For Today, For Tomorrow

Philips Fortimo LED Systems Quick Guide

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Philips Fortimo LED Systems For Today, For Tomorrow

LED is really here to stay and is already delivering breakthroughs in regular lighting applications. And what currently are still unthinkable lighting applications will soon become reality. The Philips Fortimo LED portfolio is already today, and will also be tomorrow, the LED module range for an extensive variety of applications.

The world of lighting is moving faster than ever. Creating light is something we, at Philips have done for many years and, creating light with LED is something that excites us enormously. There are so many more possibilities with LED lighting but equally as many challenges. Despite these challenges, we truly believe LED lighting is now ready to be used effectively in almost all lighting applications, varying from accent lighting in a retail environment to general lighting in office spaces as well as a variety of outdoor lighting applications.

Five Fortimo Building Blocks

High Quality of White Light

A luminaire that delivers high quality light is something that luminaire manufacturers, specifiers, and end users nowadays all aim for, either in design, specification or in usage. Not so long ago the quality of LED light was inferior compared to other sources lighting such as incandescent or halogen. However, the Philips Fortimo LED modules have been leading the way when it comes to LED lighting, Continuous upgrades have allowed improvements in the three critical measures that determine quality of white light; color-rendition (CRI), color consistency and beam uniformity.

Leading in Energy Efficiency

It is well recognized that LED lighting is significantly more energy efficient when compared to incandescent, halogen and fluorescent lighting. New generations of Fortimo LED modules are introduced every nine to twelve months applying the latest innovations in LED technology that will maintain consistency in light output, but that aim to deliver even lower energy consumption versus the previous generation. Total cost of ownership is not only reflected in the actual energy consumption but also in the initial cost of the total LED system. Ensuring that system costs come down will help to stimulate a more competitive total cost ownership proposition.

Future Proof System

It is apparent that many lighting companies struggle to develop, manufacture and sell LED luminaires when the LED technology itself is changing so dramatically and so fast. Stable building blocks are required. Philips recognized this already at an early stage and started to develop our so called "future proof " modules five years ago. The vision of Philips Fortimo LED Systems is constant innovation within fixed dimension formats with a fixed optical interfaces. As long as this defined format is used, luminaire manufacturers can easily implement the latest Fortimo LED modules taking advantage of the latest advances in LED energy efficiency. This means performance upgrades can be introduced, but luminaire manufacturers do not have to worry about changing the design of the luminaire as module dimensions remain constant along with the required light output.

Smart System Approach

Philips Fortimo LED systems always include a choice of Xitanium drivers. Xitanium drivers offer many advantages for luminaire manufacturers. One of the key features of Xitanium LED drivers is the adjustable output current, which enables a luminaire manufacturer to set the lumen output and efficiency of a Fortimo LED Module to their own specification. The output current can be set with a resistor inside the module, or with a programmable Xitanium DALI driver.

Xitanium drivers work within operating windows, whereby a particular driver can be used across different Fortimo Module families and across different lumen outputs. Another smart feature of the Xitanium driver is the NTC (negative temperature coefficient) which regulates the light output down if certain critical temperature points have been exceeded. A Fortimo Module in combination with a Xitanium driver is a truly smart system choice.

Reliability and High Quality

Quality has already been the cornerstone for all Philips products for decades. Philips stands for high quality standards in all products and services brought to the market, including our Fortimo LED Systems. Extensive research and testing is done prior to market introduction, but also during the lifetime of a product. Over the past 120 years Philips has built on those basic principles, with its experience in electronics, optics, thermal engineering and more. And today, all of these disciplines play a crucial role in the success of LED lighting solutions. It is a legacy of pioneering expertise that has led to Philips becoming one of the leading drivers of the LED lighting industry's standardization activities.

For manufacturing, Philips deploys state-of-the-art production techniques, not just in our own facilities but also at our certified subcontractors. These are constantly monitored by extensive process control and tested by Philips engineers. All these processes and combined expertise have resulted in a very high quality performance of the Fortimo LED systems portfolio.

Zhaga Consortium

An industry-wide initiative for developing specifications for LED light sources. The global lighting industry joins forces, in the Zhaga consortium, to speed up the adoption of LED technology.

In 2010, Philips was one of the leading initiators behind the Zhaga initiative. Zhaga is an industry-wide cooperation aimed at the development of standard specifications for the mechanical and electrical interfaces of LED light engines. An LED light engine is a LED module with defined interfaces, that do not depend on the type of LED technology used inside the light engine. Zhaga will enable interchangeability between similar products made by several manufacturers.

More than 200 companies from three continents and a future-oriented sector, on one clearly defined common mission: Zhaga's overriding aim is to develop specifications for interchangeability of LED light engines.

For more information go to www.zhagastandard.org

Zhaga#

Philips is a member of the Zhaga consortium

OEMs 'Design-in' assistance

Philips dedicated engineering team offering support, analysis and evaluation

Philips is proud to offer North American OEMs Design-In assistance in the use of Philips LED Modules. Solely dedicated to the North American market, the team is comprised of talented lighting industry engineers ready to support fixture manufacturers in the integration of Philips LED Modules into their finished products.

