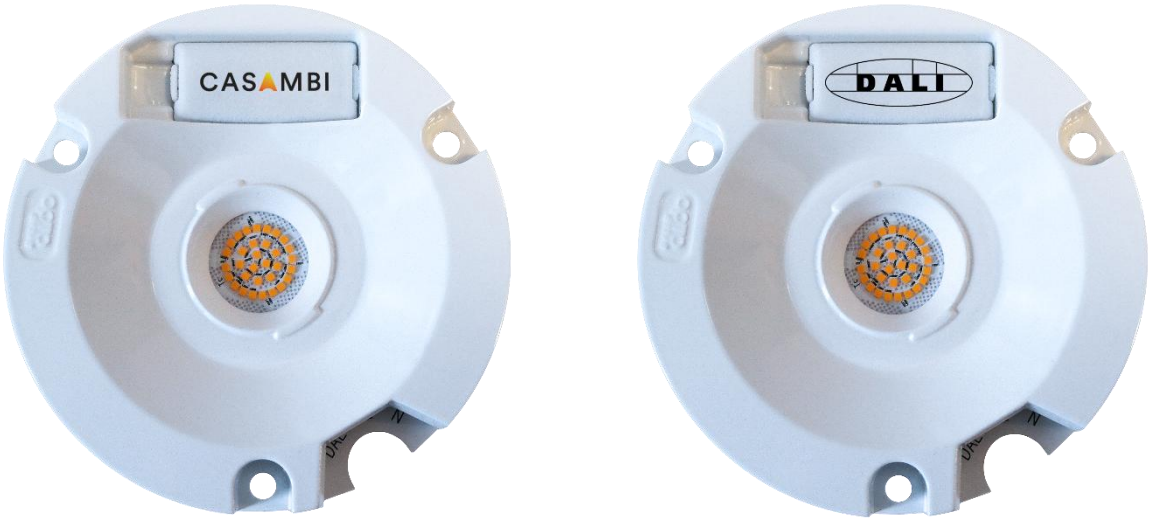
ADA AC



ADA76 AC IoT

10 and 20W
FlickerFree

Round LED-module for spotlights and downlights.

No driver is required

Key Features

ADA76 is specifically crafted for 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.

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1. Integrated Smart Lighting
    - Built-in drivers with possible support for DALI, Casambi, INGY and other smart control systems, offering seamless dimming options.
2. Effortless Connectivity
    - Direct connection to 230VAC with no external drivers required, simplifying installation across different environments.
3. Flicker-Free Dimming
    - Provides smooth, flicker-free dimming using either standard dimmers or smart control protocols for consistent, comfortable lighting.
4. IoT-Ready
    - Easy integration into IoT ecosystems, enabling smart control and energy efficiency for both personal and commercial applications.
5. Sustainable Design
    - Compliant with the latest EU circular economy directives, making it both eco-friendly and future-proof.

Content

Introduction

The ADA76 LED module offers versatile dimming capabilities, working seamlessly with standard dimmers right out of the box. For more advanced, intelligent lighting control, our compact DimIn unit can be integrated, enabling compatibility with DALI, Casambi, or other communication protocols. 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.

ADA76 Package

Designed for pendant applications, the ADA76 is a round LED light engine with side entry for easy wire integration. Its plug-in connectors allow for quick and straightforward setup. With the option to integrate smart systems like DALI, Casambi, or other IoT-based protocols, this module fits into various lighting ecosystems. Additionally, all IoT LED modules feature an electrically isolated heat pad, ensuring safety and compatibility with Class II fixture installations.

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

ADA76 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.

High-Resolution Analog Dimming

When controlled by a DimIn module, ADA76 processes dimming commands via a 10 kHz interface. Inside the LED module, the signal is transformed into analog current regulation using amplitude modulation (AM), completely avoiding PWM.
This ensures flicker-free light, high precision at low dimming levels, and predictable electrical performance for lighting controls and energy-aware applications.

Smart Lighting

The ADA76 LED module is IoT-ready, designed to integrate easily with systems like Casambi, DALI, or other communication standards. Our goal is to make smart lighting accessible to small and medium-sized manufacturers, allowing them to incorporate advanced controls without requiring extensive technical expertise. Whether it's straightforward integration or the addition of new smart features, the process is simple, aligning with the latest EU directives on the circular economy for sustainable, future-proof solutions.

Smart Lighting with IoT

The world of lighting design is evolving rapidly, and smart LED engines are leading the charge. With IoT technology, designers can now integrate DALI and Casambi directly into their lighting systems, creating dynamic, adaptable environments. From enhancing comfort in workspaces to crafting immersive lighting experiences, smart lighting provides an unparalleled level of control.

Imagine having these capabilities built into your LED module from the start—Optoga makes it possible. The compact, sugar-cube-sized DimIn modules are the key. They seamlessly fit into our IoT interface and can be easily swapped between DALI, Casambi, or even basic dimming controls, making smart lighting accessible to everyone. All that's needed is a mains connection (230VAC) and two wires—either for DALI or for connecting a potentiometer or switch.

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		
ADA60 AC IoT	X	X	X	X	X		
ADA76 AC IoT	X	X	X	(X)			
Sanna158 IoT	X			X	X		
Sanna158 AC IoT HCL				X		X	
Sanna290 IoT				X			X

DimIn Modules for Ultimate Control

- DALI: Our DALI-compatible device works seamlessly with DALI-2 systems, offering precise control over lighting with bus-powered simplicity.
- Casambi: Casambi isn't just wireless control—it's a smart, connected lighting system that can respond to changing environments, adjust brightness, and create human-centered lighting that enhances well-being and productivity.
- Switch: Use a momentary switch for simple, smooth dimming control in freestanding devices.
- POT: The potentiometer option allows easy dimming (up/down) and on/off functionality, perfect for standalone fixtures.

Potentiometer Control

With our easy-to-use potentiometer, users can enjoy intuitive lighting control. The click mechanism provides tactile feedback for on/off, while a smooth clockwise rotation increases light intensity on a logarithmic scale—ideal for precise control over ambiance.

Short form Characteristics

MODULE CHARACTERISTICS		5W (Not ready)	10W	20W
Power		5 W +/-10% ea.	10 W +/-10% ea.	20 W +/-10% ea.
Voltage			230VAC	
Number of LED's			32	
Colour Rendering Index			>Ra80, >Ra90	
Colour temperature			2700K, 3000K, 4000	
Optics			12-64°	
MECHANICAL				
Module dimension			Ø 76.0mm	
Diameter lens			Ø 76.1mm	
Height			11.3 mm	
Weight				
Assembly holes			3 x 3.5 mm	
Wire connector			Push in	
ELECTRICAL				
Input voltage range			220-240V (max 264VAC)	
Dimmable			Yes (phase cut, DALI, Casambi)	
Power factor			>0.95	
Total harmonic distortion			< 15%	
Peak inrush current			TBD	
Surge protection			2kV	
Burst protection			2kV	
Over temp. protection			150°C	
Energy class	2700K		F	F
	3000K		F	F
	4000K		F	F
PHOTOMETRICAL				
Flux		~ 500 lm	900-1100 lm	1700-2100lm
Efficiency		100lm/W	90-110lm/W	85-105lm/W
SDCM (Mac Adam)			3	
Flicker percent		3%	3%	3%
SVM		0.3	0. 3	0.3
PstLM		0.3	0.3	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	

*Specifications are valid for >Ra95.

Article number structure

Ada76 AC.P.230.32.9yy-OH.FF.IOT	
AC	AC= 230VAC, ED=External Driver required, ID=Internal Driver
P	Power (Watt) 5, 10 or 20
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
FF	Flickerfree (below 3%)
IoT	IoT interface

Article name and versions

ADA LED Engine Article description

ARTICLE NAME	POWER	CURRENT	CRI	CCT	Lumen	LENS
ADA76 AC.10.230.32.927-OH.FF.IOT	10	230	90	2700	850	Optic Holder
ADA76 AC.10.230.32.930-OH.FF.IOT	10	230	90	3000	870	Optic Holder
ADA76.AC.10.230.32.840-OH.FF.IOT	10	230	90	4000	900	Optic Holder
ADA76 AC.20.230.32.927-OH.FF.IOT	20	230	90	2700	1500	Optic Holder
ADA76 AC.20.230.32.930-OH.FF.IOT	20	230	90	3000	1550	Optic Holder
ADA76 AC.20.230.32.940-OH.FF.IOT	20	230	90	4000	1600	Optic Holder

