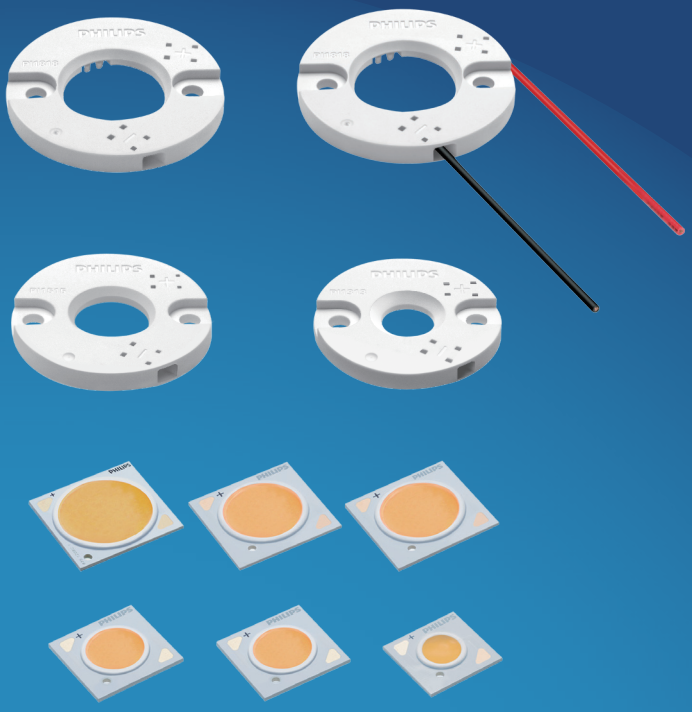
PHILIPS

CertaFlux

LED

CertaFlux SLM G1



Design-in Guide

Experience **good** performance with **affordable** cost

December 2018

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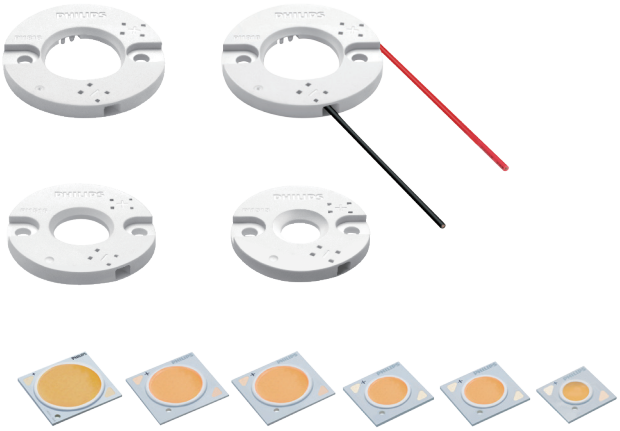
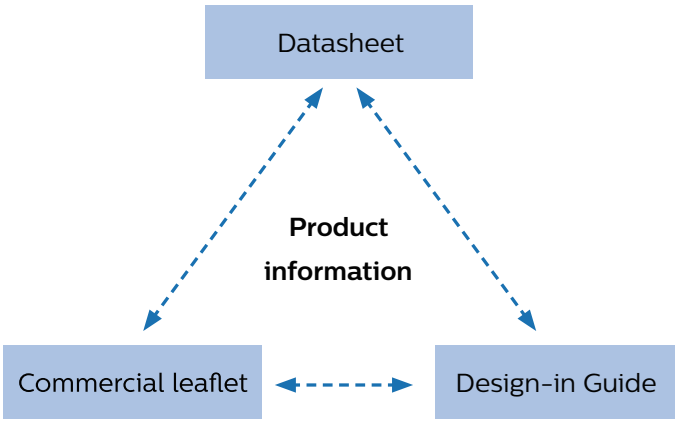


CertaFlux LED SLM G1



Thank you for choosing the Philips CertaFlux LED SLM G1. In this guide you will find the information required to design this module into a luminaire.

Information and support

If you require any further information or support please consult your local Philips office or visit our website: www.Philips.com/Technology

Determine which documents contain what information

In order to provide information in the best possible way, Philips' philosophy on product documentation is the following.

- **Commercial leaflet** contains product family information & system combinations (compatible Philips drivers and Rsets)
- **Datasheet** contains the module specification
- **Design-In Guide** describes how to design-in the products

All these documents can be found on the download page of the OEM website www.Philips.com/Technology.
If you require any further information or support please consult your local Philips office.

Warnings and instructions

When using a driver, intended for these modules

Warning:

- Avoid touching the light emitting surface!

Safety warnings and installation instructions

To be taken into account during design-in and manufacturing.

Design-in phase

- Do not apply mains power to the module (Philips CertaFlux LED SLM G1 CoB) directly.
- Connect the modules and drivers before switching on mains.
- Provide adequate environmental protection
- Due to the Tcase nominal temperature of the CertaFlux LED SLM G1 of 85 °C, it is important to into account the maximum touchable metal surface take temperatures of the luminaire. With such a high Tc temperature the maximum temperature for touch safety can easily be exceeded.
- Avoid contamination (direct or indirect) from any incompatible chemicals reacting with the silicone. A list of incompatible chemicals is provided in the chapter for Compliance and Approval.

Manufacturing phase

- Do not use products in case the phosphor on the CoB is discolored/ scratched or if the holder is broken.
- Do not drop the LED SLM or damage in any way.
- Connect the modules and drivers before switching on mains.
- Avoid contamination (direct or indirect) from any incompatible chemicals reacting with the silicone. A list of incompatible chemicals is provided in the chapter for Compliance and Approval.

