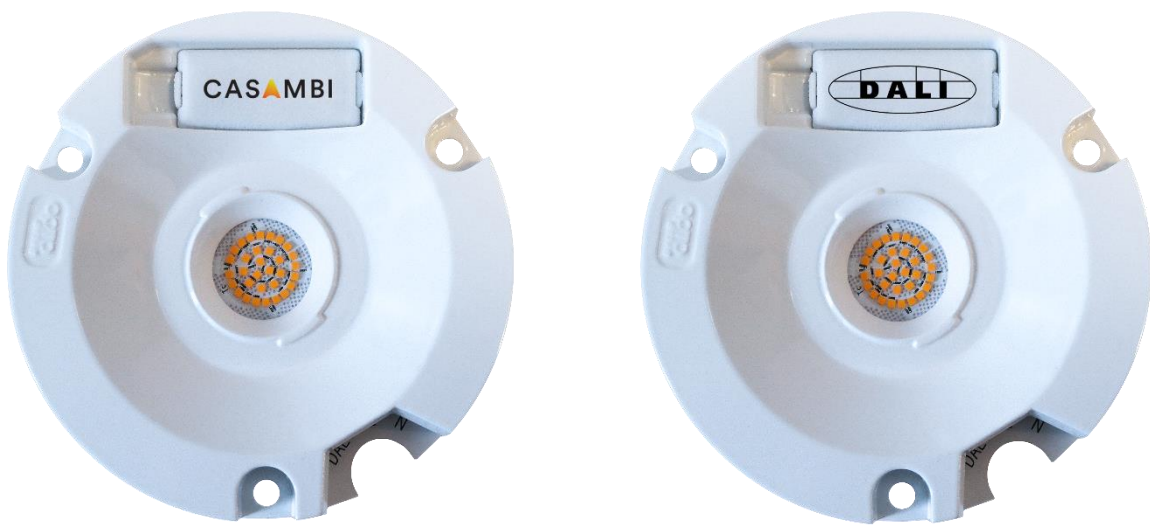




# ADA AC



## ADA AC IoT

10 and 20W

FlickerFree

*Round LED-module for spotlights and downlights.*

*No driver is required*



## ADA AC IoT

Object:  
**Datasheet ADA AC IoT**

Document no:  
n/a

Revision:  
1.0

Page:  
Page 2 of 30

Author:  
SL

Date:  
2021-08-19

## Features

The LED module is named ADA and it is designed for spotlights and downlights in mid-sized lightings. It can be used with a holder for Hybrid Optics and Reflectors.

### Key features

- High performance Optics
- Even light distribution
- No need for a driver
- Integrated Hybrid Optic Holder
- Simple integration





## ADA AC IoT

Object:  
Datasheet ADA AC IoT

Document no:  
n/a

Revision:  
1.0

Page:  
Page 3 of 30

Author:  
SL

Date:  
2021-08-19

## Content

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Introduction.....	4
Short form Characteristics .....	5
Article number structure.....	6
Ordering and Packaging information .....	9
Dimensions .....	11
Mounting instructions.....	12
Photometrical .....	14
Parameters of the lens system .....	16
Binning structure graphical representation .....	22
Electrical Optical Data .....	23
Lifetime (Calculated).....	24
Light fitting routine tests.....	25
DIMMERS tested.....	26
Precautions for use .....	27
ROHS III Compliant.....	28



## Introduction

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Previously, we had developed LED Modules for analog technology in the form of wall dimmers (leading or trailing edge dimming) and it was when we turned the dimmer that the light increased or decreased. In modern larger installations, there are now several different communication systems that the lighting must be able to work with in order for it to shine. Our new LED Modules can therefore handle both the new systems and the "old" because we never know how the end user wants it. If you want to dim with ordinary dimmers, they work exactly as they are, but if you want it more intelligent, a sugar-bite-sized unit called DimIn is fitted with the option of DALI, Casambi or another communication protocol.

The boundary between what is a luminaire and what is a system (of luminaires) is opened up. The control systems behind the luminaires are becoming increasingly complex and enable personal and intuitive lighting solutions. There are really no restrictions beyond how and in what way the light from these LED Modules can be controlled.

### ADA IoT package

The solution is developed to make it easier for the designers and engineers to develop new types of light fittings. No driver is to be adopted since the driver is fully integrated and flickerfree. It is well equipped for flexible and safe mounting. All IoT LED Modules have an electrical insulated heat PAD mounted to be able to manage Class II light fitting installations.

### Light output

Colour stability is important to ensure that the installation has a uniform light output. Parameters such as binning, lifetime and thermal control are vital for good results.

### Dimming

Use the latest dimmers from standard LED manufacturers and make sure that the dimmer has the capacity to handle the low load on the LEDs' energy consumption. When you instead use one of the DimIn types for dimming, it will stay completely within the regulatory range of the new SVM standard. It handles it throughout the dimming sequence.

See more in the DimIn section.



## 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	34		
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	>0.80		
Total harmonic distortion	< 15%		
Peak inrush current	30mA		
Surge protection	1.5kV		
Burst protection	2kV		
Over temp. protection	150°C		
Energy class	2700K	F	G
	3000K	F	G
	4000K	F	G

### PHOTOMETRICAL

Flux	~ 500 lm	900-1100 lm	1700-2100lm
Efficiency	100lm/W	90-110lm/W	85-105lm/W
SDCM (Mac Adam)	3		
Flicker percent	7%	7%	7%
Flicker index	0.0275	0.0275	0.0275
SVM	0.5	0.5	0.5
PstLM	0.6	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		
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\*Specifications are valid for >Ra95.



## Article number structure

### Ada AC.P.230.22.9yy-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 10%)
IoT	IoT interface

## Article name and versions

### ADA LED Engine Article description

ARTICLE NAME	POWER	CURRENT	CRI	CCT	LENS
ADA AC.10.230.34.927-OH.FF.IOT	10	230	90	2700	Optic Holder
ADA AC.10.230.34.930-OH.FF.IOT	10	230	90	3000	Optic Holder
ADA.AC.10.230.34.840-OH.FF.IOT	10	230	90	4000	Optic Holder
ADA AC.20.230.34.927-OH.FF.IOT	20	230	90	2700	Optic Holder
ADA AC.20.230.34.930-OH.FF.IOT	20	230	90	3000	Optic Holder
ADA AC.20.230.34.940-OH.FF.IOT	20	230	90	4000	Optic Holder

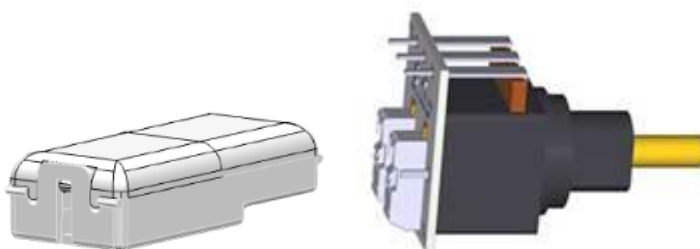
### Optics for ADA LED engine

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
<b>DimIn Casambi</b>	Casambi	Wireless
<b>DimIn POT</b>	Internal dimming	Wire
- <b>DimIn Potentiometer</b>	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

Smart LED Engines is a game changer for light and luminaire designers. Now, DALI and Casambi can be combined in lighting controls and lighting designers can build flexibility into how spaces are lit from the beginning to provide an immersive and interactive experience. Optoga makes it possible to use smart lighting and combine DALI with Casambi directly in the lighting to take your design to the next level. Wouldn't you like to have smart lighting built into your LED module right from the start?

