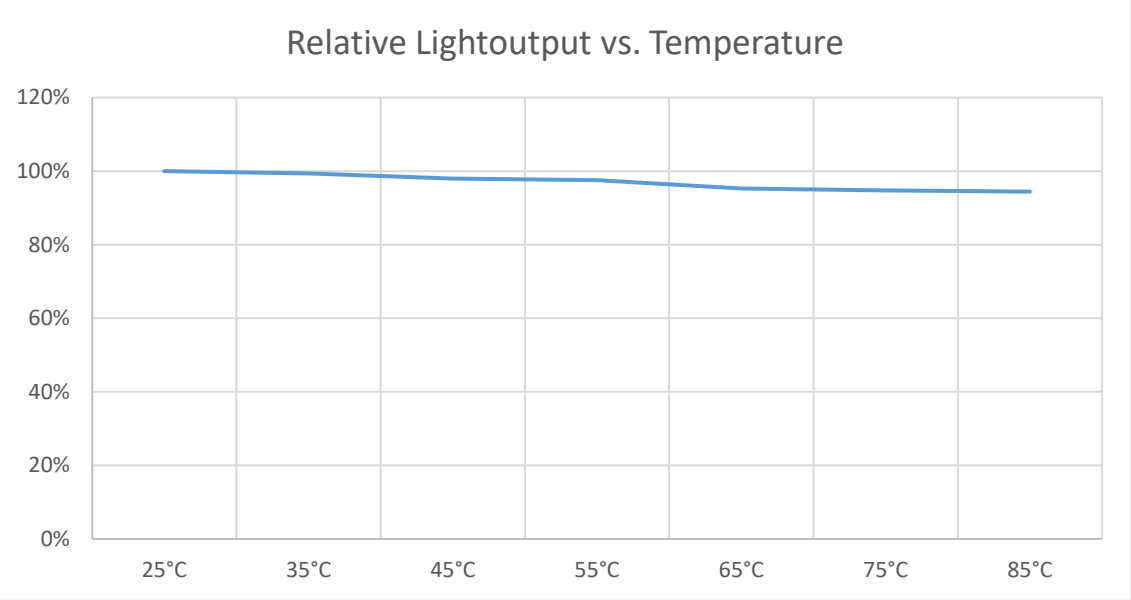
Colour Code	CCT
27	2700K
30	3000K
35	3500K
40	4000K
50	5000K

Electrical Optical Data

Voltage effect on light exchange



Temperature Characteristics



Consider the thermal properties where the LED module is to be mounted. Temperature is an important factor for lifetime longevity as well as for degradation of luminous flux.

Lifetime (Calculated)

TM 21 Interpolation

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

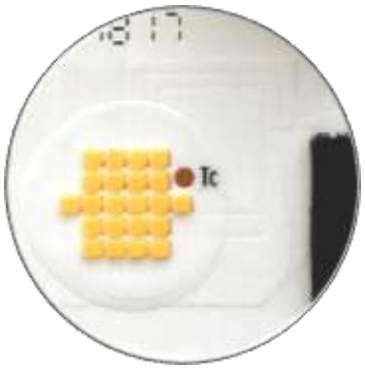
Predicted light output based on LED lifetime (LM80) performance ONLY				
	55℃	65℃	75℃	85℃
L70B10	>50 000h	>50 000h	>50 000h	>50 000h
L80B10	>50 000h	>50 000h	>50 000h	>50 000h
L90B10	>50 000h	>50 000h	45 000h	37 000h

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.

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!

Measurement Control



The recommended maximum value is 65°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.

Maximum Temperature

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

Verification of Conformity

Radio Disturbance	IEC 55015:2006 + A1:2007 + A2:2009	
SURGE	IEC 61000-4-5	1 kv
Fast transient BURST	IEC 61547	2 kv
SAFETY	IEC 62031:2008	
Photo Biological Safety	IEC 62471:2008	
Radio Disturbance	IEC 55015:2006 + A1:2007 + A2:2009	
EMC	IEC 61000-3-2:2006	
EMC	IEC 61000-3-3:2008	
ESD*	IEC 61000-4-2	8 kv Air discharge 4 kv Contact discharge

** 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.

DIMMERS tested (TBD)

LED Engine: ADA AC.10.230.34.827-OH

Brand	Model	Max W	Min W	Min %	Flicker (perceived)	Noise
Elko	400GLI					
Niko	310-0190X					
Vadsbo	VD200					
Qlight	Monodim 350					
Schneider	SBD315RC					
SG	820320 LEDIM400					
Elko	315 GLE					
Gira	2262 00 / i01					
ABB/Busch Jaeger	2247U					
Q-light	Duo touchdim					
Q-light	Zerodim 350					
Ehmann	T14.03.1					
V-com	1-OR 2 WAY Dimmer switch					
Vadsbo	VD300					
Vadsbo	LDN200					
Vadsbo	LD440					
ABB/Busch Jaeger	6523URJGL-214-103					

It is important to understand that this is figures tested with standard dimmers in laboratory environment and can only be considered as reference information. Please, always perform a test in its actual application. We don't take any responsibility for the changes, differences and updates towards dimmers and the performance etc. due to this.

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 jewelry) 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 Compliant

All our LED modules meet the Restrictions of Hazardous Substances (RoHS III)!

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 and the Japan Ministry of Trade and Industry (MITI). 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. This is in compliance with our responsibilities as good corporate citizens.

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

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

Read more about OptoDrive at www.optoga.com.
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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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