Installation and service for luminaires incorporating the CertaFlux LED SLM System

- Do not service the luminaire when the mains voltage is connected; this includes connecting or disconnecting the LED SLM holder from the driver.

Philips Design-in support

Is available; please contact your Philips sales representative.

Introduction to the SLM G1 system

Application Information

The Philips CertaFlux LED Spotlight Module (SLM) is a high-performance, compact, and cost-effective series of products for general and accent lighting. This product offers a long-lifetime and energy efficient lighting solution for retail, hospitality and general down-lighting applications.

Module types

Identifying a CoB

On ordering a CertaFlux SLM CoB, the customer will receive a box stating the CoB type. Apart from this, each CoB has a printed label on it describing the color and CoB type to enable easy identification. The following is a description of the identification on the CoB:

YZZ 12XXC 1

YZZ	: Color (835: CRI 80, 3500K; 927: CRI 90, 2700K and so on)
12XX	: CoB type (1201,1202,1203,1204, 1205, 1208)
C	: CertaFlux
1	: Gen1

In this guide you will find the specific information required to develop a luminaire based on Philips CertaFlux LED SLM module. Product specific data can be found in the associated datasheet on www.Philips.com/Technology.

Naming of the CertaFlux LED spotlight modules

The names of the modules are defined as shown in the example below:

CoB

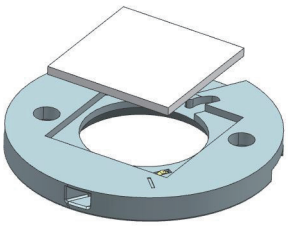
CertaFlux SLM C 830 1208 L14 G1

CertaFlux	: brand name
SLM	: Spotlight module
C	: CoB
830	: For a color rendering index >80; 30 stands for a CCT of 3000 K
1208	: CoB type
L14	: = LES (Light Emitting Surface) has a diameter of 14 mm
G1	: Indicates the generation Gen1

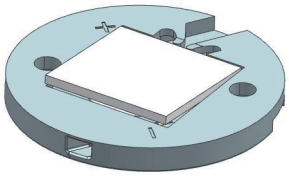
Holder

CertaFlux SLM H YY 1818 G1

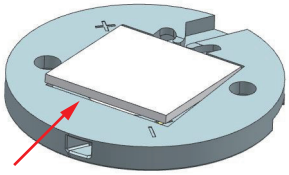
CertaFlux	: brand name
SLM	: Spotlight module
H	: Holder
YY	: This stands for the following names:
-	: Standard version
PI	: Poke-in version
1818	: Holder dimensions
G1	: Indicates the generation Gen1



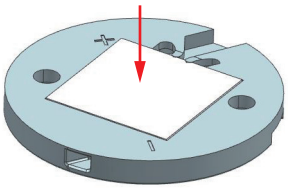
Step 1: Align the + and - of the CoB and holder



Step 2: Place the CoB against the spring at an angle



Step 3: Compress the spring with the CoB

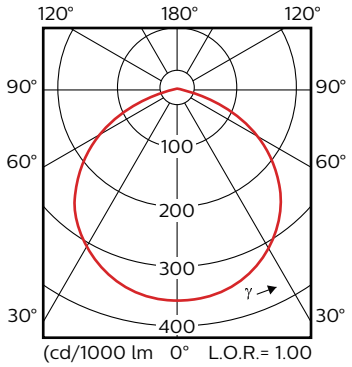


Step 4: Click the CoB down into the holder

Assembling your CertaFlux LED SLM module

To assemble CertaFlux SLM CoB and holer, please ensure that the + and – sign on the CoB are aligned with that on the holder. The CoB must be clicked into the slot by pushing back onto the spring. The pictures on the left explain this process step by step.