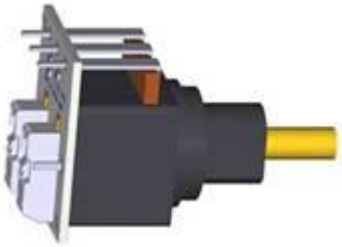
Optics for ADA LED engine

ARTICLE NAME	BEAM ANGLE	LUX Value 1 meter (20W)
Lens OH 60	64°	800 lx
Lens OH 40	40°	TBD
Lens OH 25/28	25°	2 600 lx
Lens OH 18/20	22°	3 800 lx
Lens OH 12/17	16°	8 100 lx
Lens OH 7/12	12°	10 200 lx

The optics are to be ordered separately

DimIn (IoT Interface)

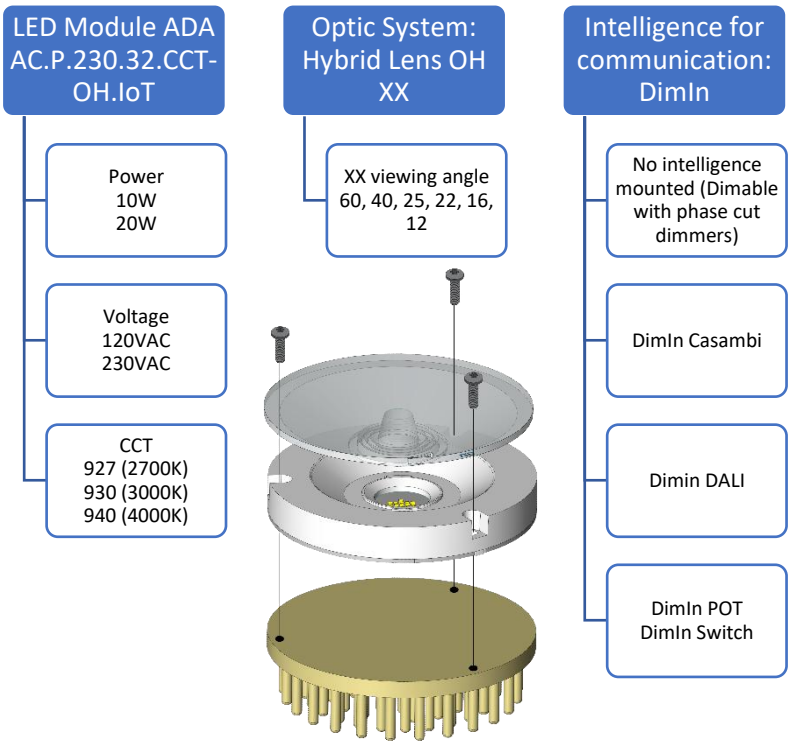
ARTICLE NAME	Eco System	Information
DimIn DALI DT8	DALI type 2	Wire
DimIn Casambi	Casambi	Wireless
DimIn POT	Internal dimming	Wire
- **DimIn Potentiometer**	Internal dimming	Wire together with DimIn POT



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%.

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.



Ada 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 OH – Packaging information

Description	Qty (pcs)	Dimension (cm)			GW (kg)
		Length	Width	Height	
Inner Box	108	30	30	23	3,15
Outer Box	216	62	32	25	6,58

DimIn – Packaging information

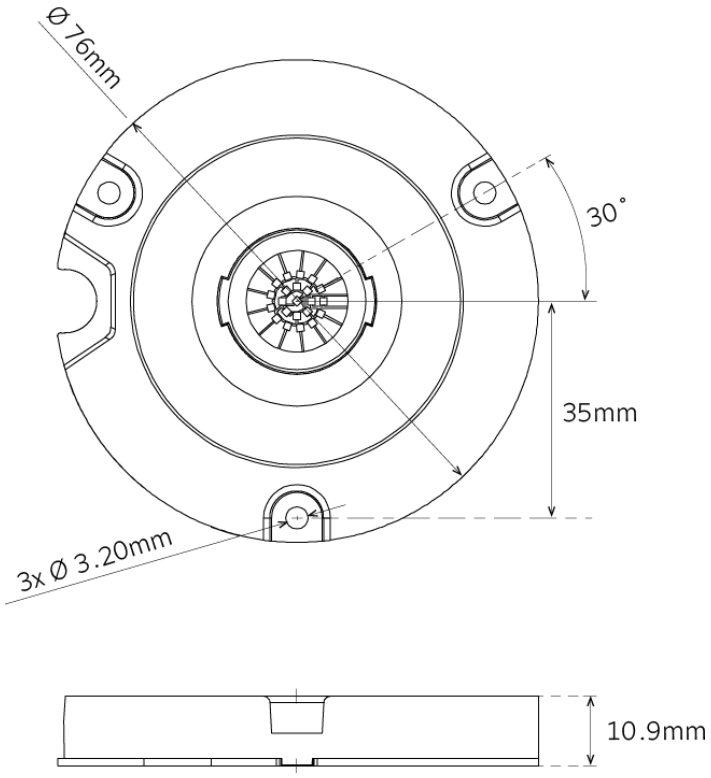
Description	Qty (pcs)	Dimension (cm)			GW (kg)
		Length	Width	Height	
Inner Box	72	35,6	22,7	9,6	
Outer Box	2304	46,5	37,5	39,6	TBD

Potentiometer – Packaging information

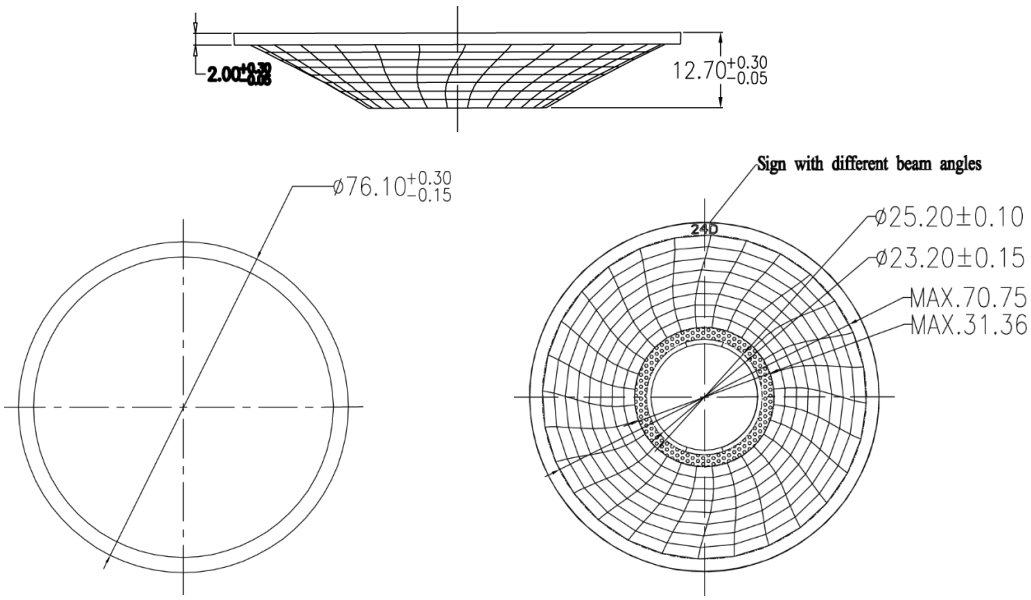
Description	Qty (pcs)	Dimension (cm)			GW (kg)
		Length	Width	Height	
Inner Box	TBD	35,6	22,7	9,6	
Outer Box	TBD	46,5	37,5	39,6	TBD

Dimensions

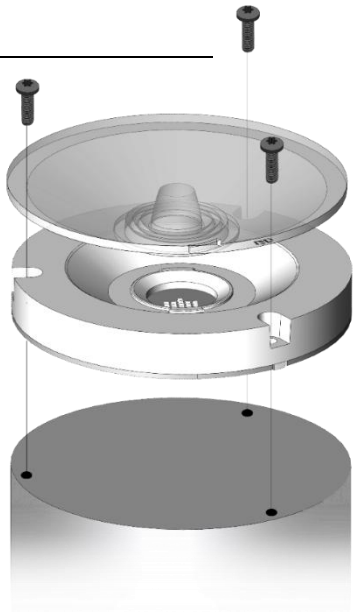
LED-module



Lens for Optical Holder



Mounting instructions



Mounting

Mount the device on heatsink with screws safely

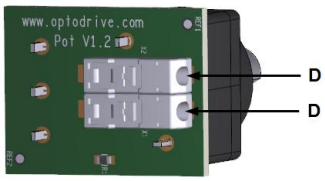
Wiring

The LED module with the nomenclature IoT 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 or a potentiometer.

