




Minor Surgery LED Engine


**Optodrive
Svea 12LED**

The LED Engine is designed to be used as a light source for minor surgery, examination lights and other medical applications as well as for veterinarian use to meet the following directives: EN60601-2-41 IEC: 2000, UL60601-1 and CAN/CSA-C22.2 No. 601.1-M-90.

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Introduction

The LED Engine is designed with internal driver and is very easy to connect in applications for 24-36VDC or with external wall outlet transformer. The efficiencies are highest available on the market for such applications. Lenses are integrated with a viewing angle of 9.5°.

A light source for minor surgery, examination lights and other medical applications as well as for veterinarian use to meet the following directives: EN60601-2-41 IEC: 2000, UL60601-1 and CAN/CSA-C22.2 No. 601.1-M-90.

Applications

The LED module and light engine is called Svea and it is a design for light fittings and luminaires aiming for the Minor Surgery and Medical area, to meet the demands on high performance optical solutions in both light emitting and in colour rendering. Mechanically it is constructed with our package design Svea (90 mm) that have the same footprint as all others in the family both for external drivers as well as built in driver for 110/230VAC.

Svea package

The same package is used for Down-, Spot-, Task- and Medical light fittings. The solution is developed to make it easy for the design engineers to mix between low to high power and from AC to DC in the same luminaire or in similar design. In the design concept there is standard dimmers with the same snap in connector (that fits the whole Optodrive concept™) as well as several heat sink designs with worldwide distribution.

ID design

ID stands for “integrated driver”, all driver and dimmer components are built in and it works between 12-36VDC with an efficiency over 90%. There is a standard plug in connector that fit all different ID designs as well as all different accessories to dim, communicate, active cooling etc.

Integrated driver


The advantage with a driver that are built in a LED engine is
 Lifetime – Connected to the heatsink and are therefore having a controlled environment
 Dimming – Dimming via PWM direct connected to the LED engine
 Small – No extra boxes

Light output

Colour stability is important to ensure that the installation have a uniform light output. Parameters as binning, lifetime and thermal control are mostly important for a good result.

Technical attributes

- Energy saving and very good lumen output
- High Colour Rendering
- Uniform Colour temperature
- Controlled lifetime
- Simple integration

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Standard article number structure Energy Star Rank

Kelvin vs. Lumen

	3000K	4000K	4500K
1000lm	Svea ID.17.24-36.12.N-10 T1G**	Svea ID.17.24-36.12.S-10 T1E**	Svea ID.17.12-36.12.W-10 T1D**
1500lm	Svea ID.24.24-36.12.N-10 T2G**	Svea ID.24.24-36.12.S-10 T2E**	Svea ID.24.24-36.12.W-10 T2D**

Kelvin vs. Power

	3000K	4000K	4500K
10W	Svea ID.10.24-36.12.N-10 T*G**	Svea ID.10.24-36.12.S-10 T*E**	Svea ID.10.24-36.12.W-10 T*D**
17W	Svea ID.17.24-36.12.N-10 T*G**	Svea ID.17.24-36.12.S-10 T*E**	Svea ID.17.24-36.12.W-10 T*D**
24W	Svea ID.24.24-36.12.N-10 T*G**	Svea ID.24.24-36.12.S-10 T*E**	Svea ID.24.24-36.12.W-10 T*D**

Standard article number structure McAdam 7step

Kelvin vs. Lumen

	3000K	4000K	4500K
1000lm	Svea ID.17.24-36.12.N-10 T1G2-G3*	Svea ID.17.24-36.12.S-10 T1E2-E3*	Svea ID.17.24-36.12.W-10 T1D2-D3*
1500lm	Svea ID.24.24-36.12.N-10 T2G2-G3*	Svea ID.24.24-36.12.S-10 T2E2-E3*	Svea ID.24.24-36.12.W-10 T2D2-D3*

Kelvin vs. Power

	3000K	4000K	4500K
10W	Svea ID.10.24-36.12.N-10 T*G2-G3*	Svea ID.10.24-36.12.S-10 T*E2-E3*	Svea ID.10.24-36.12.W-10 T*D2-D3*
17W	Svea ID.17.24-36.12.N-10 T*G2-G3*	Svea ID.17.24-36.12.S-10 T*E2-E3*	Svea ID.17.24-36.12.W-10 T*D2-D3*
24W	Svea ID.24.24-36.12.N-10 T*G2-G3*	Svea ID.24.24-36.12.S-10 T*E2-E3*	Svea ID.24.24-36.12.W-10 T*D2-D3*

Standard article number structure McAdam 3step


Kelvin vs. Lumen

	3000K	4100K	4400K
1000lm	Svea ID.17.24-36.12.N-10 T1G3*	Svea ID.17.24-36.12.S-10 T1E2*	Svea ID.17.24-36.12.W-10 T1D3*
1500lm	Svea ID.24.24-36.12.N-10 T2G3*	Svea ID.24.24-36.12.S-10 T2E2*	Svea ID.24.24-36.12.W-10 T2D3*