Optical design-in



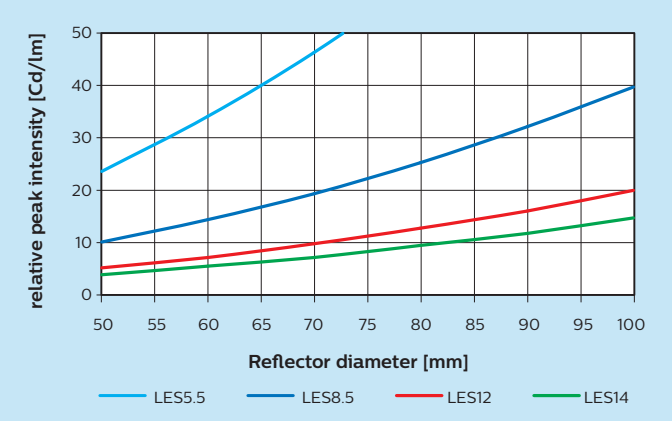
Light distribution diagram

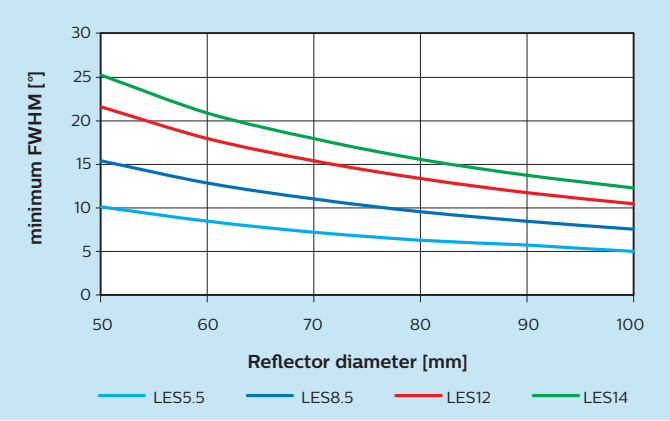
Light distribution

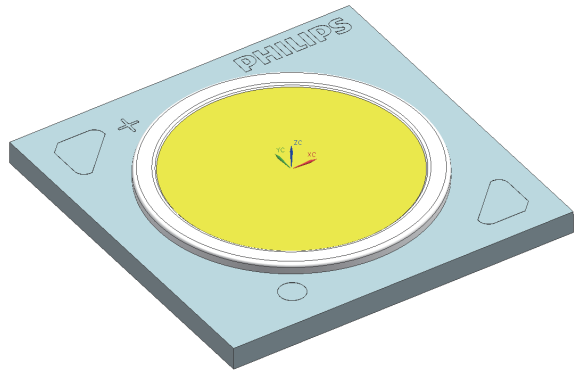
CertaFlux LED SLM G1 generates a Lambertian beam shape (see light distribution diagram). The secondary optics design should not cover the exit aperture. The IES (or .ldt) files are available via the website www.Philips.com/Technology.

Reflector design limits

The graphs below give an indication of the relation between the diameter of the reflector exit aperture and the minimum beam angle (FWHM) or beam peak intensity that can be achieved with CertaFlux LED SLM G1 modules.







Rayset Origin

Ray sets

The following ray set files are available for customer use, and can be downloaded from www.Philips.com/Technology.
All ray set files are available containing 100,000, 500,000 and 5,000,000 rays.

Software	File extension
ASAP	.dis
Light Tools (ASCII)	.ray (zipped)
TracePro/Oslo (ASCII)	.dat (zipped)
Zemax	.dat

The origin of the ray sets is shown in the pictures on the left, and it coincides with the origin of the CAD file:
- X = 0 and Y = 0 at the center of the module.
- Z = 0 at the emitting surface.

Note:
The ray set files provided are general and can be used in most applications for all released CCTs and CRIs . Specific ray sets for a certain color or holder are available on request, if needed.

Color consistency
Color consistency refers to the spread in color points between modules. It is specified in SDCM (Standard Deviation of Color Matching) or MacAdam ellipses, which are identical. The current general specification of all the CertaFlux LED SLM G1 modules is 3 SDCM. This results in an excellent color consistency performance.

Color targets
The color target points of the CertaFlux LED SLM modules are found in the respective datasheets on www.Philips.com/Technology.

Spectral light distribution
The typical spectral light distributions of the CertaFlux LED SLM G1 colors are shown in the respective datasheets on www.Philips.com/Technology.

Complementary partners for Secondary Optics
Secondary optics is not part of the CertaFlux LED SLM system offering. This is an added-value area for OEMs, offering the possibility to differentiate. The OEM can choose between reflectors and lenses. The use of reflectors is often preferred for a high light output ratio and glare shielding. Lenses however offer full beam control and can be more compact. There are many reflector companies who have a standard portfolio of compatible reflectors available, enabling quick and easy luminaire creation. A list of complementary partners offering compatible optics for CertaFlux LED SLM modules is provided at the end of this document.

Reference to these products does not necessarily mean they are endorsed by Philips. Philips gives no warranties regarding these products and assumes no legal liability or responsibility for any loss or damage resulting from the use of the information given here.

Starting characteristics
The CertaFlux modules light up milliseconds after being switched on, which is a general characteristic of LEDs.

Mechanical design-in

CertaFlux LED SLM G1 module dimensions

3D CAD files can be downloaded from our website www.Philips.com/Technology.
Basic dimensions for each module can also be found in the datasheets which are also available at the afore mentioned website.

Thermal design-in

The critical thermal management points for the LED module are set out in this chapter in order to facilitate the design-in of CertaFlux LED spotlight modules (SLM). If these thermal points are taken into account, this will help to ensure optimum performance and lifetime of the LED system.

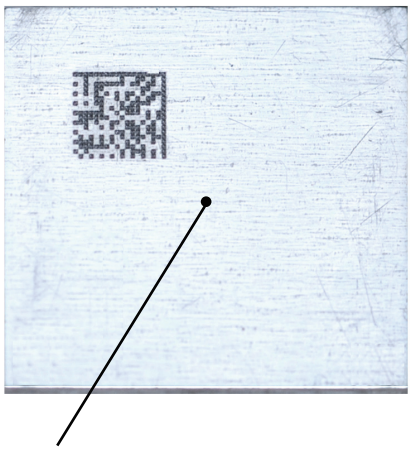
Optimum performance

To ensure optimum performance, the CertaFlux LED SLM system must operate within specified temperature limits.

Test requirements

Measurements, e.g. of temperature, luminous flux and power, are reliable once the luminaire is thermally stable, which may take between 0.5 and 2 hours, and is defined as at least 3 readings of light output and electrical power over a period of 30 minutes taken 15 minutes apart with stability less than 0.5%. The time depends on the thermal capacity of the luminaire (see also the relevant clauses in IEC 60598-1).

Note:
Thermal stability can be considered if the temperature changes are less than 1 °C over three measurements taken 15 minutes apart. Measurements must be performed using thermocouples that are firmly glued to the surface (and not, for example, secured with adhesive tape).



Tcase max. 95 °C

Critical measurement points

Because LEDs are temperature sensitive, LED modules require a different approach with respect to the maximum permissible component temperature. This is different to most other types of conventional light sources.