We will work with the small sugar-cube sized device as a functionality module that fits into our IoT interface. They are all interchangeable between each other. All devices have mains (Neutral and Live 230VAC) connected. Plus, two wires more, that can be connected and those two can either be DALI or two wires going out 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

This is a bus-powered device and it works with the Eco-System DALI-2.

### Casambi

Most Casambi users know that smart lighting is not just about dimming or turning wireless on and off. Smart lighting is connected and intelligent so that it can change in brightness or color in response to all kinds of information. It can also be used to save energy, to enable dynamic light and to provide "human-centered lighting" that promotes well-being. An increasing amount of scientific evidence shows that this can make workplaces and schools more productive by improving vigilance.

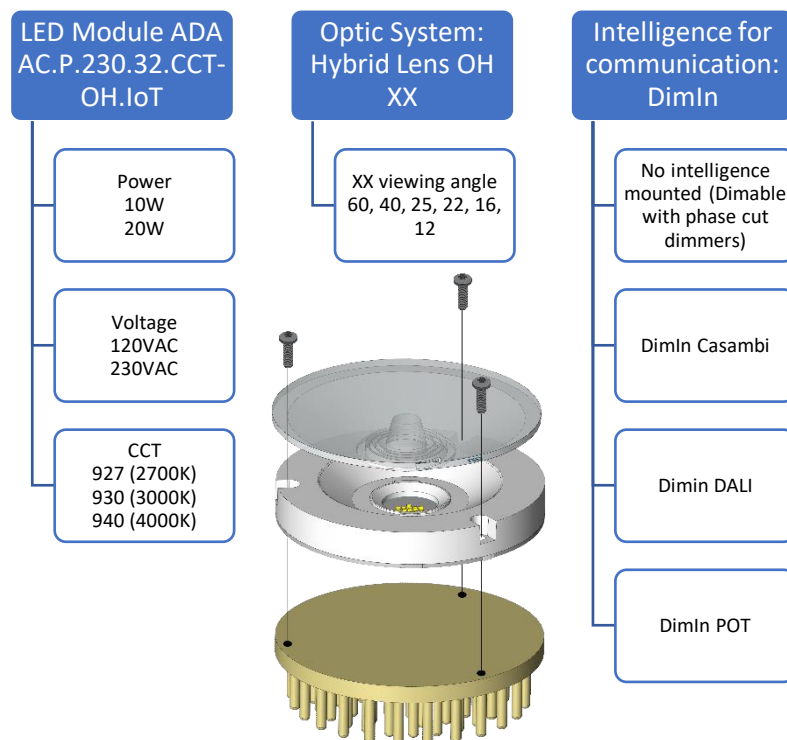
### POT (Rotary Potentiometer)

This is part of the DimIn system for completely independent units where they must not be connected externally but they must be able to be dimmed locally. We have designed a potentiometer that can be mounted and can easily be used for dimming, on / off, up and down. Potentiometer is connected to the same output for cables used for DALI and DimIn Pot is pressed into place in the LED Module. It can be used to advantage in free-standing luminaires, work lighting or luminaires that are free-standing with requirements for 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.



### 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

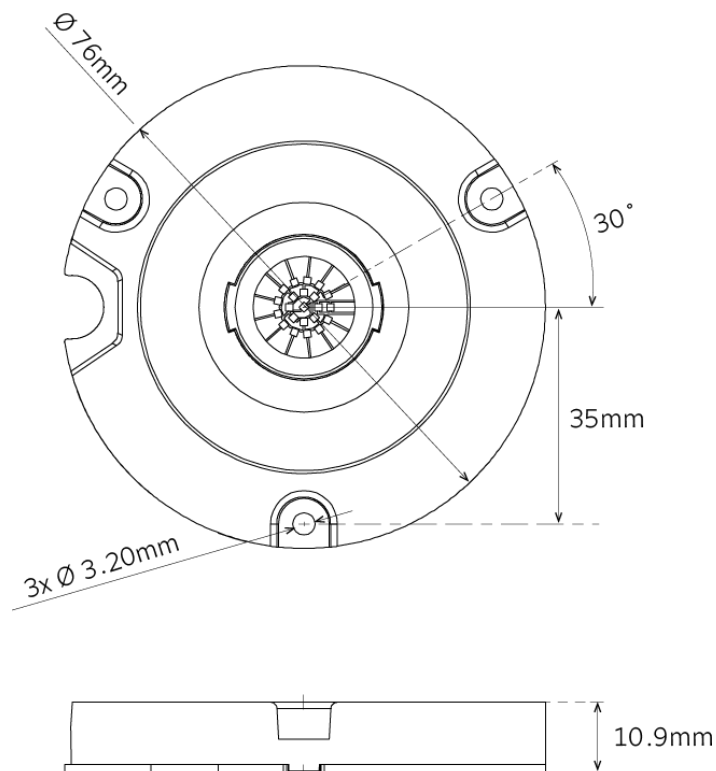
Description	Qty (pcs)	Dimension (cm)			GW (kg)
		Length	Width	Height	
Inner Box	288	35,6	22,7	9,6	
Outer Box	2304	46,5	37,5	39,6	TBD

## Potentiometer – Packaging information

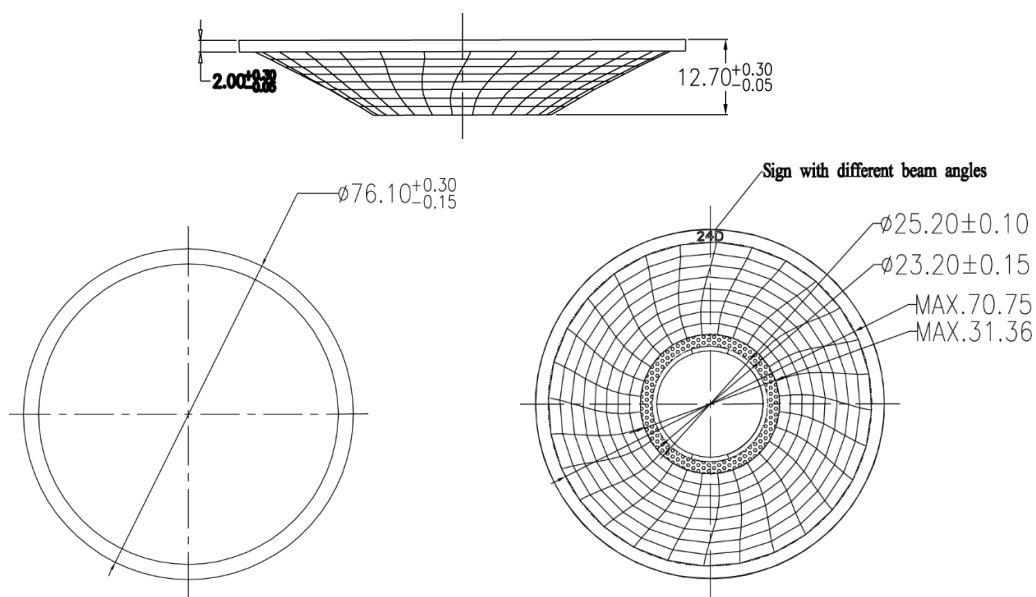
Description	Qty (pcs)	Dimension (cm)			GW (kg)
		Length	Width	Height	
Inner Box	TBD	35,6	22,7	9,6	
Outer Box	TBD	46,5	37,5	39,6	TBD