Kelvin vs. Power

	3000K	4100K	4400K
10W	Svea ID.10.24-36.12.N-10 T*G3*	Svea ID.10.24-36.12.S-10 T*E2*	Svea ID.10.24-36.12.W-10 T*D3*
17W	Svea ID.17.24-36.12.N-10 T*G3*	Svea ID.17.24-36.12.S-10 T*E2*	Svea ID.17.24-36.12.W-10 T*D3*
24W	Svea ID.24.24-36.12.N-10 T*G3*	Svea ID.24.24-36.12.S-10 T*E2*	Svea ID.24.24-36.12.W-10 T*D3*

* indicates a no or figure of a value that will be set from production when it is delivered.

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Mechanical Characteristics:

Board dimensions: 83 mm diameter
Assembly holes: 3 x 3.42 mm
Connector: PHR-3 or similar
Height: 18 mm

Electrical characteristics:

Number of LED's: 12
Power supply: 24 - 36VDC 24W
LED current: 400 mA +/-10% (17W version)
600 mA +/-10% (24W version)

Dimming Signal:

PWM high level: 4 – 7V
PWM low level: 0 – 0,5V
PWM frequency¹: 100 – 20kHz

Efficiency: >90

Reversed polarity protection: Yes
Transient protection: Yes
Overvoltage protection-
Dimming signal: Yes

Environmental operating conditions:

Temperature range: -40°C to 65°C (Absolute maximum temp Tc 65°C)
Relative Humidity: 10-75%
Ambient air pressure: 500-1060 HPa

Accessories to be built in (light fixture)

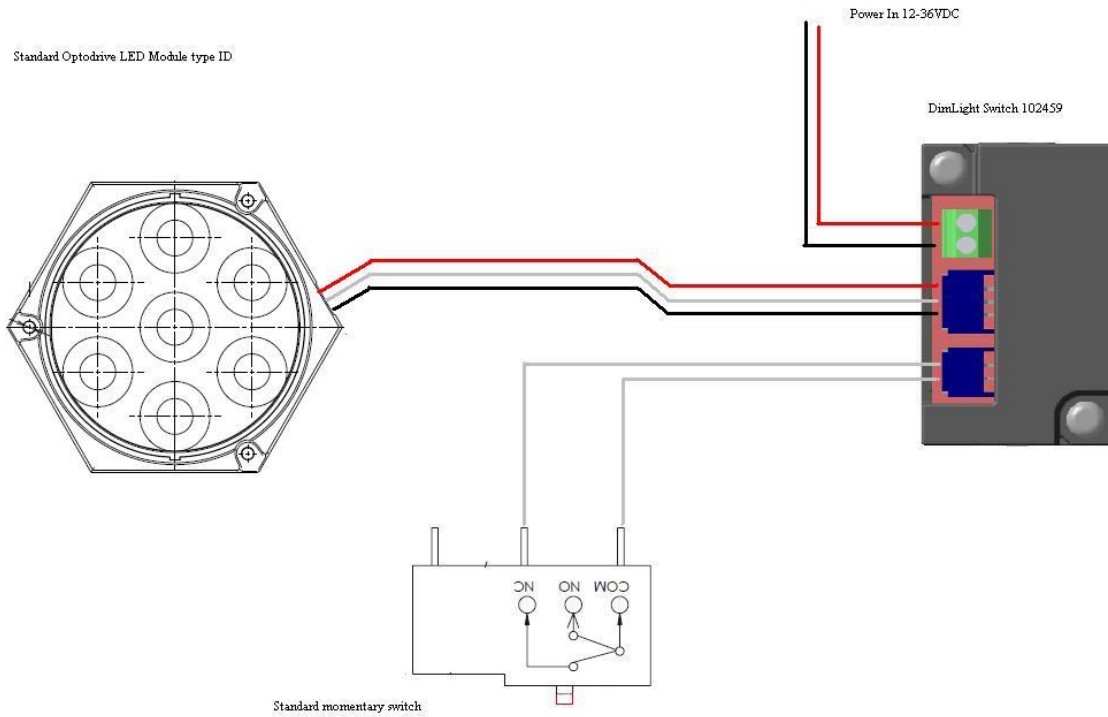
Dimmers:

- Dali
- Puls
- Switch
- 0-10V
- Colour control unit

The dimmers are for digital dimming and can be set up in a network. The dimmers work for all types of Optodrive modules with built-in driver. Please find all details in separate datasheet under accessories at www.optodrive.se

Wiring diagram:

Standard Wire DimLight Switch



Optical Efficiency:

24W

Bin code	Efficiency
T1	50 lm/W
T2	57 lm/W
U1	65 lm/W

17W

Bin code	Efficiency
T1	57 lm/W
T2	65 lm/W
U1	74 lm/W

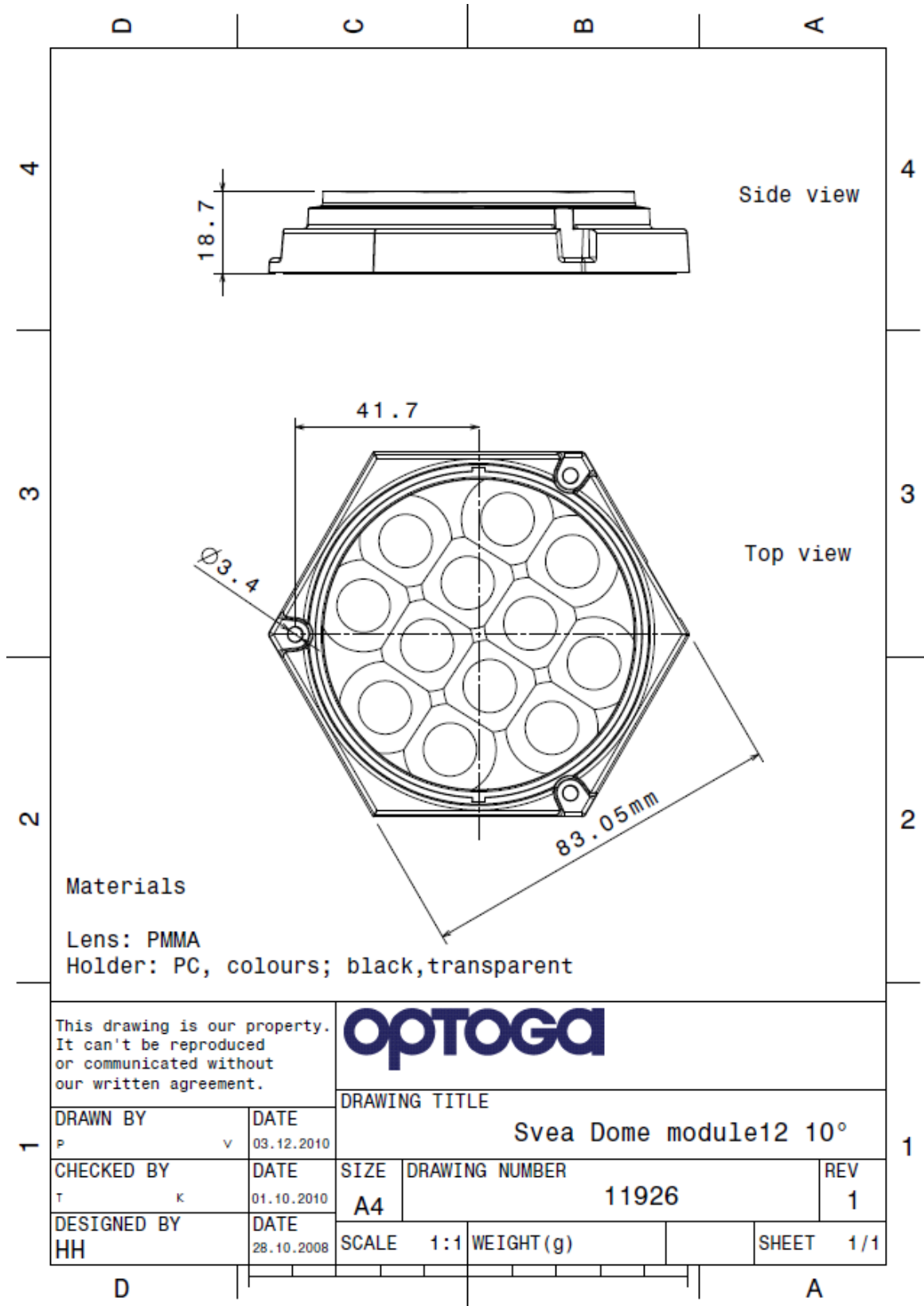
10W

Bin code	Efficiency
T1	66 lm/W
T2	76 lm/W
U1	86 lm/W

The optical efficiency includes the electrical efficiency and the optical losses in the lens unit. The values are to be considered as ±10% tolerances @ 25°C.