For LEDs the junction temperature is the critical factor for operation. Since there is a direct relation between the case temperature and the LED junction temperature, it is sufficient to measure the aluminum casing of the LED module at its critical point. The critical point is on the rear surface of the LED module, as shown in the figure on the left. If the case temperature (Tc) at the critical measurement point exceeds the recommended maximum temperature, the performance of the LEDs will be adversely affected, for example in terms of light output, lifetime or lumen maintenance.

Tc-nominal and Tc-max

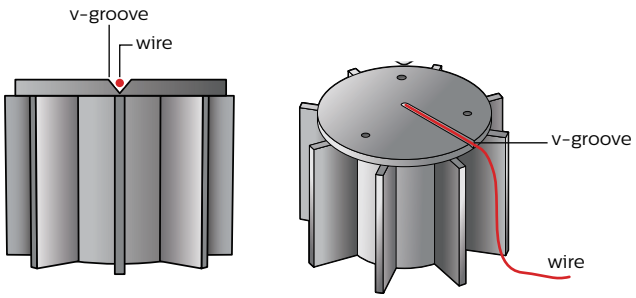
With the introduction of CertaFlux LED SLM G1 the luminaire manufacturer is enabled to make their luminaire even more compact due to a smaller heat sink. For this, Tc-max has been introduced. The Tc-max value for the CertaFlux LED SLM G1 is set to 95 °C and it is the maximum temperature at which the Philips CertaFlux LED SLM G1 modules can be operated. Please contact your Philips repre sentative for detailed product specs in that case.

Warning:

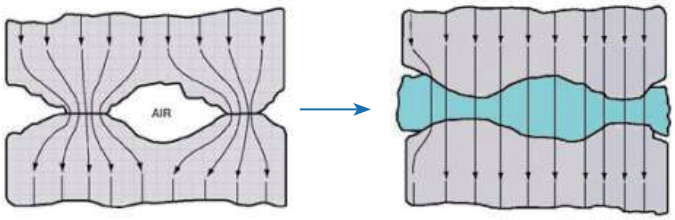
Special care needs to be taken for active cooled solutions. Please ensure that your operating current is within limits for the CoB.

Note:

With no Rset connected to the driver/current set via DALI or SimpleSet the driver goes to its default current (specified in the driver datasheet). This default current must also be less than the maximum current specified for the module.



Thin v-groove in the heat sink to embed a thermocouple



The working principle of thermal interface material (TIM)

How to measure the critical temperature point Tc

The Tc temperature can be measured by making a thin v-groove or a small drill hole in the heat sink to reach the bottom of the LED module. Be sure to measure the temperature of the bottom of the module and not of the thermal interface material (TIM).

Thermal interface material

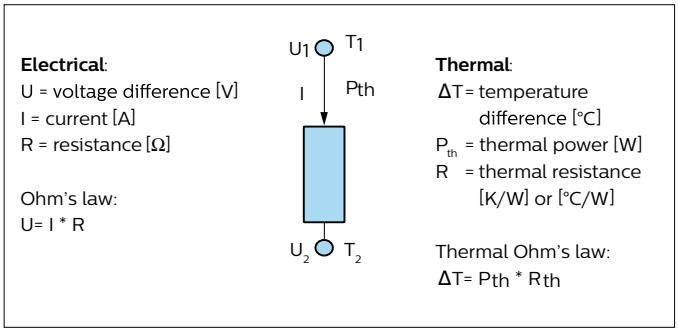
The function of a thermal interface material is to reduce thermal impedance between the LED module and the heat sink. The thermal interface material replaces air, which is a thermal insulator, by filling the gaps with material that has better thermal conductivity. This is shown diagrammatically in the figure on the left.

In general:

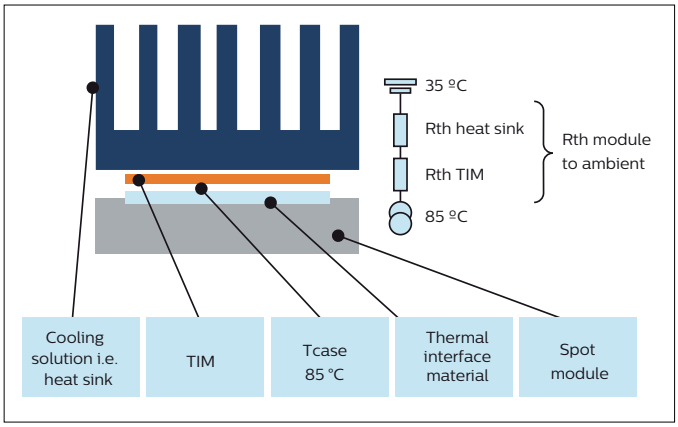
- Thermal paste performs better than thermal pads.
- The lower the thermal impedance the better.
- The thickness of the TIM should relate to the surface roughness and flatness of the used heatsink.

Due to the small footprint of the CertaFlux LED SLM G1, it is more sensitive to roughness and surface quality of the heat sink counter surface. It is highly recommended to have this surface clean and free of burs before applying the thermal interface material and the SLM module.
A list of complementary partners for thermal interface material products that can be used with the CertaFlux LED SLM module can be found at the end of this document. Reference to these products does not necessarily mean they are endorsed by Philips. Philips gives no warranties regarding these products and assumes no legal liability or responsibility for any loss or damage resulting from the use of the information given here.