## Dimensions

### LED-module



### Lens for Optical Holder



## Mounting instructions

### Mounting

Mount the device on heatsink with screws safely

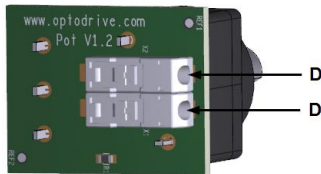
### Wiring

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

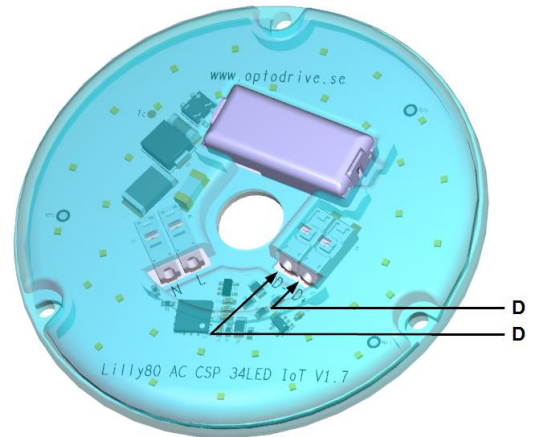


The Pot potentiometer board works with the DimIn Pot functionality module. D + or D- play a certain role as they change the dimming direction depending on the connection.

#### 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.

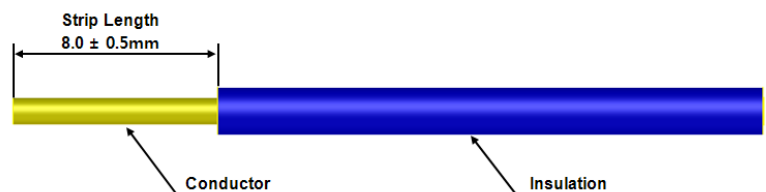


#### Connector

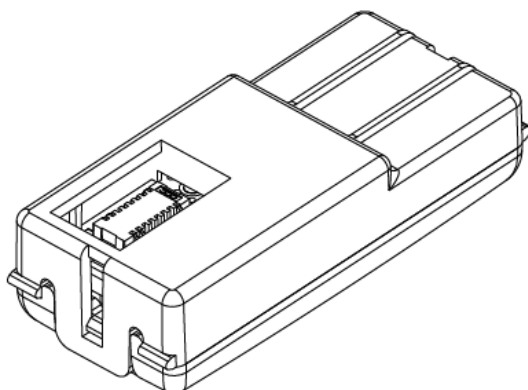
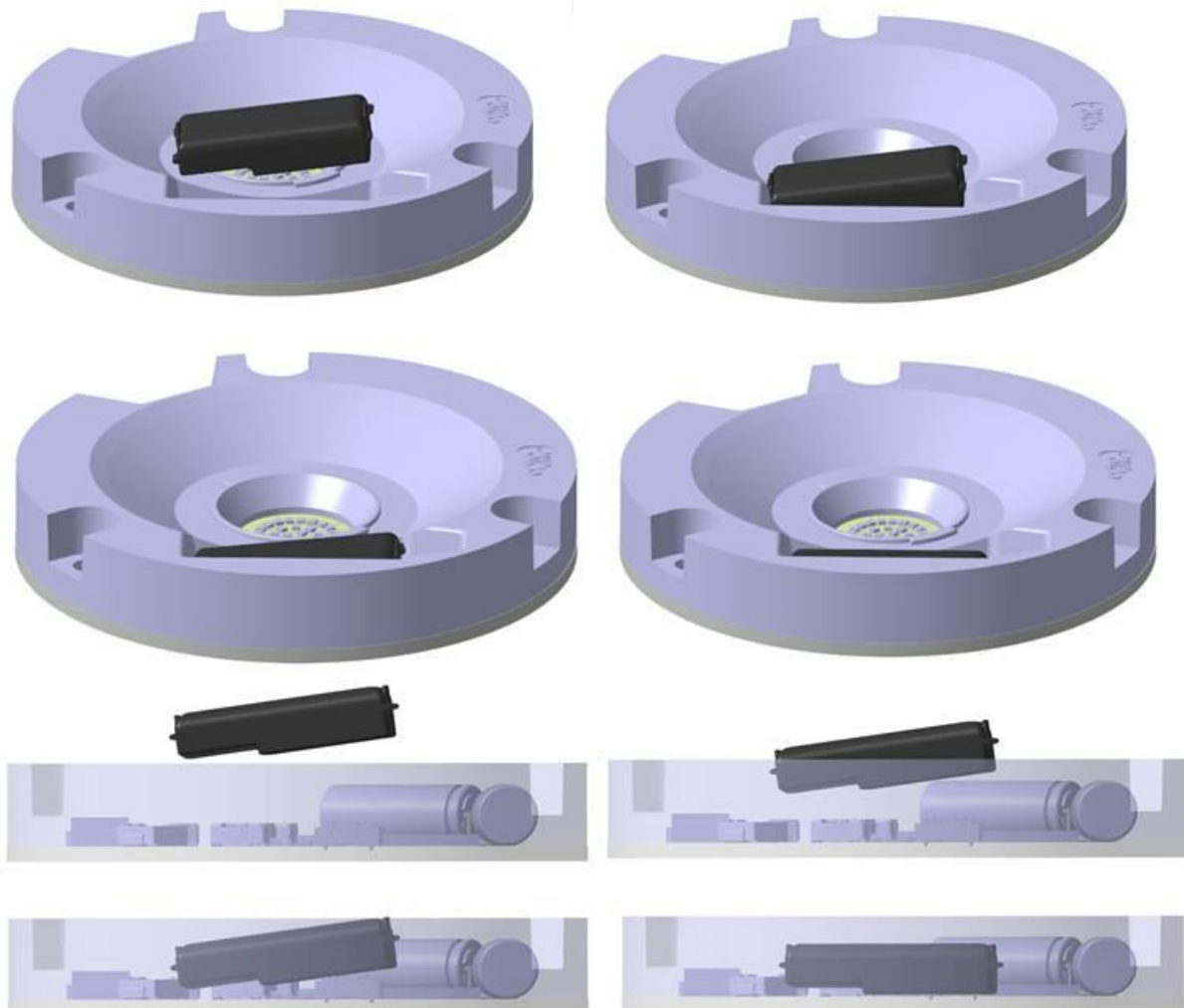
Type	Push In type
------	--------------

#### Wire (Recommended)

Type of wire	AWG	mm <sup>2</sup>
Stranded	22-20	0.32-0.5mm <sup>2</sup>
Solid	24-18	0.51-1.02Ø (0.2-0.8mm <sup>2</sup> )
Insulation diameter	Max 2.1 mm	



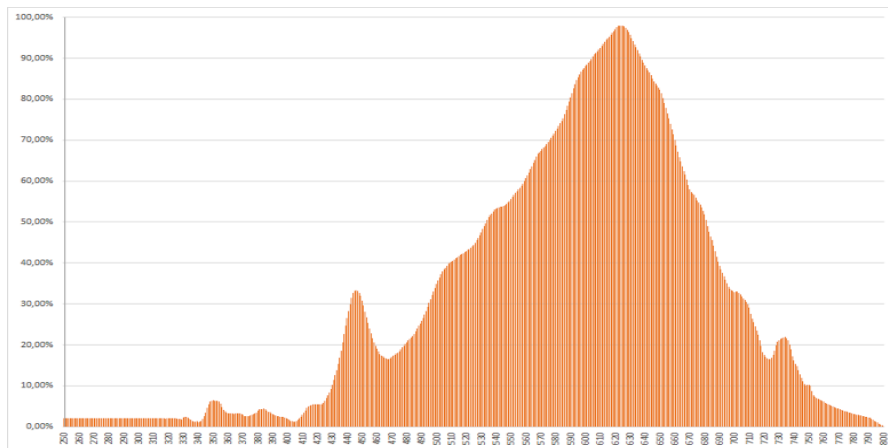
## Mounting of DimIn



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.