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Dimensions LED Module
Version 10°:



Materials
 Lens: PMMA
 Holder: PC, colours; black, transparent

This drawing is our property. It can't be reproduced or communicated without our written agreement.			
DRAWING TITLE		Svea Dome module12 10°	
DRAWN BY P	DATE 03.12.2010	SIZE A4	DRAWING NUMBER 11926
CHECKED BY T	DATE 01.10.2010	SCALE 1:1	REV 1
DESIGNED BY HH	DATE 28.10.2008	WEIGHT (g)	SHEET 1/1

Parameters of the light output

White LED

Electro-Optical characteristics LED at $I_F=600\text{mA}$, $T_A=25^\circ\text{C}$

Parameter	Rank / Binning	Symbol	Value			Unit
			Min	Typ	Max	
Luminous Flux	U1 rank ⁽¹⁾	Φ_V	1600		1800	lm
	U2 rank ⁽¹⁾	Φ_V	1800		1950	lm
	U3 rank ⁽¹⁾		1950		2100	
Correlated Color Temperature	B* rank ⁽²⁾	CCT	5300		6000	Kelvin
CRI		R_a	-	70	-	-
Power		P_o		24		W

(1) See detailed information in chapter "Luminous Flux Bin"

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

Electro-Optical characteristics LED at $I_F=400\text{mA}$, $T_A=25^\circ\text{C}$

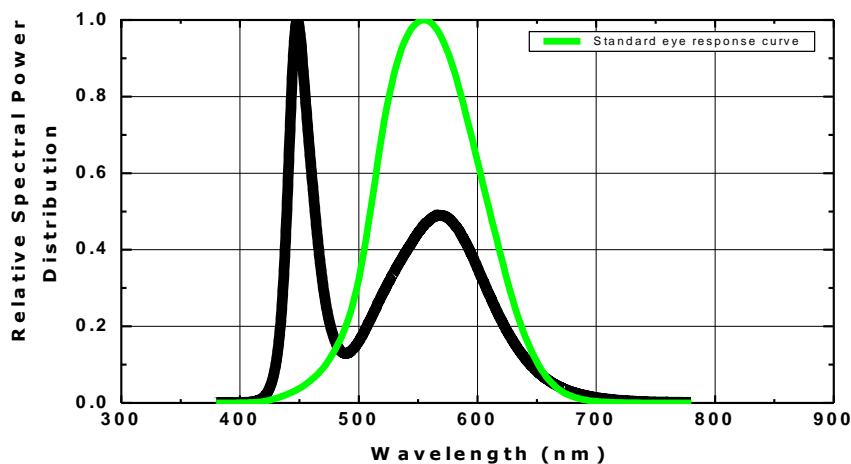
Parameter	Rank / Binning	Symbol	Value			Unit
			Min	Typ	Max	
Luminous Flux	U1 rank ⁽¹⁾	Φ_V	1300		1450	lm
	U2 rank ⁽¹⁾	Φ_V	1450		1550	lm
	U3 rank ⁽¹⁾		1550		1700	
Correlated Color Temperature	B* rank ⁽²⁾	CCT	5300		6000	Kelvin
CRI		R_a	-	70	-	-
Power		P_o		17		W


(1) See detailed information in chapter "Luminous Flux Bin"

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

Colour Spectrum

White



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Normal White LED

Electro-Optical characteristics LED at $I_F=600\text{mA}$, $T_A=25^\circ\text{C}$

Parameter		Symbol	Value			Unit
			Min	Typ	Max	
Luminous Flux	T1rank ⁽¹⁾	Φ_V	1250		1450	lm
	T2rank ⁽¹⁾	Φ_V	1450		1600	lm
	U1 rank ⁽¹⁾	Φ_V	1600		1800	lm
Correlated Color Temperature	E* ⁽²⁾	CCT	3700		4200	Kelvin
	D* ⁽²⁾	CCT	4200		4700	Kelvin
CRI		R_a	90	93	96	-
Power		P_o		24		W

(1)See detailed information in chapter "Luminous Flux Bin"

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

Electro-Optical characteristics LED at $I_F=400\text{mA}$, $T_A=25^\circ\text{C}$

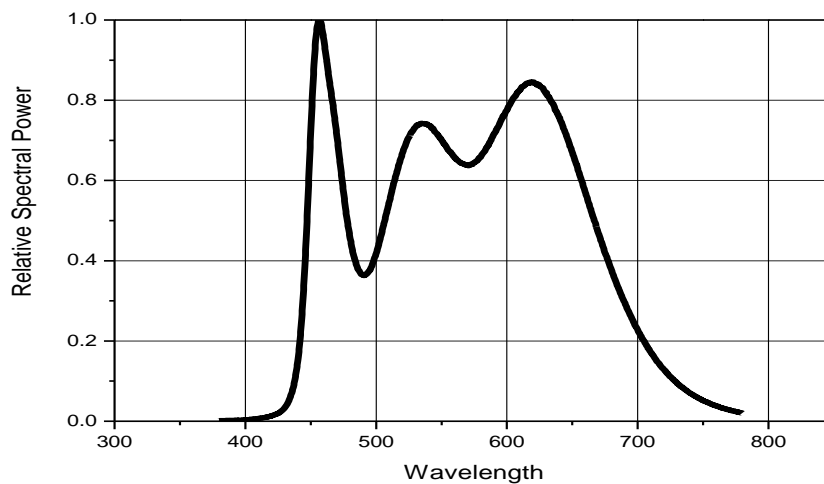
Parameter		Symbol	Value			Unit
			Min	Typ	Max	
Luminous Flux	T1rank ⁽¹⁾	Φ_V	1000		1150	lm
	T2rank ⁽¹⁾	Φ_V	1150		1300	lm
	U1 rank ⁽¹⁾		1300		1450	
Correlated Color Temperature	E* ⁽²⁾	CCT	3700		4200	Kelvin
	D* ⁽²⁾	CCT	4200		4700	Kelvin
CRI		R_a	90	93	93	-
Power		P_o		17		W