DimIn

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

Potentiometer card

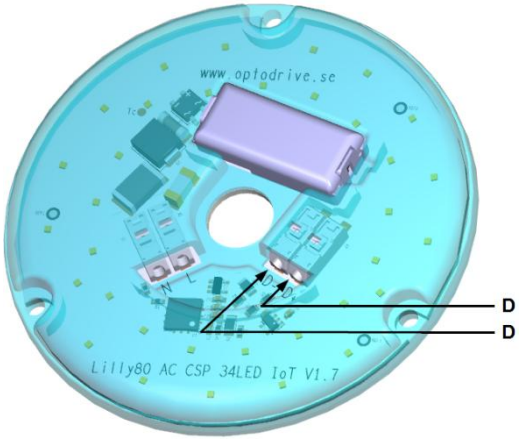


The Pot potentiometer board works with the DimIn Pot functionality module. D + or D- play a certain role as they change the dimming direction depending on the connection.

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.

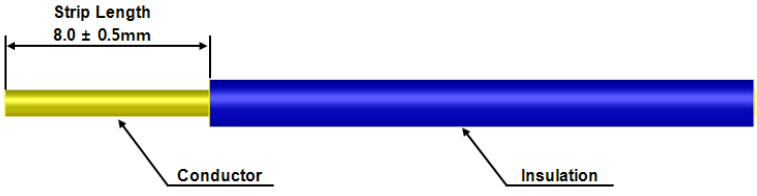


Connector

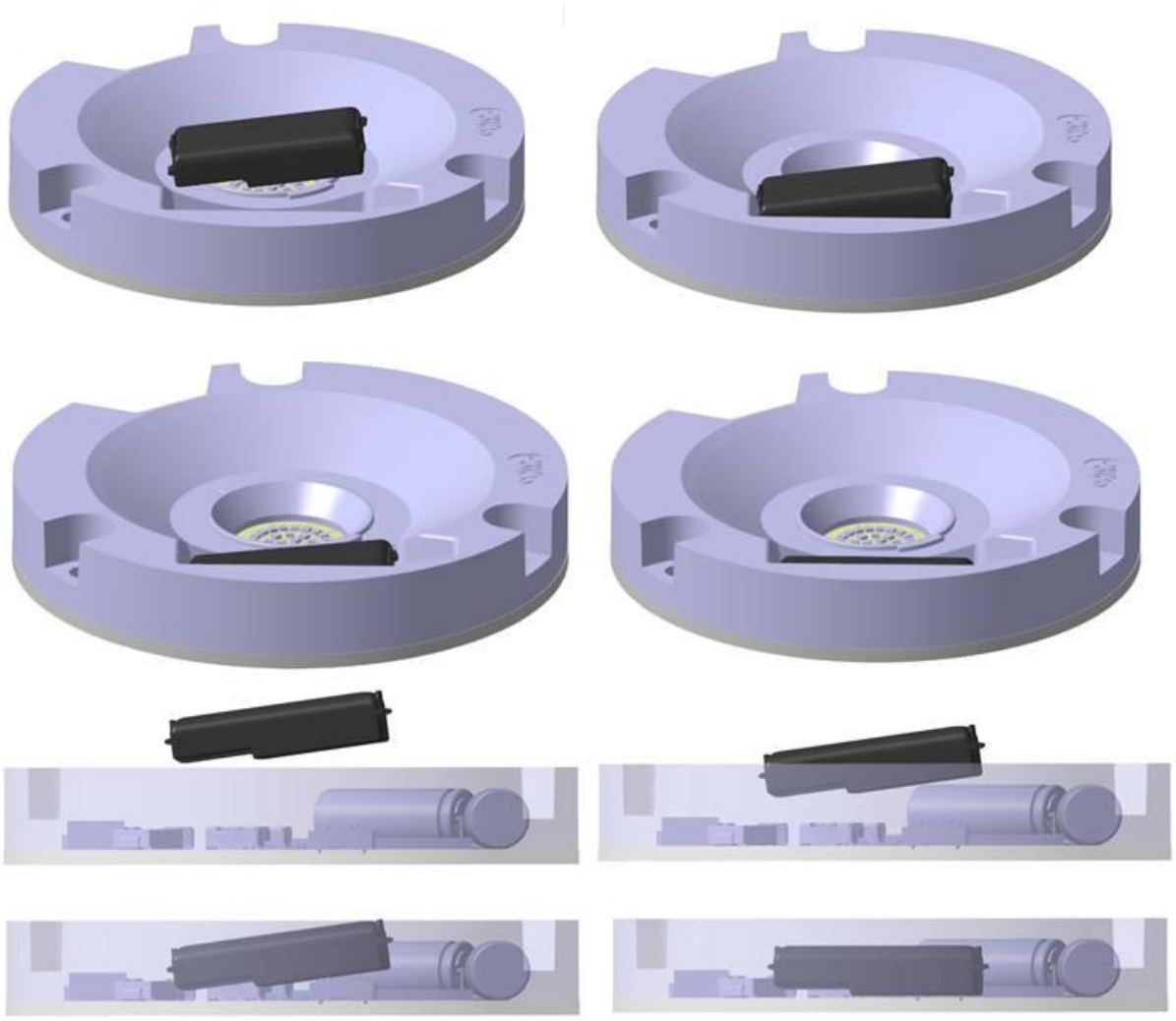
Type	Push In type

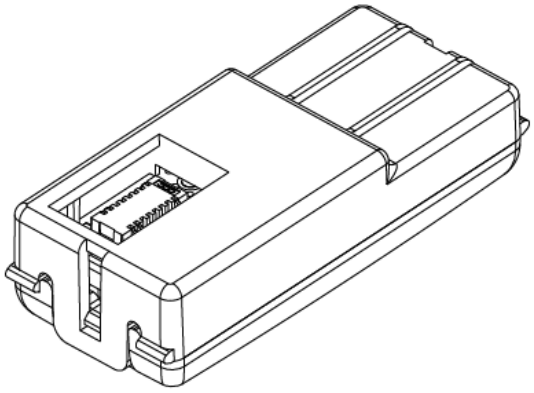
Wire (Recommended)

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

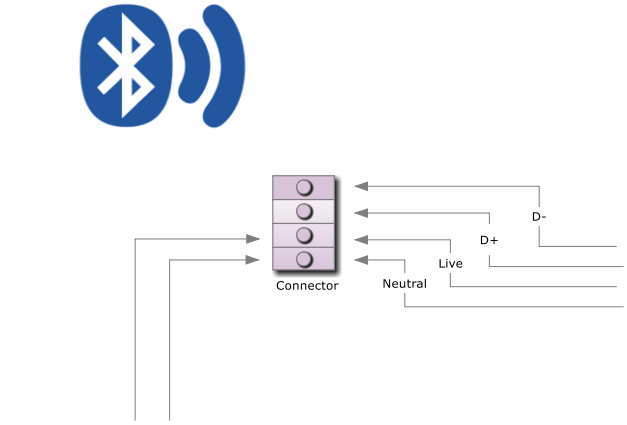




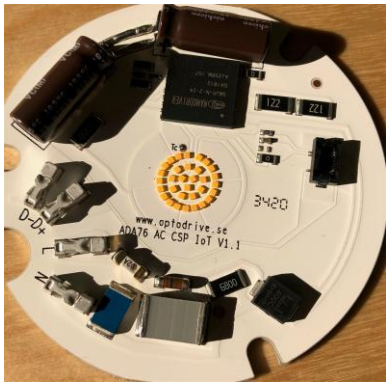
Here on the left you can see the DimIn unit from below and you can see the connector that is connected to the LED module as well. It is important to insert the front first during assembly, as you can see in the pictures above, then press the rear end and the contact into place. Friction locking between the LED module's safety cover and the DimIn unit's protection locks it in place.

Wiring for different DimIn versions

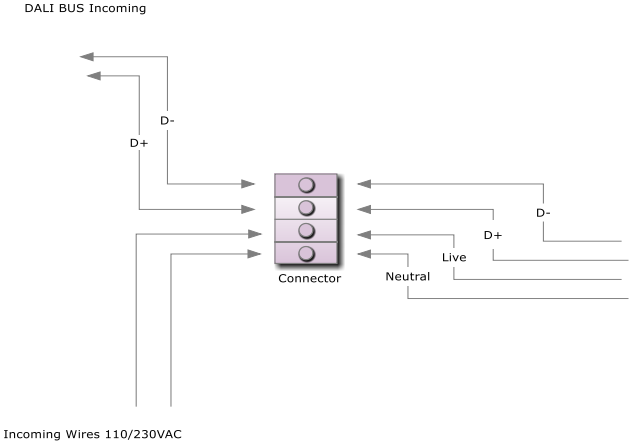
Casambi



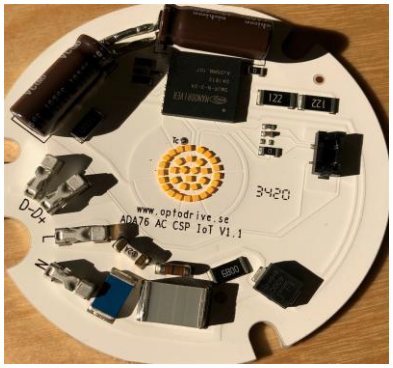
LED Module with IoT (DimIn Casambi)