For the CertaFlux LED SLM G1 it is recommended to use a thermal paste or phase change material as Thermal Interface Material (TIM). Please also be aware that an electrically insulating phase change material will introduce a thermal penalty compared to nonelectrically isolating phase change material. Thick thermal interface materials are not recommended.



Electrical and thermal analogy



Thermal model

Electrical and thermal analogy

Standard static thermal situations can be modeled using 'thermal resistances'. These resistances behave like electrical resistances. The analogy between electrical and thermal resistances is explained in the figure entitled 'Electrical and thermal analogy' on the left. The electrical units are shown on the left, while the thermal equivalents are given on the right. With a known voltage difference at a certain current it is possible to calculate the electrical resistance using Ohm's law. The same applies for a thermal resistance. If the temperature difference and the thermal power are known, the thermal resistance can be calculated using the thermal Ohm's law. Please note that using the concept of thermal resistances is a strong simplification of the actual physics of heat transfer, to aid in understanding of heat flow and temperature.

Thermal model

A thermal model that can be used to determine the required thermal performance of the cooling solution for the LED module is shown in the figure on the left.

A simplified model of the thermal path from LED module to ambient; Tc of 85 °C is used as an example.

Thermal design of a heat sink

A successful thermal design-in means that the Tc temperatures of the LED module is within thermal specifications at given maximum operating ambient of the luminaire.

Remarks:

- For track spot lighting applications, a minimum of 25 °C design ambient is recommended.
- For recessed spot lighting applications, a minimum of 35 °C design ambient is recommended.

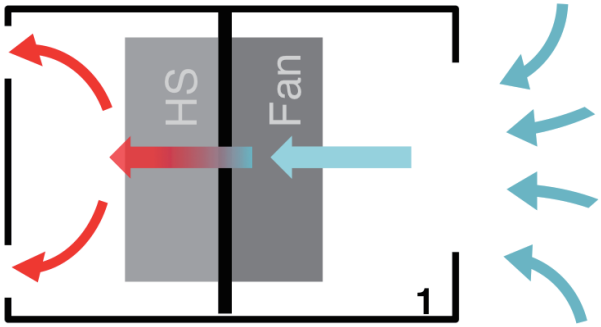
If the expected maximum operating ambient for the luminaire is <25 °C ambient, the luminaire still needs to be tested within thermal specifications of Tcase nominal in a lab environment at 25 °C ambient.

Warning:

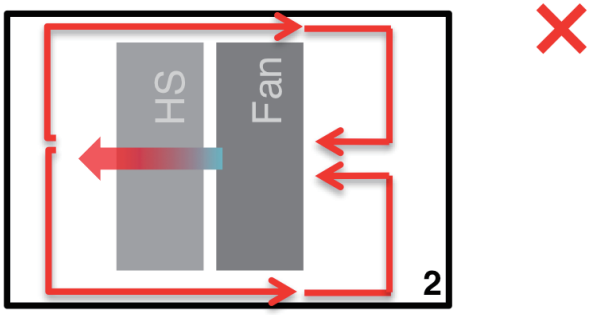
The maximum temperature difference between Tc and Tambient should not exceed 60 °C for CertaFlux LED SLM G1, otherwise it could lead to a reduction in the lifetime of the system.

Warning:

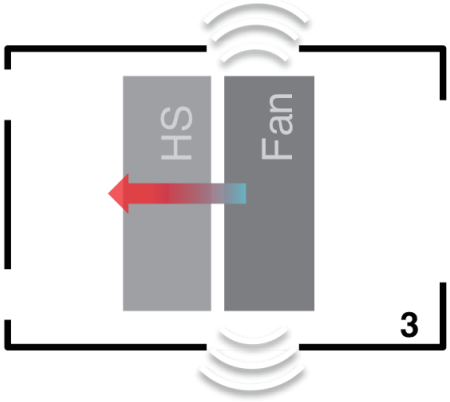
Due to the increased Tcase nominal temperature of the CertaFlux LED SLM G1 to 85 °C, it is important to take into account the maximum touchable metal surface temperatures of the luminaire during design. With such a high Tcase temperature the maximum temperature for touch safety can easily be exceeded.



1. Design guidelines for active cooling solutions



2. Design guidelines for active cooling solutions



3. Design guidelines for active cooling solutions

Active and passive cooling

In theory two thermal solutions are possible.

Active cooling

With this method the air is forced to flow by means of a fan or membrane, which enhances the thermal dissipating capacity of the heat sink. As a result, a smaller heat sink can be used and the orientation of the heat sink has less impact on the thermal performance. A potential side effect is that the fan or membrane might produce noise and consume extra energy.
Furthermore, the specified lifetime of the fan should match that of the application.

Design guidelines for active cooling

Design guidelines for active cooling include:

- The luminaire should be equipped with an inlet for cool air and an outlet for hot air (Image 1).
- The airflow from the inlet to the outlet should be smooth and without restriction in order to limit vibration, recirculation and noise.
- Recirculation of hot air (Image 2) inside the luminaire should be prevented, as this will lead to a lower thermal performance and higher noise level.
- Unnecessary openings near the fan in the luminaire housing (Image 3) should be avoided in order to help contain any noise from the fan.

Passive cooling

Passive cooling systems are based on the fact that hot air moves upwards, thus creating airflow along the surfaces. This is called natural convection. There are many standard heat sinks available, but it is also possible to design your own heat sink.
In general, a passive cooling solution requires a larger heat sink than an active cooling solution.