(1)See detailed information in chapter "Luminous Flux Bin"

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

Colour Spectrum

Neutral White



Warm White

Electro-Optical characteristics LED at $I_F=600mA$, $T_A=25^\circ C$

Parameter	Symbol	Value			Unit	
		Min	Typ	Max		
Luminous Flux	T1rank ⁽¹⁾	Φ_V	1250		1450	lm
	T2rank ⁽¹⁾	Φ_V	1450		1600	lm
Correlated Color Temperature	H* ⁽²⁾	CCT	2600		2900	Kelvin
	G* ⁽²⁾	CCT	2900		3200	Kelvin
CRI	R_a		90	90	96	-
Power	Po		24			W

(1)See detailed information in chapter "Luminous Flux Bin"

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

Electro-Optical characteristics LED at $I_F=400mA$, $T_A=25^\circ C$

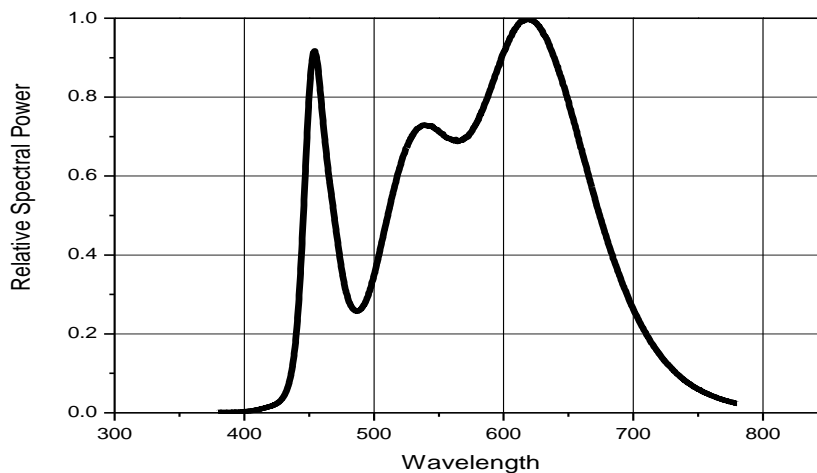
Parameter	Symbol	Value			Unit	
		Min	Typ	Max		
Luminous Flux	T1rank ⁽¹⁾	Φ_V	1000		1150	lm
	T2rank ⁽¹⁾	Φ_V	1150		1300	lm
Correlated Color Temperature	H* ⁽²⁾	CCT	2580	2700	2870	Kelvin
	G* ⁽²⁾	CCT	2870	3000	3220	Kelvin
CRI	R_a		90	93	96	-
Power	Po		17			W


(1)See detailed information in chapter "Luminous Flux Bin"