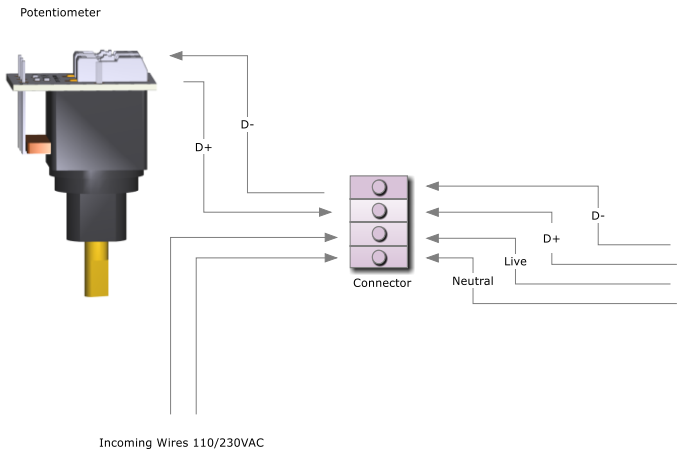
DALI



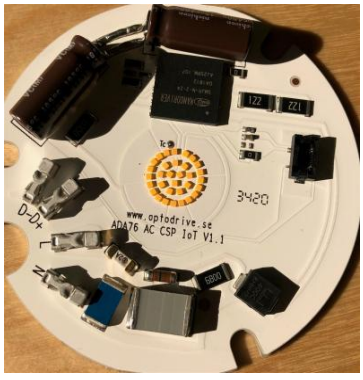
LED Module with IoT (DimIn DALI)



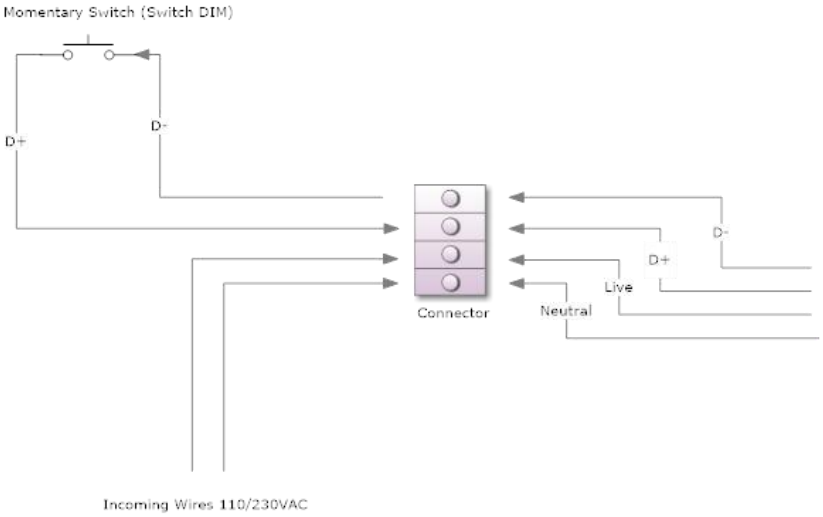
POT / Potentiometer



LED Module with IoT (DimIn POT)



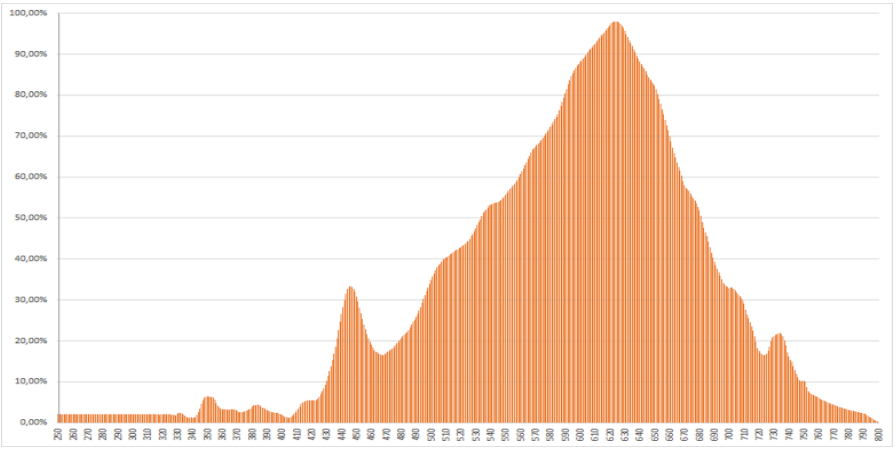
DimIn Switch (Switch-Dim)



LED Module with IoT (DimIn Switch)

Photometrical

Colour Spectrum 2700K



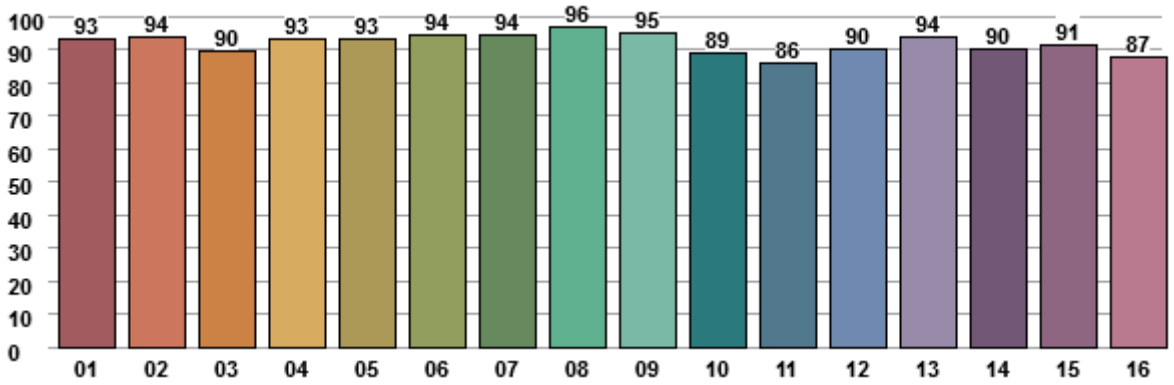
Colour Rendering Index (CRI) 2700K

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

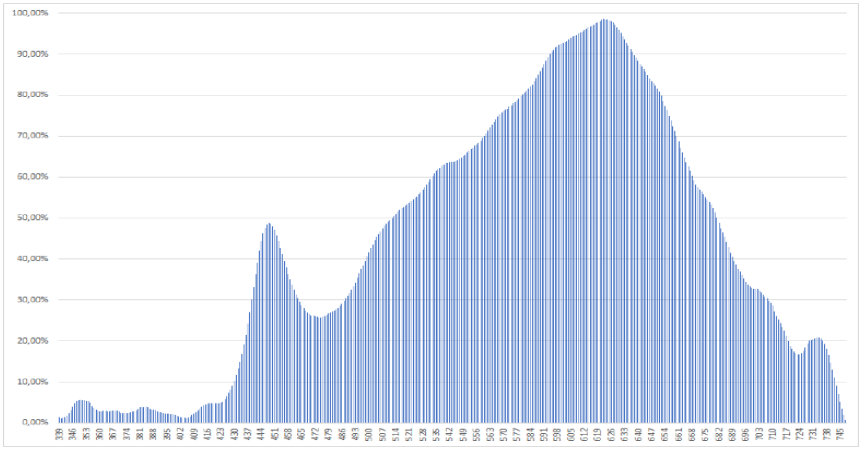
TM-30-15

Main Parameters	
Fi	92
Rg	101
Rfskin	96

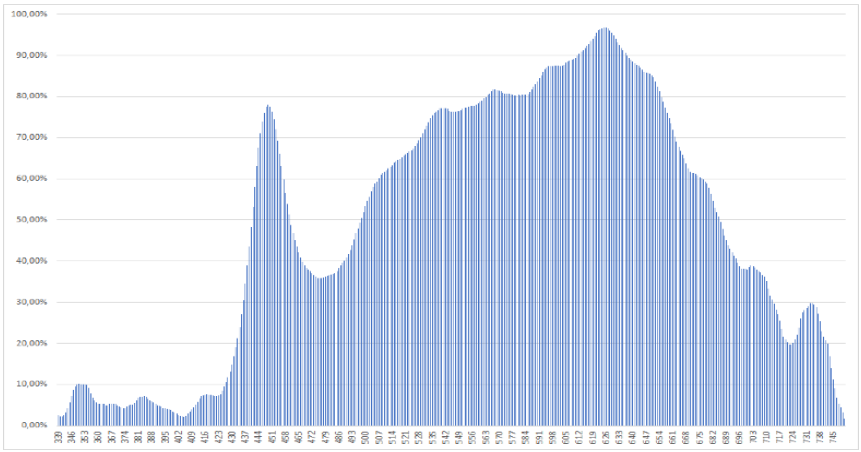
Hue Bin Fidelity Index (Rfh,j)