## Photometrical

### Colour Spectrum 2700K



### Colour Rendering Index (CRI) 2700K

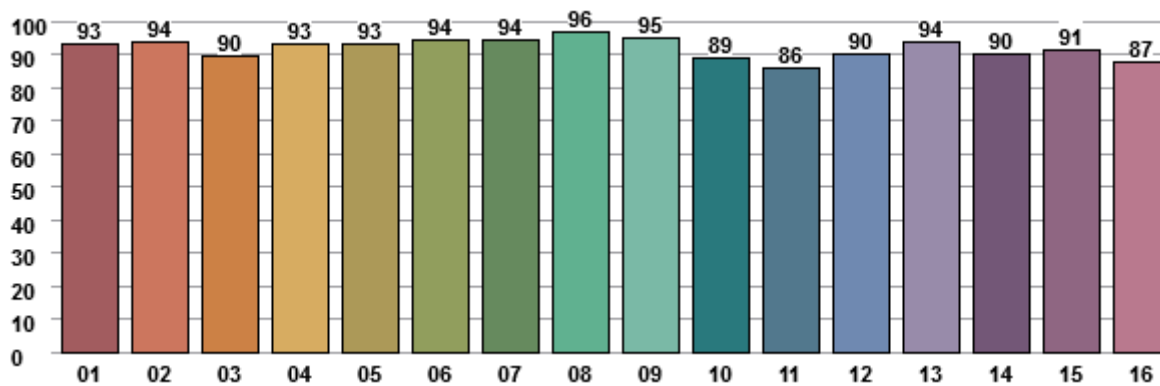
Ra	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
94.0	95.3	95.4	93.2	94.7	94.2	93.1	95.5	90.6	76.2	87.3	94.4	79.9	95.3	95.3

### TM-30-15

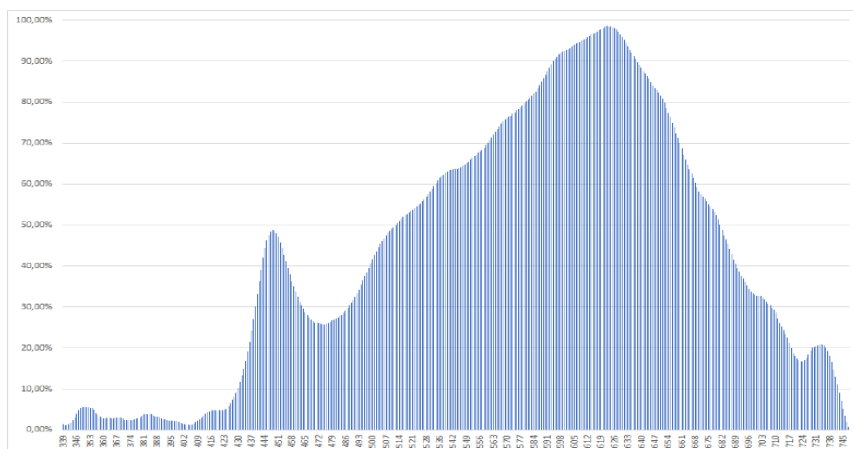
#### Main Parameters

Fi	92
Rg	101
Rfskin	96

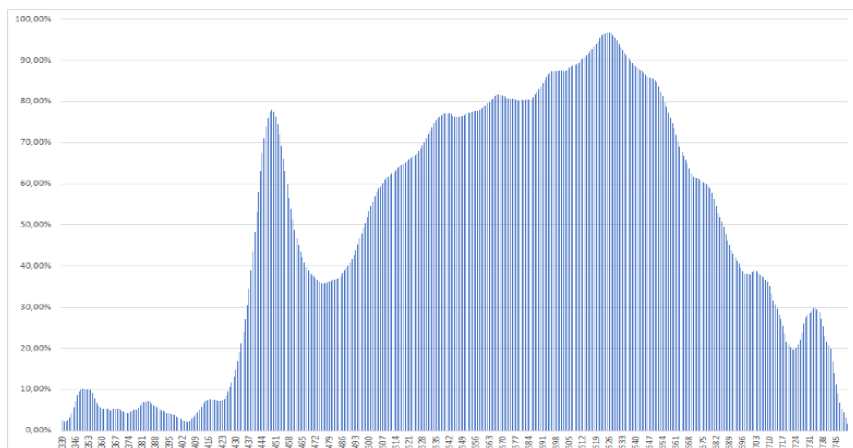
### Hue Bin Fidelity Index (Rfh,j)



## Colour Spectrum 3000K



## Colour Spectrum 4000K

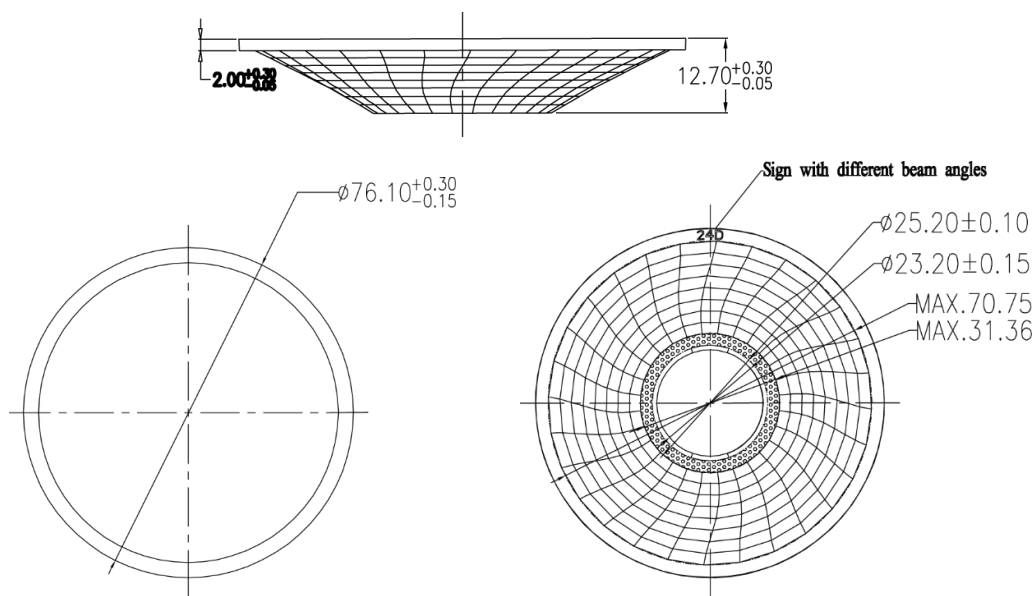


## Flicker

<b>Intensity</b>	<b>Flicker index</b>	<b>Flicker Percent</b>
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