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

Colour Spectrum

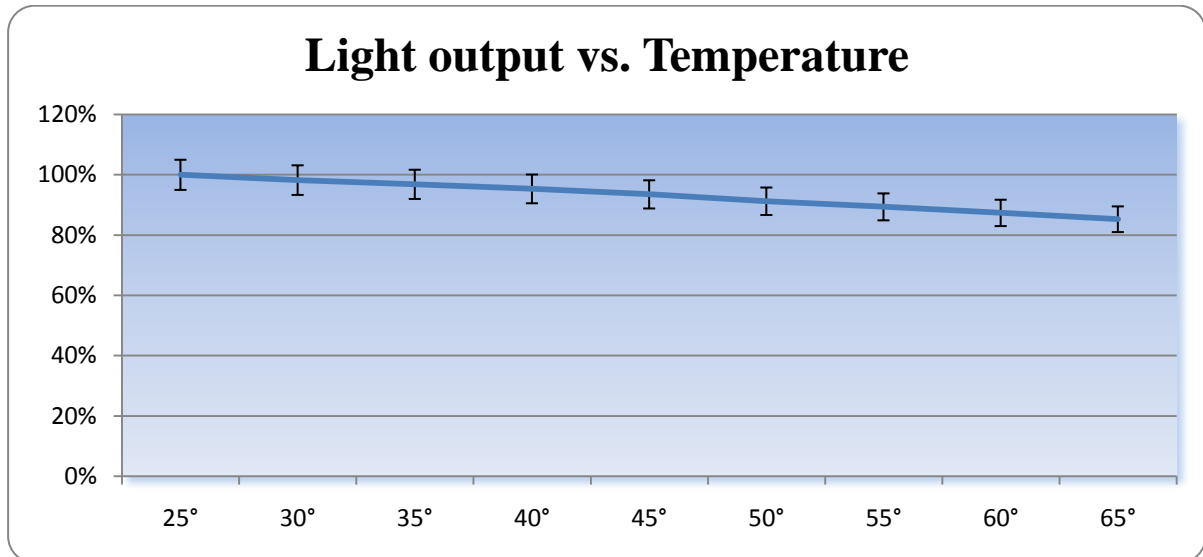
Warm White



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Electro Optical data

Temperature Characteristics



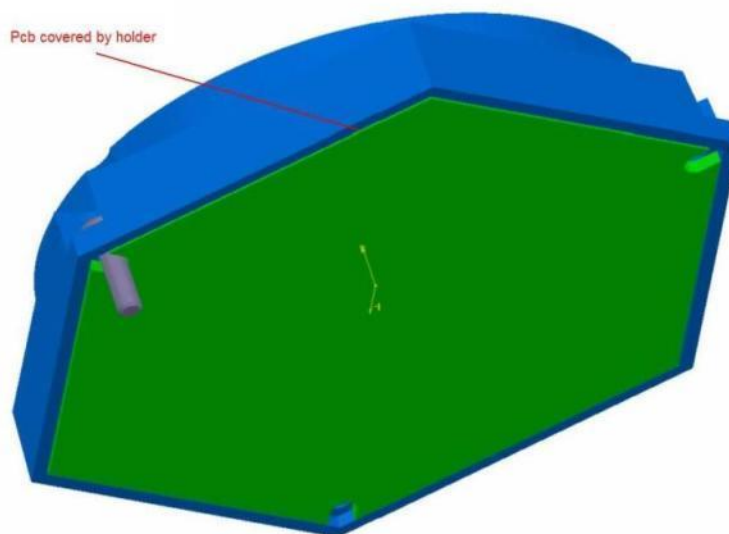
Consider the thermal capabilities of where the LED module is to be fitted. The temperature is an important factor for light output as well as for long time light output degradation.


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 65°C. Read more in the section how to measure temperature.



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Short form letter for binning and labeling

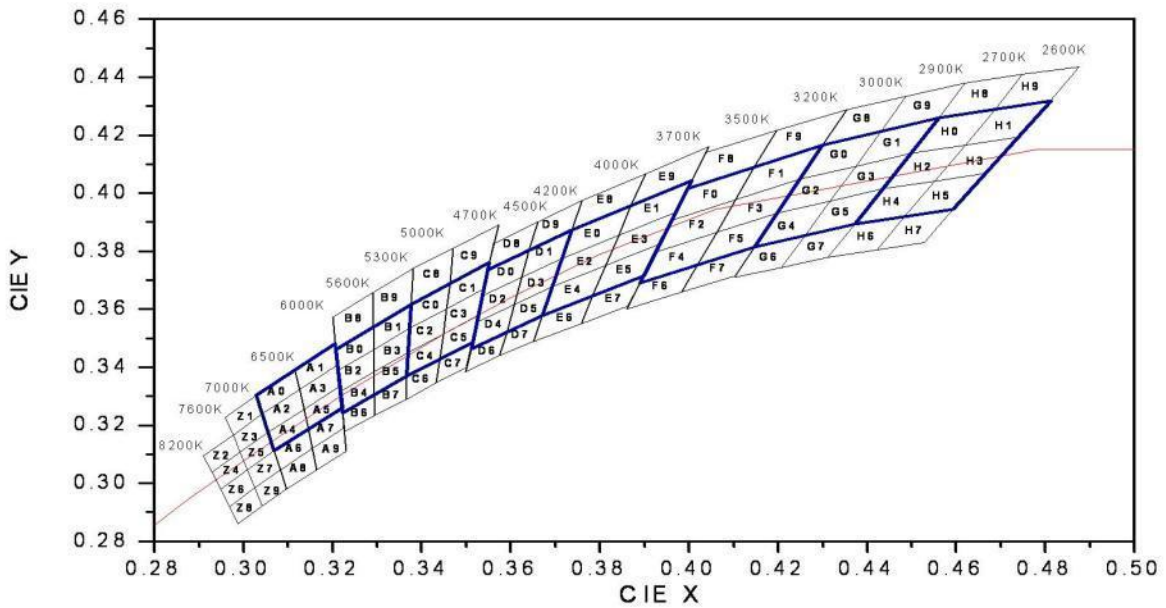
Colour

Colour Code	Colour
W	White
S	Neutral White
N	Warm White
B	Blue
G	Green
R	Red
A	Amber