Colour Spectrum 3000K

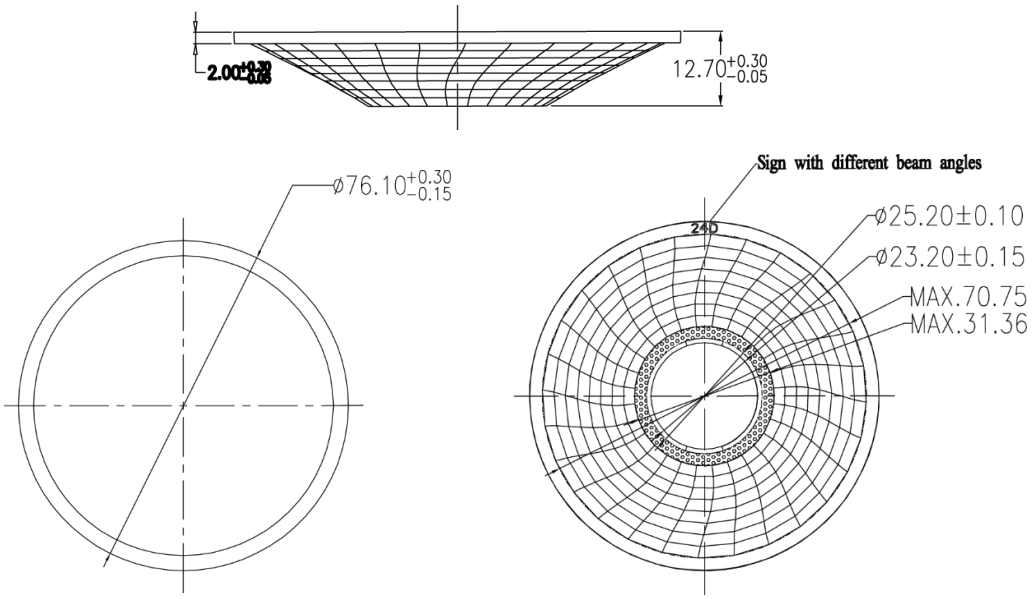


Colour Spectrum 4000K



Parameters of the lens system

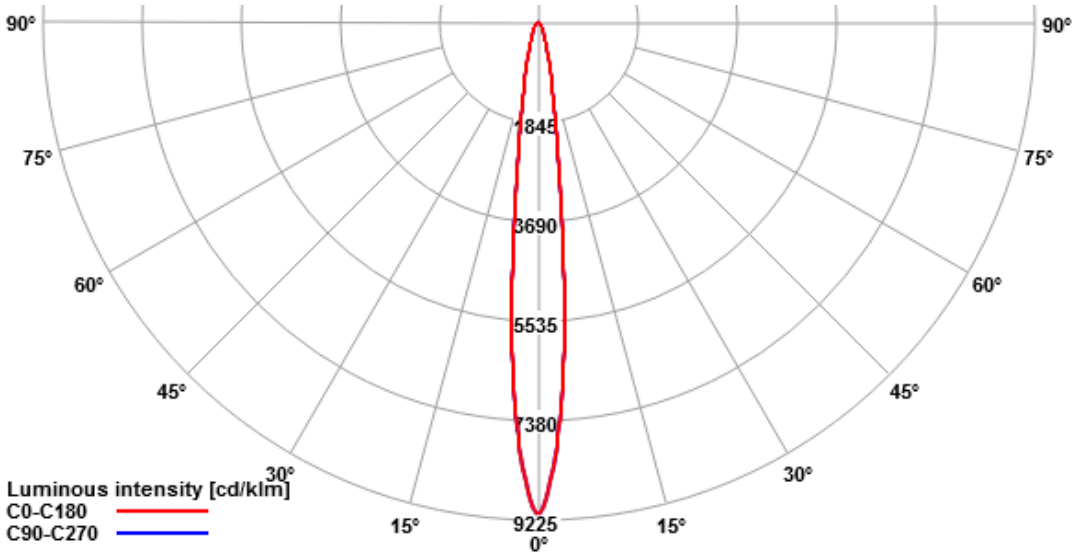
Lens for Optical Holder

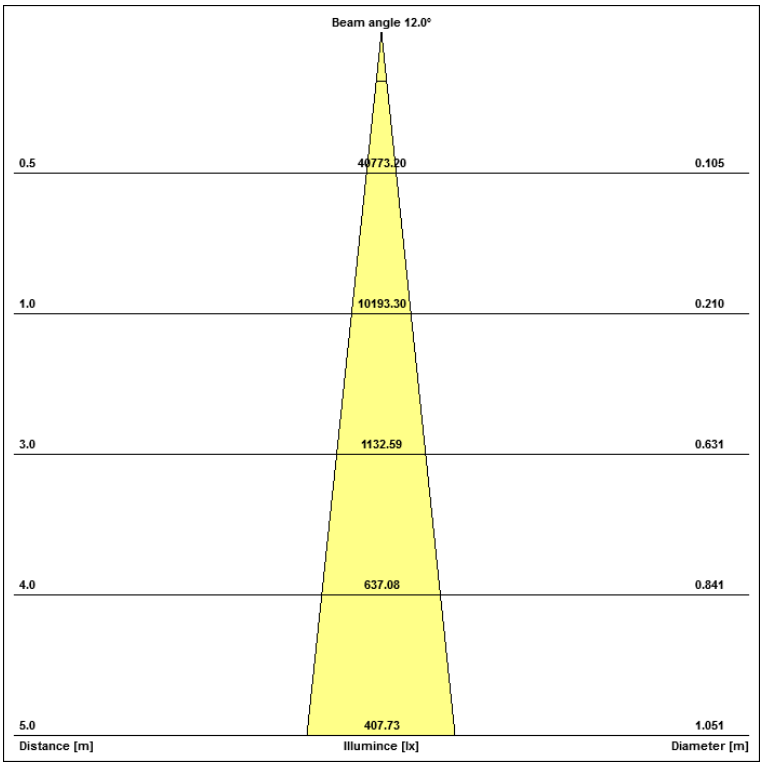


Material

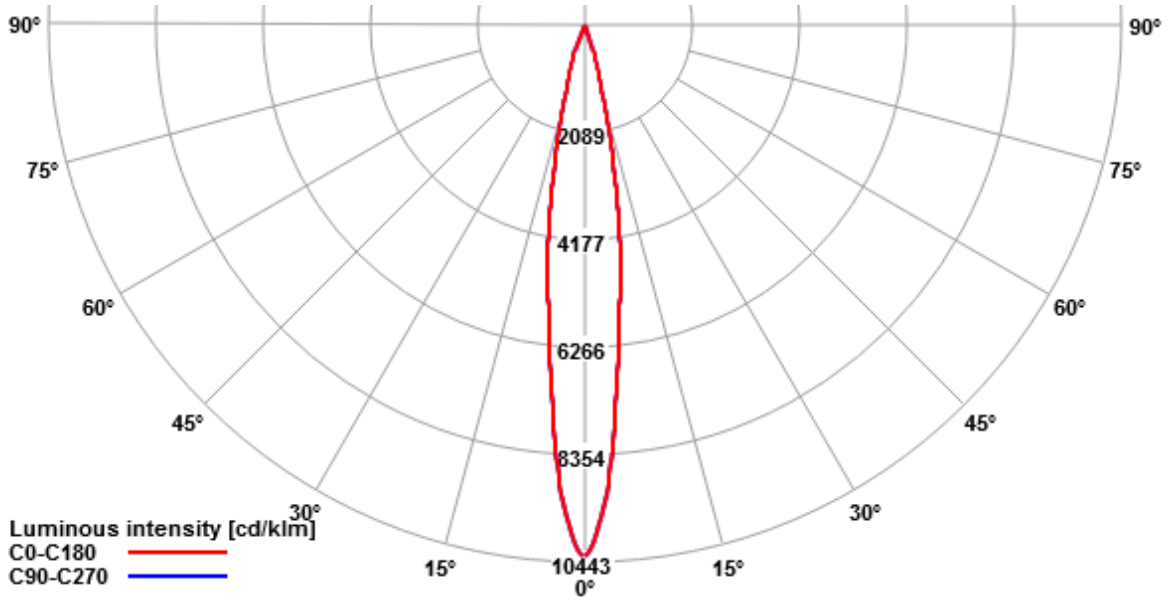
Lens material	PC LEV1700 (Vacuum metalizing on back of lens)
Connector material	PBT4815
Operating temp. range	-40℃~+110℃(upper limit +120℃)
Storage temp. range	-40℃~+110℃(upper limit +120℃)