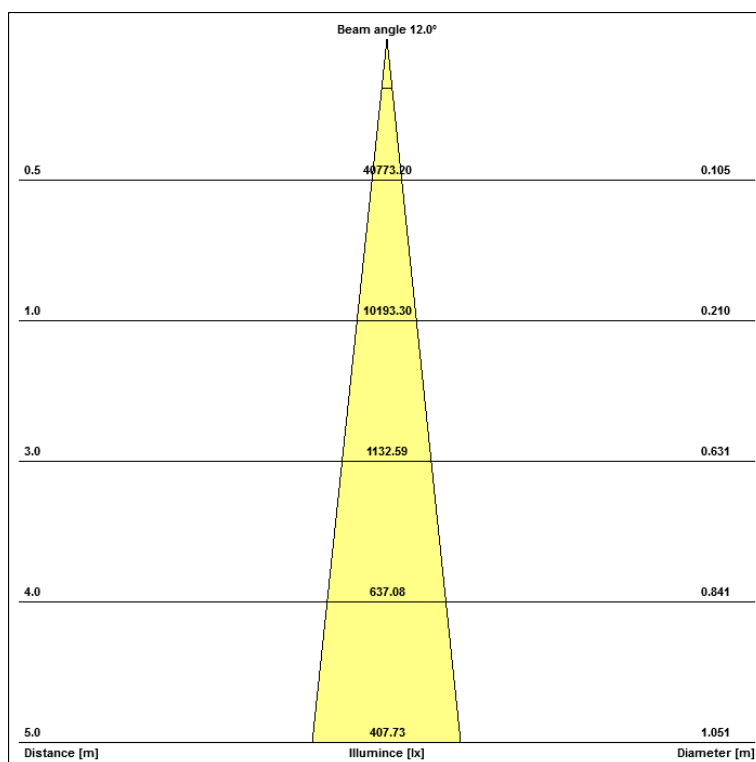
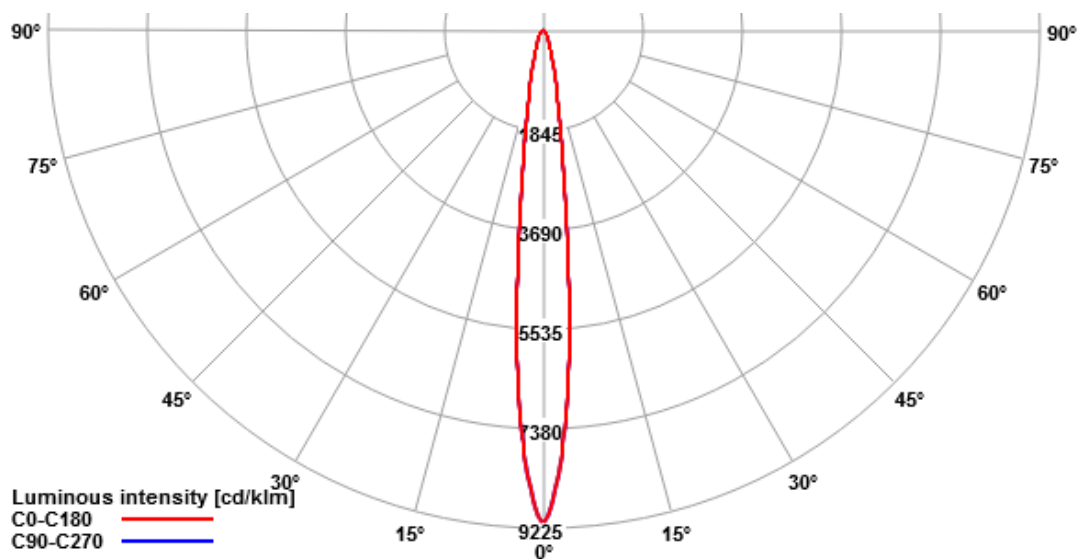


### Material

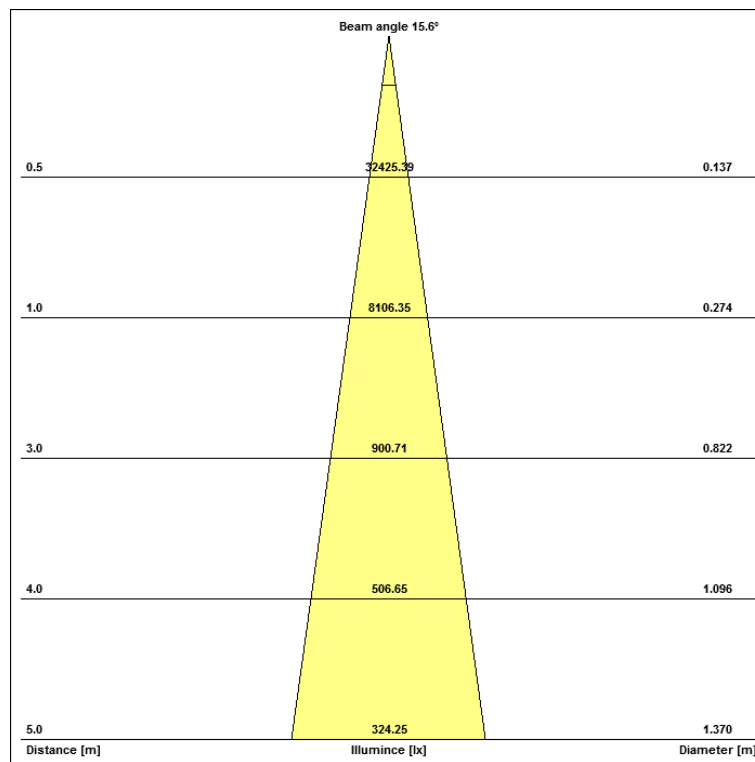
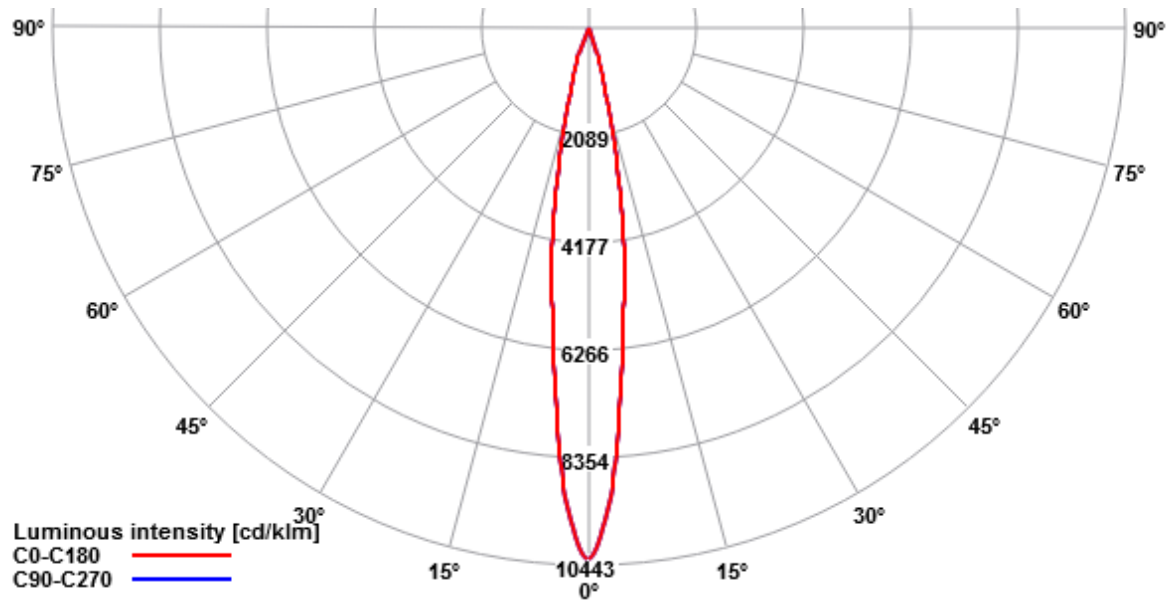
Lens material	PC LEV1700 (Vacuum metalizing on back of lens)
Connector material	PBT4815
Operating temp. range	-40°C~+110°C(upper limit +120°C)
Storage temp. range	-40°C~+110°C(upper limit +120°C)