Design guidelines for passive cooling

Before starting to perform any calculations, an important point to consider is the airflow. In general hot air moves upwards at a relatively low speed. The shape and position of the heat sink will affect the airflow. Ideally, the fins should be parallel to the direction of airflow. Closure of the top of the profile will reduce the cooling capacity of the heat sink and should therefore be avoided during design and installation.

Some additional design guidelines for passive cooling include:

- Limit the number of thermal interfaces in the thermal path from module to ambient.
- Thick fins conduct heat better than thin fins.
- Large spacing between fins is better than small spacing between fins.
- Make cooling surfaces more effective by using proper conductive materials, appropriate thickness and correct fin orientation.
- Thermal radiation plays a significant role => anodized or powder-coated surfaces are preferable to blank surfaces.

Complementary thermal solution partners

Thermal solutions do not form part of the CertaFlux LED SLM system offering. This is an added-value area for OEMs, offering the possibility to differentiate. However, there are many thermal solution companies who have a standard portfolio of compatible heat sinks available, enabling quick and easy luminaire creation. A list of complementary partners offering compatible cooling systems for CertaFlux LED SLM modules can be found at the end of this document.

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Electrical design-in

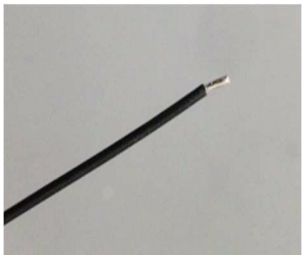
Connection to the mains supply
The mains supply must be connected to the LED driver (Line and Neutral can be interchanged).

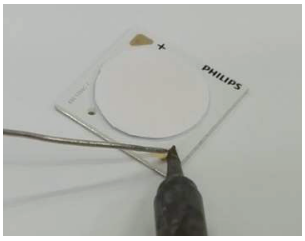
SELV Drivers
The CertaFlux LED SLM G1 should work with SELV driver.

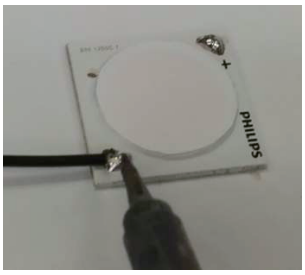
Tune the luminaire's flux (lm) and efficacy (lm/W)
The LED SLM specifications are provided under nominal conditions, like nominal flux at nominal current. It is however possible to deviate from this nominal current. By altering the current, we can obtain different flux outputs. At the same time, the required forward voltage (Vf) also changes, leading to a change in the efficacy (lm/W).

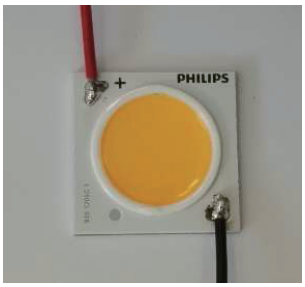
Compatible Drivers with CertaFlux LED SLM G1
A list of compatible drivers, specific to your choice of module and operating point can be obtained from the Easy Design-in Tool that can be found at www.easydesignintool.com. In case of queries, please contact your Philips representative.

Recommended Soldering Process









Wires can be directly soldered onto the CoB emitter. The following supplies are needed to do so:

- Grounded soldering iron, capable of reaching 350°C
- Stranded or solid copper wire – 24 gauge or larger
- Low-flux Sn96Ag4 solder wire
- Hot-plate, capable of reaching 100°C (optional)

Follow these steps to attach the wires to the CoB emitter:
Please note: SLM light emitting surface is highly recommended to be covered when wires are soldered to the CoB emitter. If solder flux or debris lands on the light emitting surface, it will lead to performance impact and will void the warranty.

1. Prepare the wires:
- Cut the wires to size.
- Strip a few millimeters of insulating material from the ends of the wires.
- Pre-tin the wires with a small amount of solder.

2. Prepare the pads
- Clean the pad.
- Place the tip of the soldering iron on the pad, apply solder and allow it to wet the pad.

3. Solder the wires to the pads
- Place the pre-tinned wire on the pad.
- Place the tip of the soldering iron on the pad and allow the solder to reflow around the wire.
- Remove the soldering iron and allow the solder to joint to cool.

Recommendations

1. Preparation
- Wear the wrist strap before operation.
- Do not touch LED during the operation.
- Wire cross-section area should be 0.2...0.75 mm^2 (18...24 AWG), solid and fine stranded

2. Soldering temperature
- Soldering bit temperature shall be 350°C or less.
- The substrate of the CoB emitter is designed to dissipate heat quickly. This may make it difficult to get the temperature of the lectrical pads to a point where the solder will reflow. Therefore it is important to place the CoB emitter on a thermally insulating surface. Alternatively, place the CoB emitter on a pre-heated hot plate set to 100°C.
- Do not place the soldering iron on the pad for more than 3 seconds.

3. Appearance Condition

- The soldering fillet is formed.
- The core part is soldered well.
- The solder has shiny appearance.
- There is not the protuberance or extreme raised on soldering.
- Insulation of wire can’t be damaged after soldering.