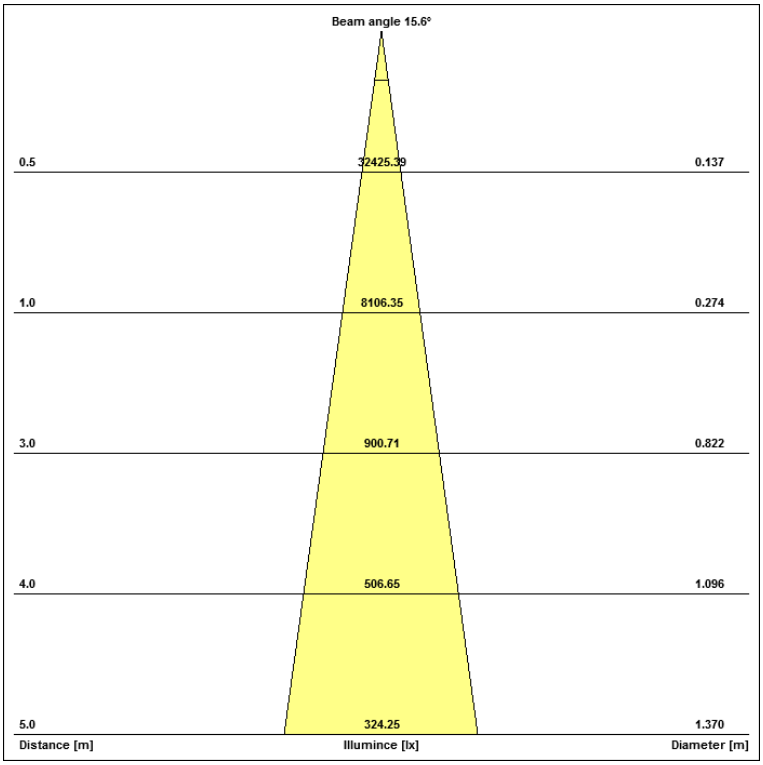
Light intensity distribution 12° Lens 10W



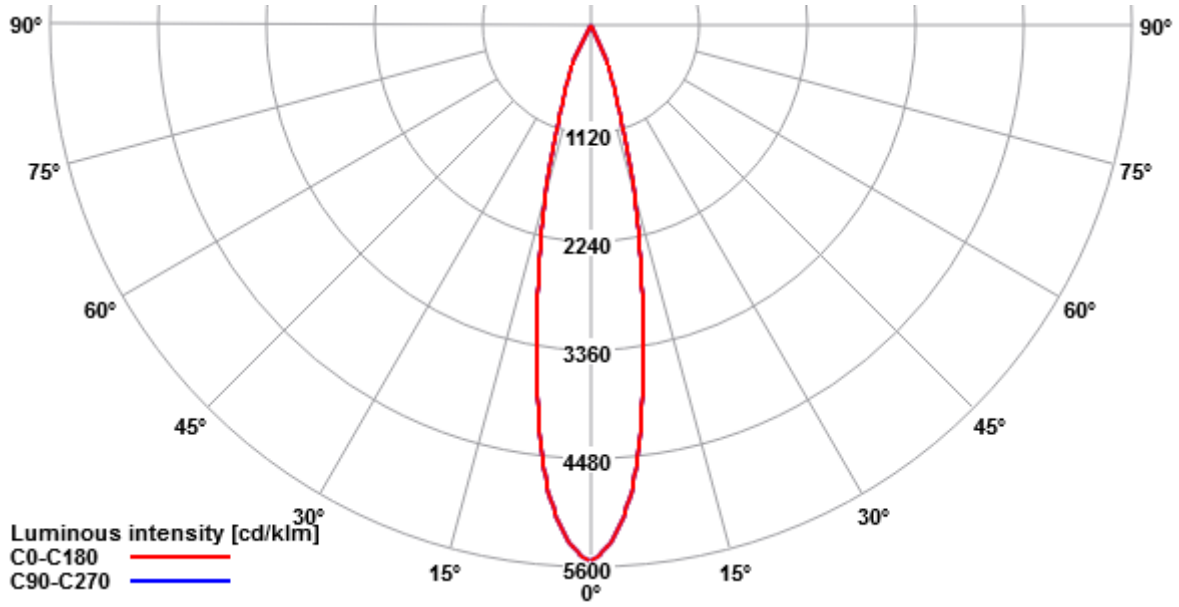


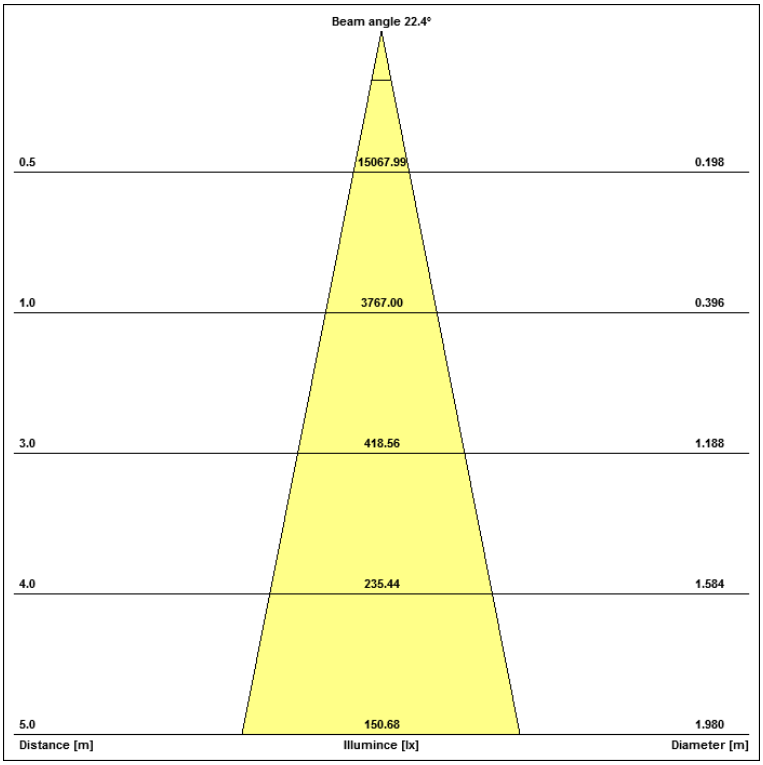
Light intensity distribution 16° Lens 10W