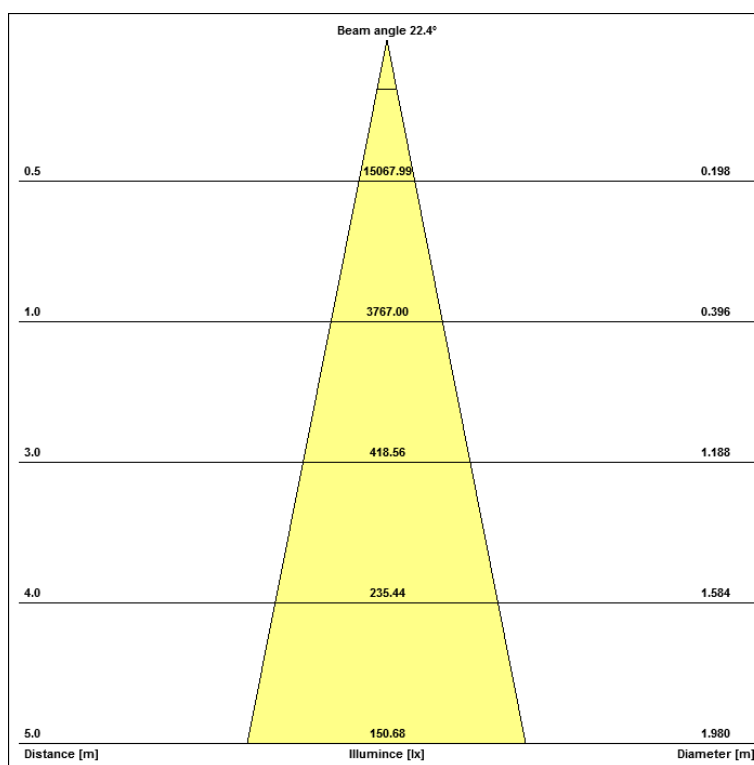
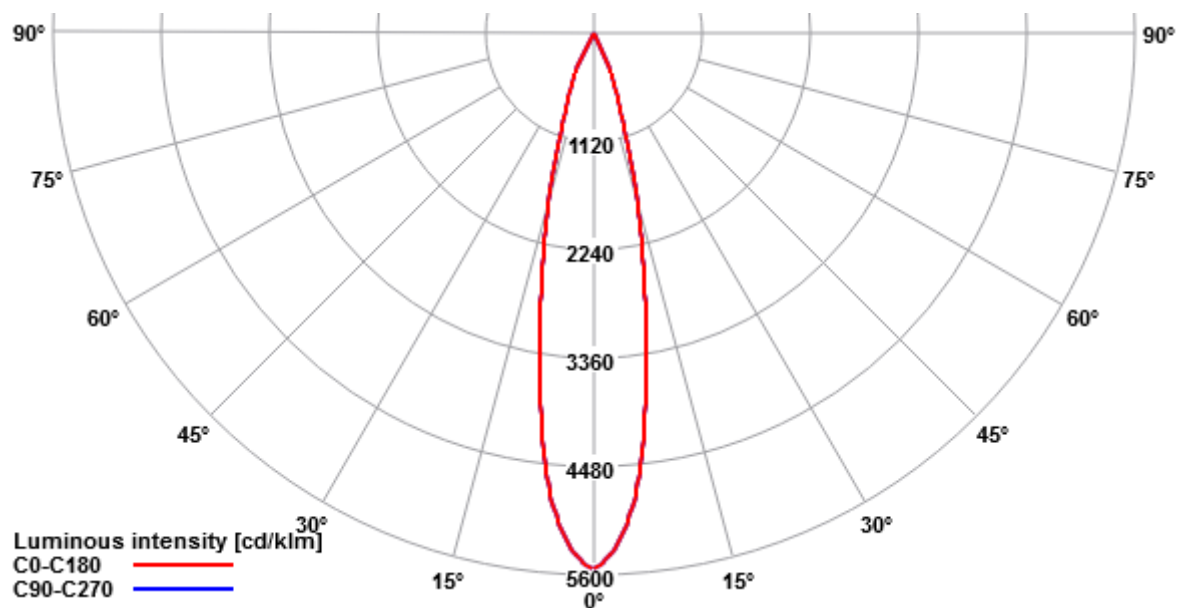
## Light intensity distribution 12° Lens 10W



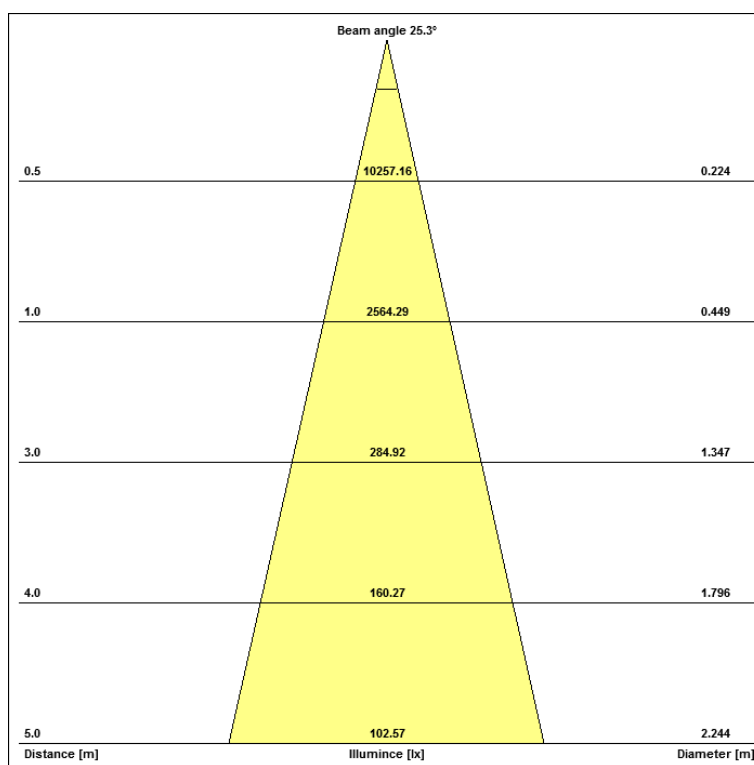
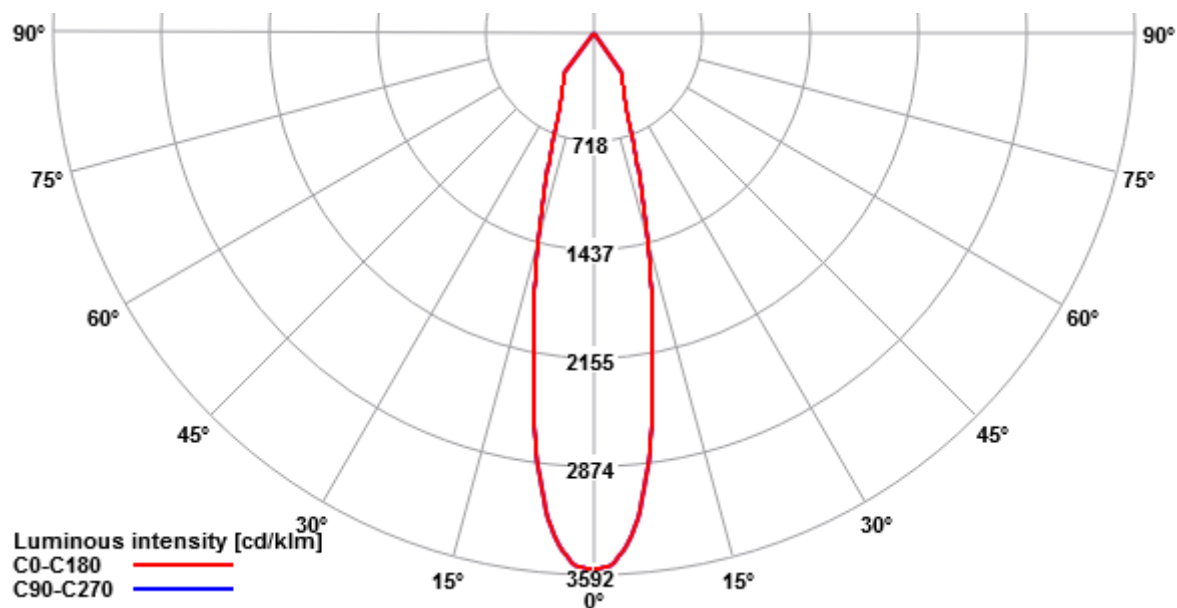
## Light intensity distribution 16° Lens 10W