Reliability

Lumen maintenance

L70B50 @ 50,000 hours

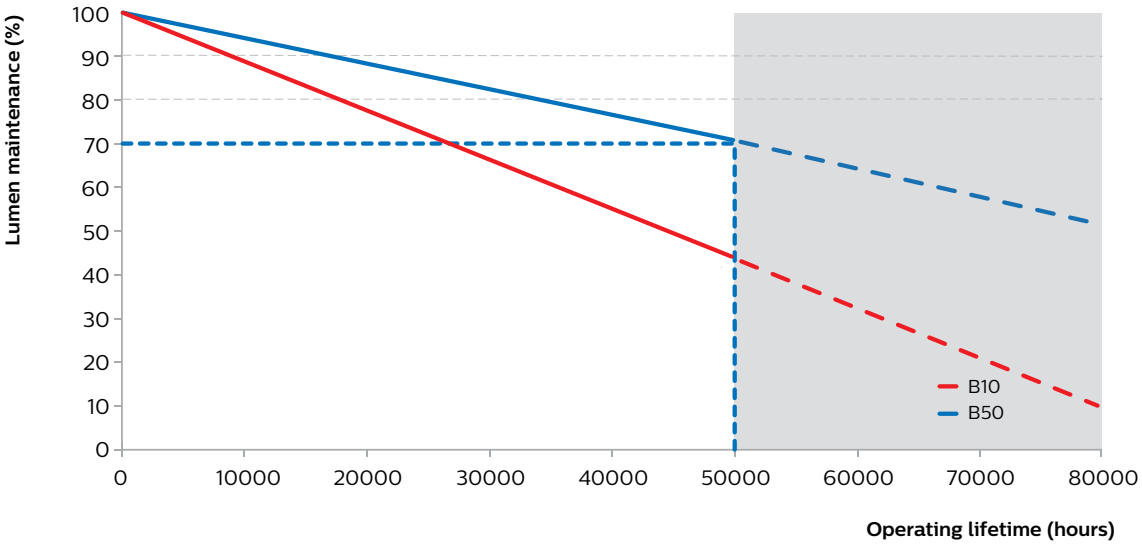
The quality of the LED SLM portfolio is backed by the Philips' claim of B50L70 @ 50,000 hours. This means that at 50,000 hours of operation at least 50% of the LEDs' population will emit at least 70% of its original amount of lumens.
This is contrary to conventional light sources, where some time after Service Life Hours the conventional light source emits no light at all.

Average rated life is based on engineering data testing and probability analysis. The CertaFlux LED SLM G1 modules are specified to reach L70B50 for the nominal specifications.

Lumen maintenance for B10 and B50

The example graph is showing the lumen maintenance (% of initial lumen over time) for B50 (50% of the population) and B10 (90% of the population).

Please look up the actual lumen maintenance graph in the associated datasheet of the CertaFlux LED SLM you are using at www.Philips.com/Technology.



Example lumen maintenance as a function of operating hours for B10 and B50 at Tc nominal

Complementary partners

Complementary reflector partners	
NATA	www.nata.cn
LedLink	www.ledlink-optics.com
Darkoo Optics	www.darkoo.cc

Complementary lens partners	
Darkoo Optics	www.darkoo.cc
CK Optics	www.ckoptics.com
LedLink	www.ledlink-optics.com

Thermal interface partners	
Laird Technologies	www.lairdtech.com
The Bergquist Company	www.bergquistcompany.com

Complementary heat sink partners	
AVC	www.avc.com.tw
Wisefull	www.wisefull.com

Compliance and approval

Compliance and approbation

The modules bear the CE mark indicating that they comply with the appropriate European EU directives. The relevant standards are summarized below. To ensure luminaire approval, the conditions of acceptance need to be fulfilled. Details can be requested from your local sales representative. All luminaire manufacturers are advised to conform to the international (luminaire standards IEC 60598-1) and national standards of luminaire design.

IP rating, humidity and condensation

The CertaFlux LED SLM modules are built-in modules relying on the luminaire for environmental protection. They have no IP classification.
The CertaFlux LED SLM has been developed and released for use in dry or damp locations. If there is a possibility that condensation could come into contact with the modules, the luminaire builder must take precautions to prevent this.

Electrostatic discharge (ESD)

ESD in production environment

Depending on the protection level of the LED module a minimum set of measures has to be taken when handling LED boards. Philips LED products have a high degree of ESD protection by design. ESD measures are required in a production environment where values can exceed the values shown in the ESD specifications table below.

ESD consultancy

Independent ESD consultancy companies can advise and supply adequate tools and protection guidance. Philips Innovation Services can provide consultancy www.innovationservices.philips.com.
More information can be found in the section entitled ‘Contact details’.

Environmental compliance

The photobiological safety standard IEC 62471/62778 ('Photobiological safety of lamps and lamp systems') gives guidance on how to evaluate the photobiological safety of lamps and lamp systems including luminaires. This standard specifies the exposure limits, reference measurement technique and classification scheme for the evaluation and control of photobiological hazards from all electrically powered incoherent broadband sources of optical radiation including LEDs in the wavelength range from 200 nm through 3000 nm. Measured results of emission limits for CertaFlux LED SLM G1 modules using the non-GLS (20 cm) method are listed in the datasheets that can be found at www.Philips.com/Technology.

Blue Light Hazard

From the nature of most LEDs applying blue light, emphasis has been put on the hazard in terms of Photo Biological Safety (PBS). Evaluation by the European lighting industry (ELC, Celma) has concluded LED light sources are safe for customers when used as intended. A photobiological safety report is available at www.Philips.com/Technology. Nevertheless luminaire makers have to comply with luminaire standards including PBS. To avoid extensive retesting, it is preferred to build on the test conclusions of the LED (module) suppliers; however this should be discussed and agreed upon with the used certification body. The testing conclusion then will be expressed in Risk Groups (RG), where RG0 and RG1 are considered safe and/or do not require specific action for the luminaire makers (as compared to RG2 and 3).