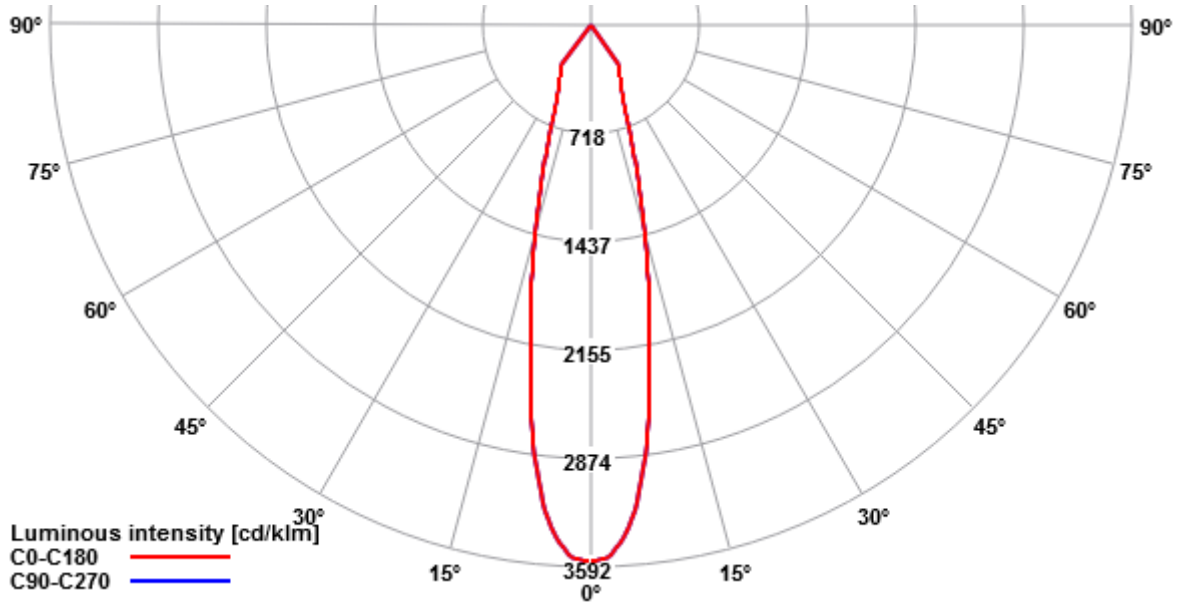


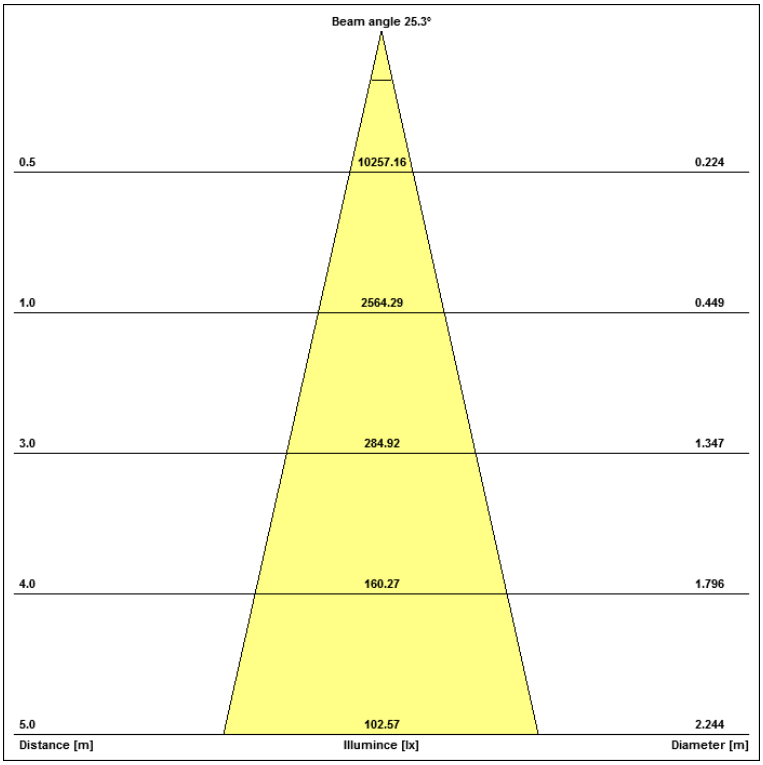
Light intensity distribution 22° Lens 10W



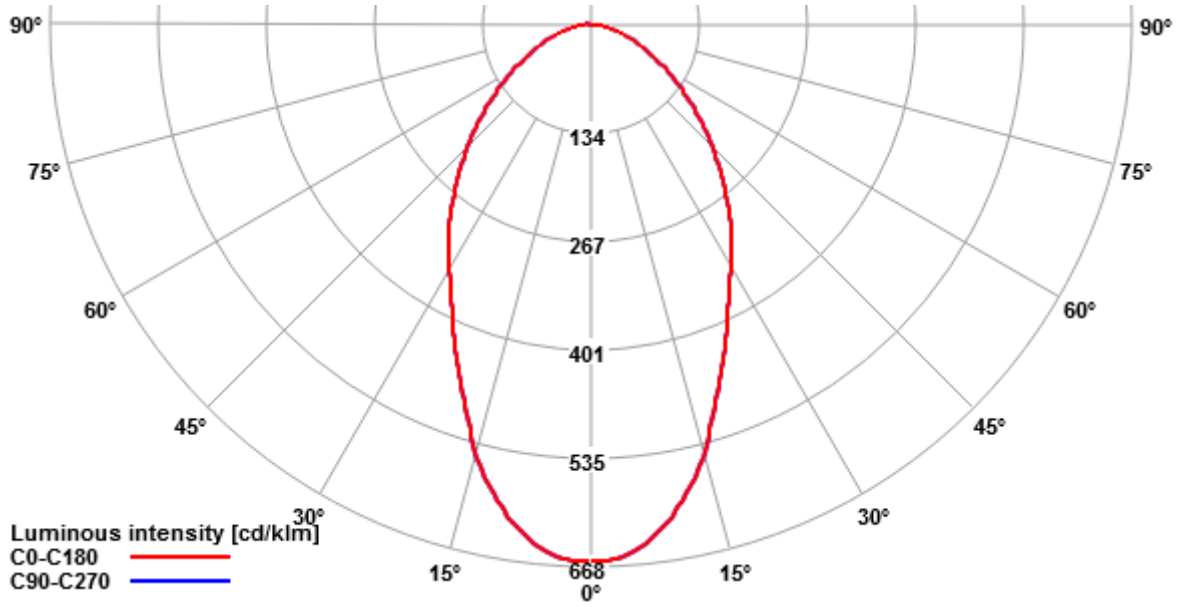


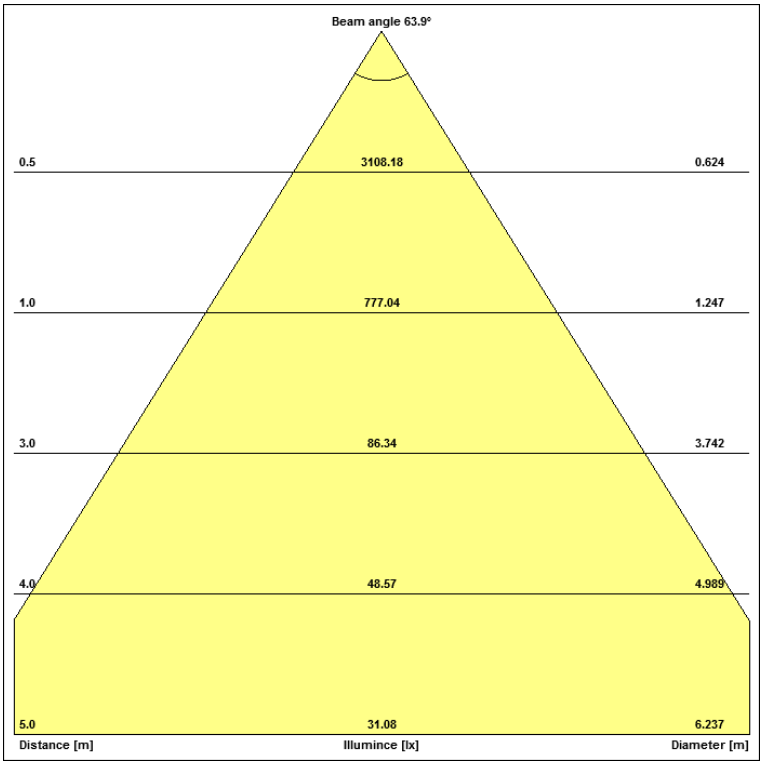
Light intensity distribution 25° Lens 10W





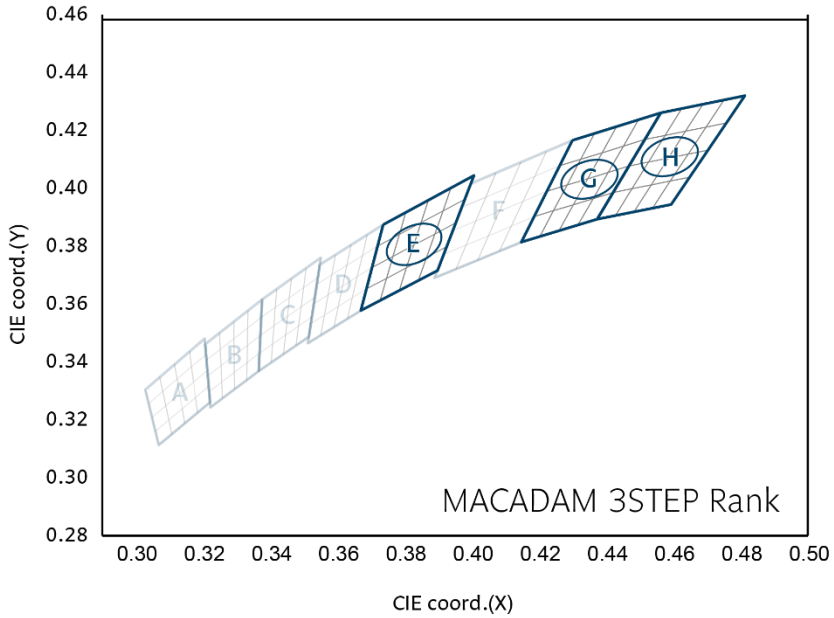
Light intensity distribution 60° Lens 10W





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)