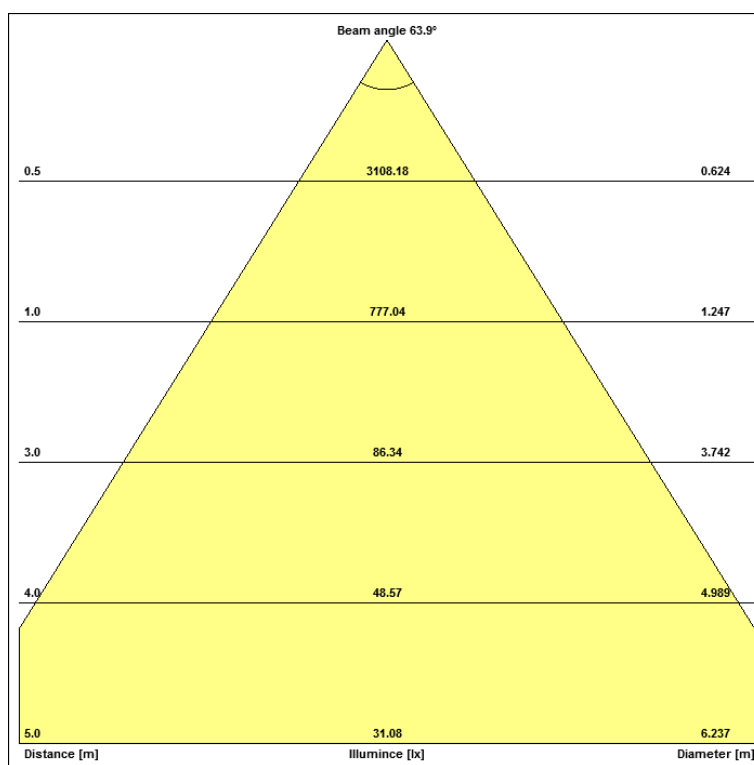
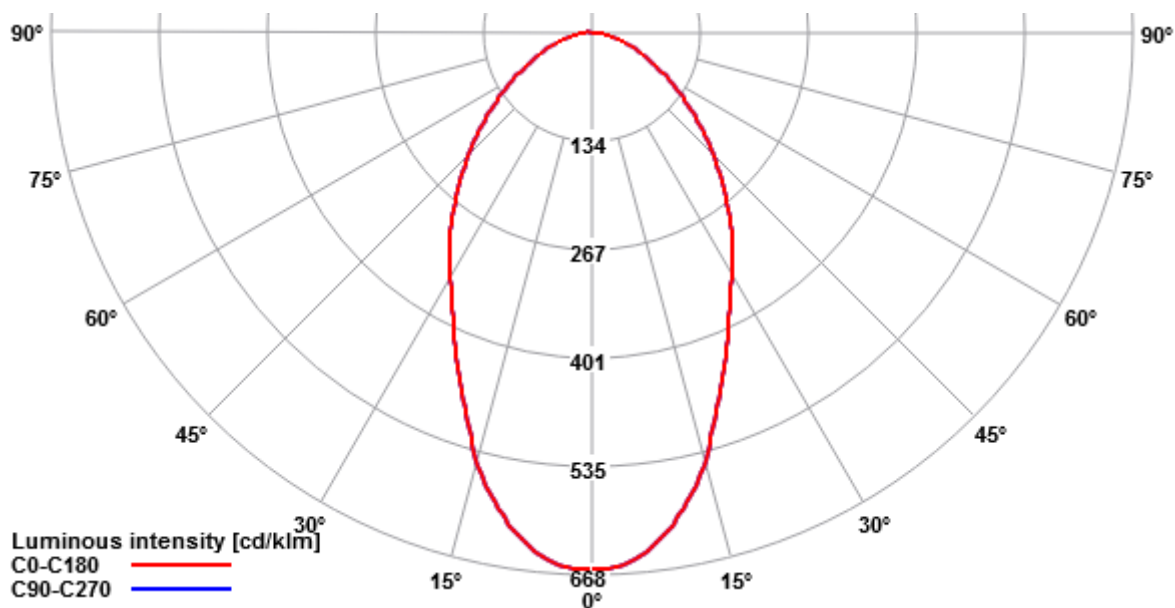
## Light intensity distribution 22° Lens 10W