Some facts on blue light

- All light; visible, IR and UV, causes fading
- It has long been known that blue light causes fading in yellow pigments
- LEDs do not produce more blue light than other sources by its nature

"Often, investigations into the effect of short-wavelength radiation—be it on humans or artwork—suggest that LEDs are dangerous because they emit more blue light than other sources like incandescent bulbs or CFLs. While it is true that most LED products that emit white light include a blue LED pump, the proportion of blue light in the spectrum is not significantly higher for LEDs than it is for any other light source at the same correlated color temperature (CCT)."

Chemical Compatibility

The CoB contains a silicone overcoat to protect the LED chip and extract the maximum amount of light. As with most silicones used in LED optics, care must be taken to prevent any incompatible chemicals from directly or indirectly reacting with the silicone.
The silicone overcoat used in the CoB is gas sensitive. Consequently, oxygen and volatile organic compound (VOC) gas molecules can diffuse into it. VOCs may originate from adhesives, solder fluxes, conformal coating materials, potting materials and even some of the inks that are used to print the PCBs.
A list of commonly used chemicals, that should be avoided as they may react with the silicone material, is provided on the left. Note that Philips does not warrant that this list is exhaustive since it is impossible to determine all chemicals that may affect LED performance. These chemicals may not be directly used in the final products but some of them may be used in intermediate manufacturing steps (e.g. cleaning agents). Consequently, trace amounts of these chemicals may remain on (sub) components, such as heat sinks. It is recommended to take precautions when designing your application.

Chemical Name	Type
Hydrochloric acid	acid
Sulfuric acid	acid
Nitric acid	acid
Acetic acid	acid
Sodium Hydroxide	alkali
Potassium Hydroxide	alkali
Ammonia	alkali
MEK (Methyl Ethyl Ketone)	solvent
MIBK (Methyl Isobutyl Ketone)	solvent
Toluene	solvent
Xylene	solvent
Benzene	solvent
Gasoline	solvent
Mineral spirits	solvent
Dichloromethane	solvent
Tetracholorometane	solvent
Castor oil	oil
Lard	oil
Linseed oil	oil
Petroleum	oil
Silicone oil	oil
Halogenated hydrocarbons (containing F, Cl, Br elements)	misc
Rosin flux	solder flux
Acrylic Tape	adhesive

Cautions

During storage and transportation

- Store in a dark place. Do not expose to sunlight.
- Maintain temperature between -40 ~ +80 °C, and RH 5 – 85%.

During operation

Philips shall not be held responsible or liable for any damage, costs or expenses to the user, resulting from an accident or any other cause during operation if the system is used without due observance of the absolute maximum ratings and other instructions provided by Philips.

Note:
That warranty is only applicable, but not limited, for the Philips CertaFlux LED SLM modules in combination with recommended Philips SELV driver. Detail combination list should always contact local sales team.

Contact details

Philips
www.Philips.com/Technology

Or contact your local Philips sales representative

Philips ESD support
www.innovationservices.philips.com

Phone : +31- (0) 40 27 46658
Fax : +31 - (0) 40 27 42224

The Philips corporate EMC competence centre is a leading provider of approbation and consultancy services.

Disclaimer

Philips will perform the testing of the LED systems to high standards of workmanship. The tests are carried out with reference to the EN/IEC standards, if any, which are regarded by Philips as being of major importance for the application of the lamp gear and the lamp within the fixture for horticultural applications.

The design-in guide, regarding the testing and design in of the LED system provided by Philips, is not an official testing certificate, and cannot be regarded as a document for official release of the fixture. The OEM is liable for the official testing by a certified test body and all markings, such as CE and ENEC marks, on the fixture assembly.

The design-in guide is for information purposes only and may contain recommendations for detecting weak points in the design of the system (lamp – lamp gear – fixture), if any.

Specifically mentioned materials and/or tools from third parties are only indicative: other equivalent equipment may be used but it is recommended that you contact Philips for verification.

Philips will not be liable for unforeseen interactions of the proposed solutions when applied in the fixtures or applications using these fixtures. Philips has not investigated whether the recommendations are or will in the future be in conflict with existing patents or any other intellectual property right. Philips does not warrant that its recommendations are technically or commercially the best options.

Since the tests are only performed on one particular fixture provided by the customer, it will be treated as a prototype. This means that there is no statistical evidence regarding later production quality and performance of the lamp – lamp gear – fixture system.

As Philips does not have control over manufacturing of the fixtures, Philips cannot be held liable for the fixture assembly.

Philips will not accept claims for any damage caused by implementing the recommendations.

No warranty whatsoever may be claimed by the OEM with regard to the content and/or quality of the design-in guide or any other advice, or the conclusions and/or recommendations in the design-in guide or any other document, either express or implied, and Philips expressly disclaims any implied warranties of any kind, including without limitation any warranties of satisfactory quality, fitness for a particular purpose or non-infringement and any warranties regarding the design-in guide or any other advice or the use of the results of any activity performed while testing the fixture with respect to its correctness, quality, accuracy, completeness, reliability, performance or otherwise.

The OEM expressly agrees that test design-in guides are provided by Philips on an ‘as is’ basis and an ‘as available’ basis at customer’s sole risk and expense. Philips shall not be liable for any lost profits or lost savings, indirect, incidental, punitive, special, or consequential damages whether or not such damages are based on tort, warranty, contract, or any other legal theory – even if Philips has been advised, or is aware, of the possibility of such damages.

The OEM must bring any claim for damages within ninety (90) days of the day of the event giving rise to any such claim, and all lawsuits relative to any such claim.

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www.philips.com/technology