Luminous Flux Bins pro LED @ 350mA measured for each individual LED

Bin Code	Luminous Flux [lm]	
J	6 ~ 8.5	
K	8.5 ~ 11.0	
L	11.0 ~ 14.5	
M	14.5 ~ 19.0	
O	19.0 ~ 24.5	
P	24.5 ~ 32.0	
Q	32.0 ~ 41.5	
R	41.5 ~ 54.0	
S	S1	54.0 ~ 60.0
	S2	60.0 ~ 70.0
T	T1	70.0 ~ 80.0
	T2	80.0 ~ 91.0
U	U1	91.0 ~ 100.0
	U2	100.0 ~ 118.5
V	V1	118.5 ~ 136.0
	V2	136.0 ~ 118.5
W	W1	91.0 ~ 154.0
	W2	154.0 ~ 177.0
X	X1	177.0 ~ 200.0
	X2	200.0 ~ 230.0
Y	260.0 ~ 340.0	

Binning structure graphical representation IEC 1931

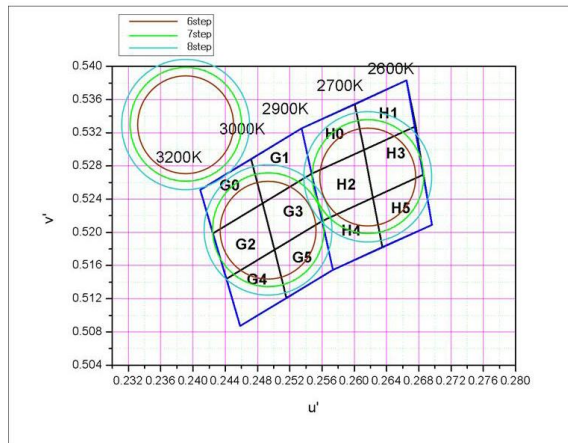
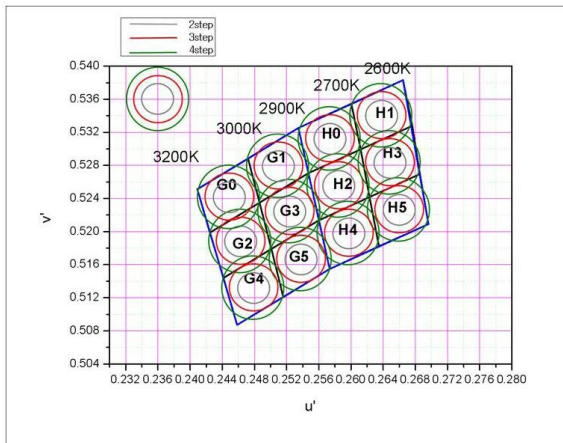


** Note Blue area is Energy Star Rank*


McAdam structure graphical representation IEC 1976

1bin: 3step

6bin: 7step

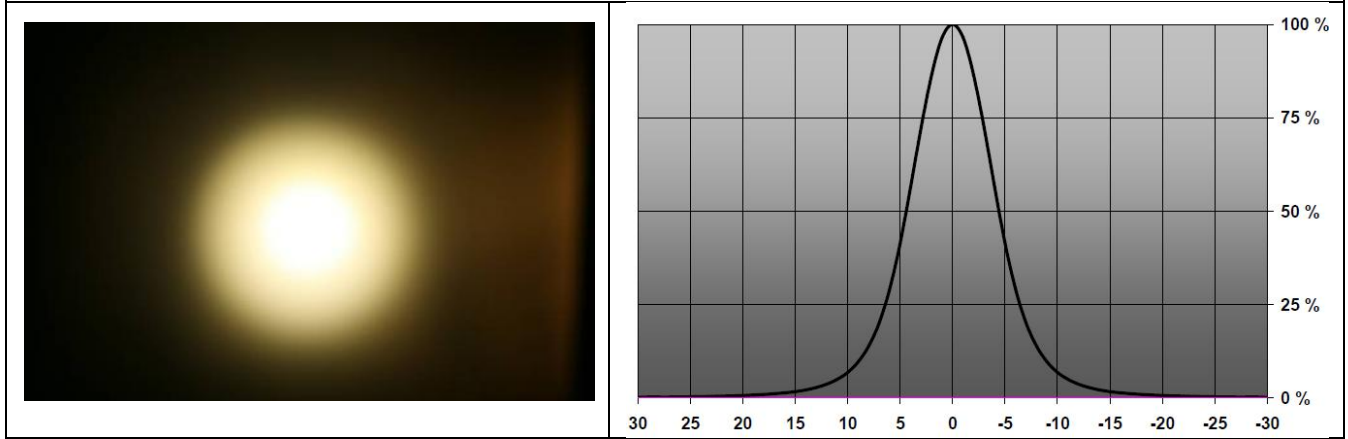


Note that the bin code from the top is transferred from IEC 1931 to IEC 1976 on the two McAdam graphs down below.