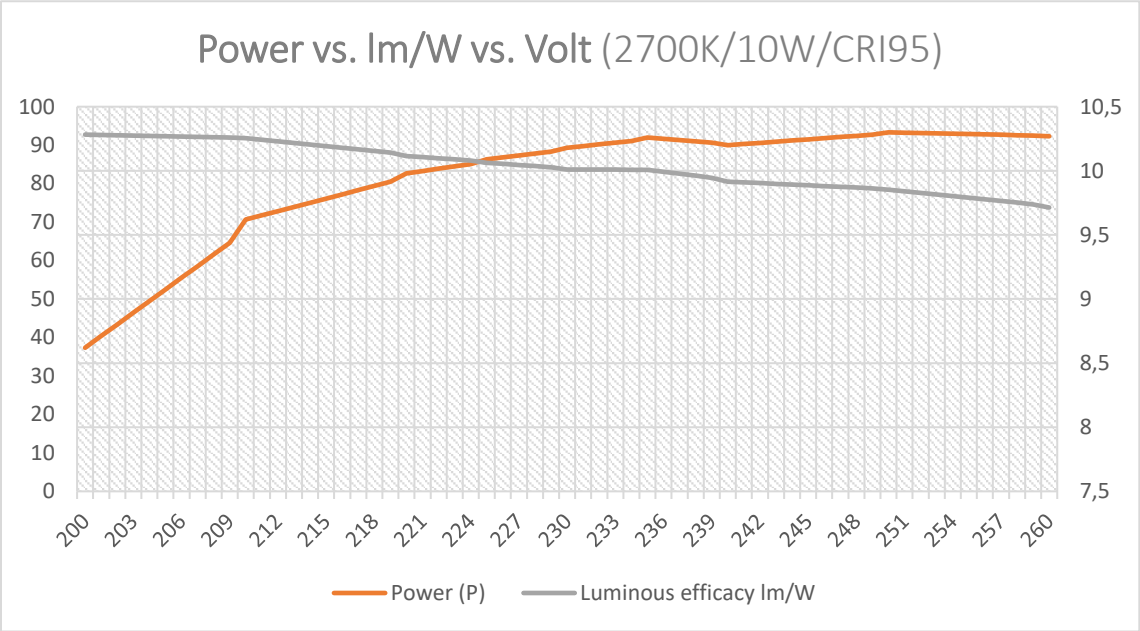
CRI Code	CRI (min) Ra
8	>80
9	>90

Short form letters for CCT (K)

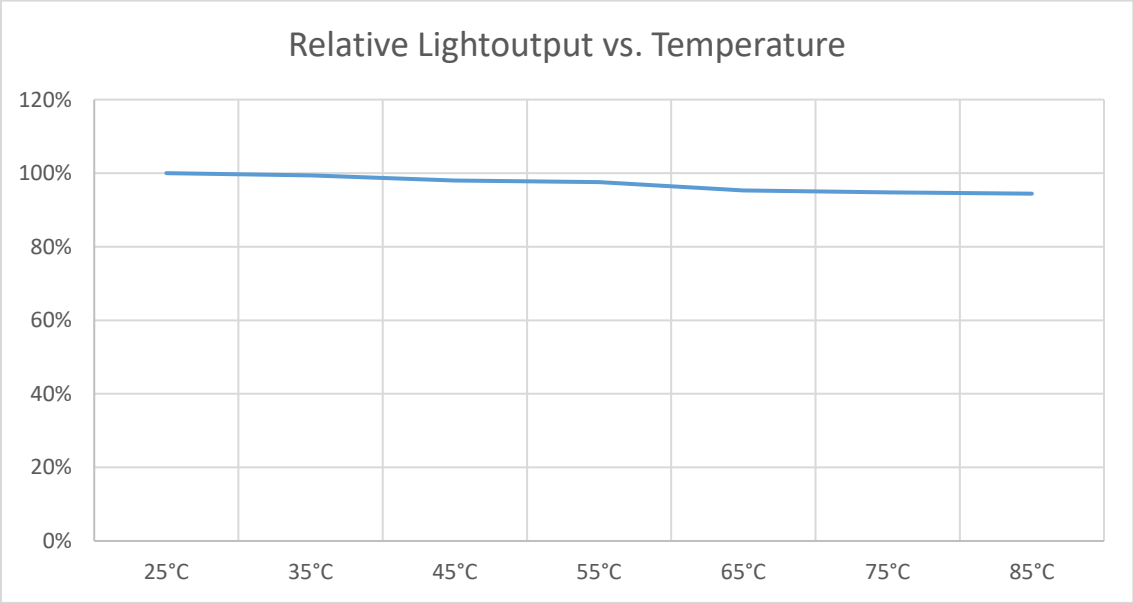
Colour Code	CCT
27	2700K
30	3000K
35	3500K
40	4000K
50	5000K

Electrical Optical Data

Voltage effect on light exchange



Temperature Characteristics

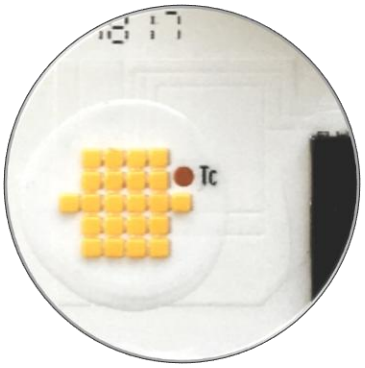


Consider the thermal properties where the LED module is to be mounted. Temperature is an important factor for lifetime longevity as well as for degradation of luminous flux.

Lifetime (Calculated)

Measurement control

At verification, the temperature at the designated Tc measurement points shall be confirmed to remain within the specified limits. Compliance with these limits determines the expected operational lifetime of the module. This verification shall be performed only after proper attachment of the heat sink.



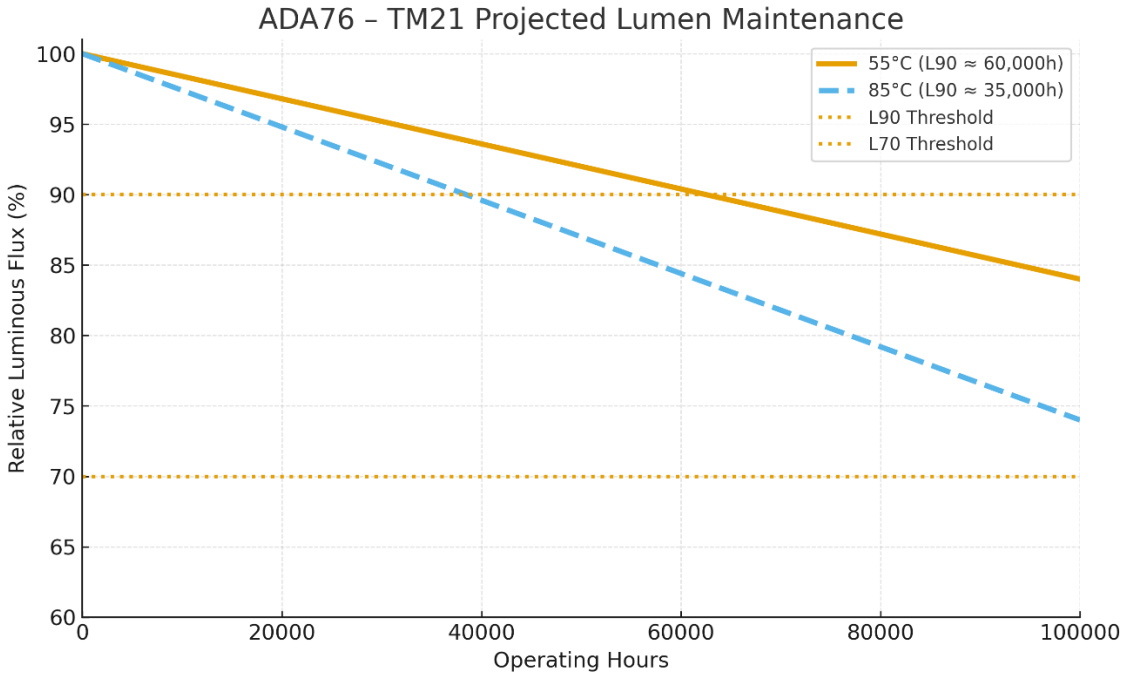
Lifetime Calculation at Tc

The calculated lifetime is based on the maximum recommended temperature at the Tc measurement point. The absolute maximum Tc is 85 °C, and this limit shall not be exceeded. For reliable design margins and extended service life, a recommended Tc of 65 °C should be applied in luminaire design.

Projected lifetime based on TM-21

The applied power load for the LED module is defined in accordance with the lumen maintenance projection. Lifetime projections are based on LM-80 test data from discrete LEDs operated under the specified thermal conditions at a drive current of 30 mA.

Metric	55 °C	65 °C	75 °C	85 °C
L90	62 500 h	54 000 h	46 000 h	38 000 h
L80	>100 000 h	>100 000 h	92 000 h	76 000 h
L70	>100 000 h	>100 000 h	>100 000 h	>100 000 h



Lifetime and Reliability

The projected lifetime values presented are based on TM-21 extrapolation of LM-80 test data for the LEDs used in the module. These figures represent lumen maintenance of the LED packages only.

An LED module, however, consists of several additional components such as PCB substrates, solder joints, driver electronics, optical materials and connectors. The overall service life of the module may therefore be influenced by these elements, depending on the application environment and operating conditions.

Optoga modules are designed and verified to ensure that supporting components are selected and dimensioned to match the LED lifetime at the recommended Tc values. This means that the projected lumen maintenance according to TM-21 is complemented by robust module design, providing customers with reliable long-term performance in real installations.

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.

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.
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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