## Light intensity distribution 25° Lens 10W

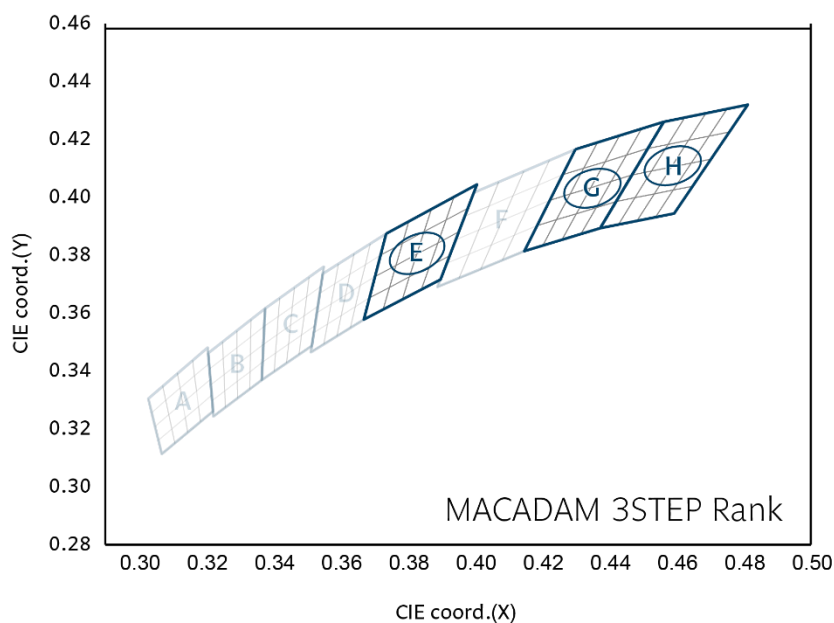


## Light intensity distribution 60° Lens 10W



## 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)

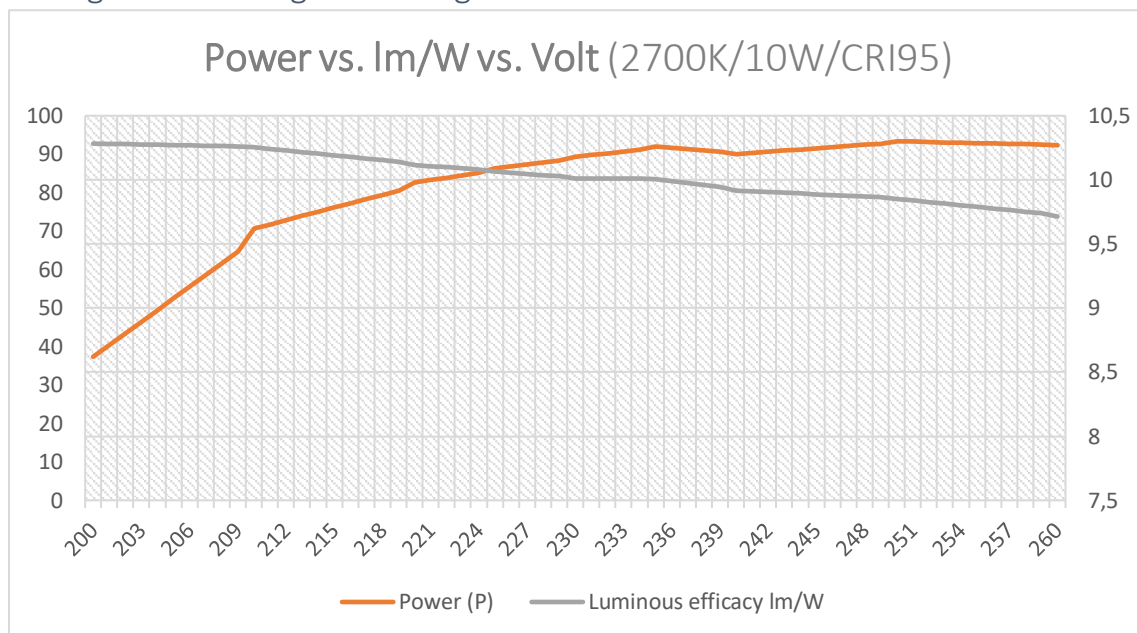
CRI Code	CRI (min) Ra
8	>80
9	>90

### Short form letters for CCT (K)

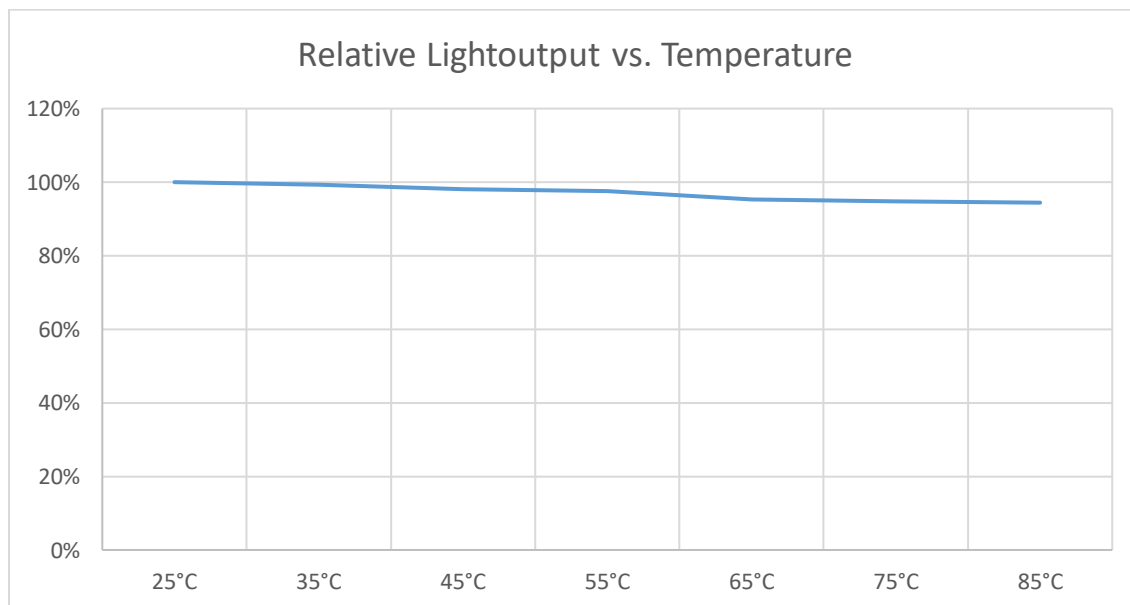
Colour Code	CCT
27	2700K
30	3000K
35	3500K
40	4000K
50	5000K

## 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)

### 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 <u>ONLY</u>				
	55°C	65°C	75°C	85°C
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.

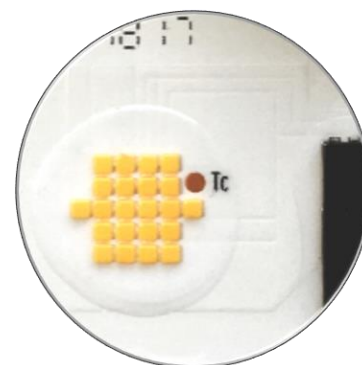
### Measurement points

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 65°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

*LED Engine: ADA AC.10.230.34.827-OH*

Brand	Model	Max W	Min W	Min %	Flicker (perceived)	Noise
Elko	400GLI	12,50	0,70	6%	No	No
Niko	310-0190X	13,30	1,40	11%	No	No
Vadsbo	VD200	9,30	0,70	8%	No	No
Qlight	Monodim 350	10,10	1,30	13%	No	No
Schneider	SBD315RC	10,10	1,50	15%	No	No
SG	820320 LEDIM400	10,20	0,50	5%	No	No
Elko	315 GLE	10,10	1,30	13%	No	No
Gira	2262 00 / i01	12,90	0,70	5%	No	No
ABB/Busch Jaeger	2247U	12,80	0,70	5%	No	No
Q-light	Duo touchdim	9,50	0,50	5%	No	No
Q-light	Zerodim 350	9,80	0,80	8%	No	No
Ehmann	T14.03.1	10,20	1,80	18%	No	No
V-com	1-OR 2 WAY Dimmer switch	12,70	1,70	13%	No	No
Vadsbo	VD300	8,30	0,40	5%	No	No
Vadsbo	LDN200	9,50	0,10	1%	No	No
Vadsbo	LD440	10,20	1,20	12%	No	No

*LED Engine: ADA AC.20.230.34.830-OH*

Brand	Model	Max W	Min W	Min %	Flicker (perceived)	Noise
ABB/Busch Jaeger	6523URJGL-214-103	18,10	0,50	3%	No	No

*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

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- 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

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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<sup>6+</sup>)
- Polybrominated biphenyls PBB
- Polybrominated diphenyl ethers PBDE
- Bis(2-ethylhexyl) phthalate DEPH
- Butyl benzyl phthalate BBP
- Dibutyl phthalate DBP
- Diisobutyl phthalate DIBP



## ADA AC IoT

Document no:  
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Revision:  
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Page:  
Page 29 of 30

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

Read more about OptoDrive at [www.optoga.com](http://www.optoga.com).

You can contact us via [info@optoga.com](mailto: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 develops 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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