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Optics Performance Medical and retail lighting

Real Spot Version 9° (30 000 lx @ 25°C)



FWHM: +/- 4.5 degree
 10% value: +/- 9 degree

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Measurement Control

The recommended maximum value is 65°C on Tc or measuring point. If this value is exceeded we can't guarantee the function and the life time. The purpose of the measurement is to control the Junction (Tj) temperature of the LED and also control the performance on the whole set up. By the help of the junction temperature (Tj) the average lifetime of the product is known.

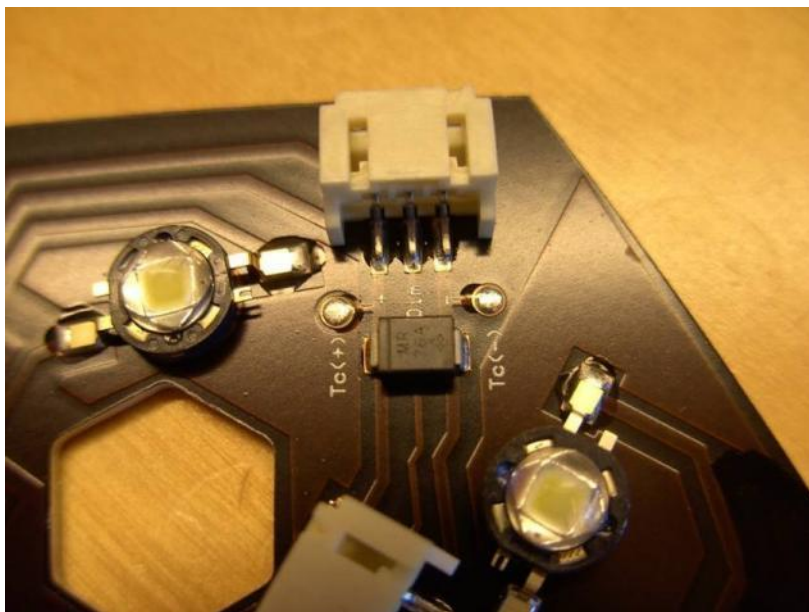
The thermal connection is measured in temperature vs. Power.

Measurement points


When the measurement takes place we verify the temperature on different places where the life time expected is depending on maximum temperature.

Measurement points

- TC (- and +)
- LED legs at the soldering point



This measurement is to be done when the heat sink is connected properly!

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Lifetime (Calculated)

The lifetime is calculated at the maximum temperature recommended at the Tc (measuring point). It is important not to exceed this recommendation; you find more information under the chapter “measurement control”.

24W unit

Tc maximum 65°C

L₇₀ (30% degradation) 37 500 hours


L₅₀ (50% degradation) 70 000 hours

17 W unit

Tc maximum 65°C

L₇₀ (30% degradation) 62 500 hours

L₅₀ (50% degradation) >100 000 hours

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Precaution for use

- This device should not be used in any type of fluid such as water, oil, organic solvent etc.
- When cleaning is required, only use water together with mild soap on the outside of the lens. Cleaning inside of the LED module is 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 are prohibited due to risk of EMC, dust, grease and other exposures that are out of control.
- The LED Module should always be mounted at a proper heat sink before it's connected with its proper leads. This due to electrical hazard.

ROHS Compliant

All our LED modules are meeting the Restriction of Hazardous Substances (RoHS)!

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 lead 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 RoHS 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 2002/95/EC (RoHS) the following substances must not be used in this product

- Lead (Pb) alloys
- Mercury (Hg)
- Cadmium (Cd)
- Cromium (6+) compounds

Would you like to know more about the benefits of OptoDrive LED?

At www.optodrive.se you can read more about OptoDrive. You can also easily notify us of your interest here (www.optodrive.se/order.pab). Of course you can also call +46 (0) 589 490 950.

Optoga AB

The company started business in November 2004. The company's staff has more than 30 years of shared experience in electronic components. Optoga develops and supplies LEDs, LED drivers, LED modules and software solutions to the lighting industry, automotive manufacturers and electronics companies.

By developing products with integrated LEDs and drive electronics, Optoga has taken the initiative to replace fluorescent, incandescent and halogen lamps with LED-based light sources.

The logo for Optoga, featuring the word "OPTOGA" in a bold, white, sans-serif font. The letter 'O' is stylized with a thick stroke and a small gap at the top.