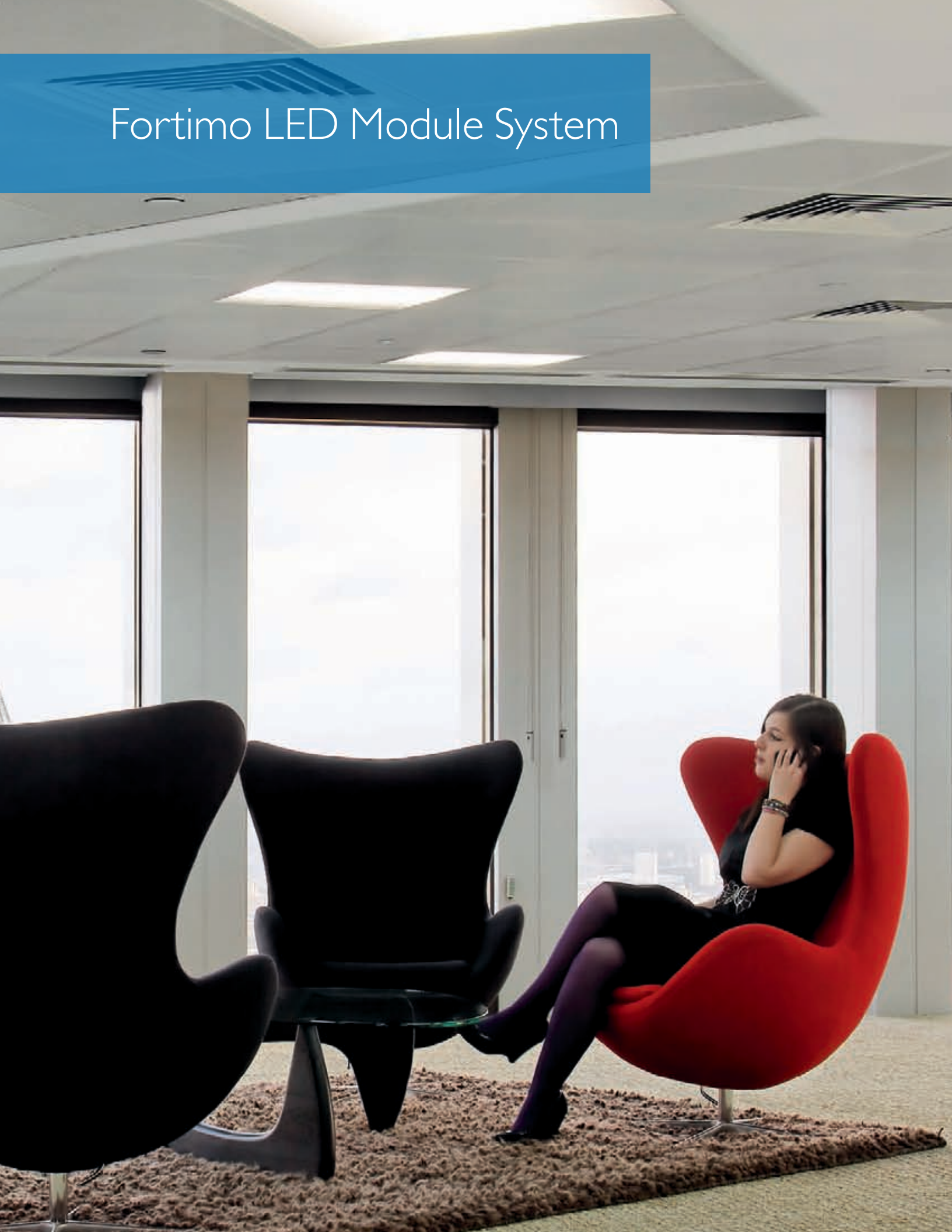
Located in our Rosemont, Illinois facility, our dedicated Philips engineering team offers support, analysis and evaluation for key integration issues including thermal, electrical, mechanical and optical—with the intent of lowering OEM development costs and speeding OEM time to market.

Available capabilities include:

1. Comprehensive design-in thermal support and testing
2. Optical design support and photometric evaluation
3. Mechanical design assistance and engineering support
4. Electrical/system level verification
5. UL approbation support
6. Surge testing
7. EMI and sound testing

Please contact your account manager for more information as well as details on how to immediately take advantage of this value-added resource.

Fortimo LED Module System



Fortimo LED Downlight Module (TDLM) System - Twistable

The Philips Fortimo Twistable module is the first Philips serviceable high-performance integrated LED module for general lighting. The complete system, comprising a Philips Twistable LED DownLight Module (TDLM) with integrated driver and a lamp holder, delivers energy efficient, low-maintenance and high-quality lighting.

Easy to experience

Thanks to its dedicated socket and integrated driver, the system is easy to design in, install and maintain. The modules can be easily replaced with the latest upgrades at the end of their life – or earlier if you want a different color temperature for a change of ambience – without having to remove the reflector or open the ceiling. This results in a truly easily upgradable and replaceable LED Technology. The Fortimo LED TDLM module is equipped with a special remote phosphor technology, enabling very high levels of LED efficacy. Also, the excellent lumen maintenance and long lifetime of up to 50,000 hours[6] make frequent relamping a thing of the past:
A promise that is backed up by a Philips three-year limited warranty[11].

Benefits for the end users

- Maintenance at ease - simply twist and replace without the use of tools
- Energy efficient LED design for improved total cost of ownership
- Easy to install with integrated driver
- Available in different color temperatures for simple change of ambiance
- Powerline Dimming
- Long life significantly reduces relamping cycles[6]
- 2000 lumen and 277 volt TDLM modules available in 2013

Module Performance Specifications*

Fortimo LED Twistable DLM System (integrated module and driver)	Approx Lumens [1,2]	CRI [3]	CCT (K) [4]	Color Consist. (SDCM) [5]	Module Rated Power (W)	Module Efficacy (Lm/W)	Input Voltage (V)	Module B_{50} L_{70} (Hours) [6]	
								T case 55°C	T case max 65°C
Fortimo LED TDLM 1100 20W/827 120V	1045	80	2700	5/6	20	51	120	50k	25k
Fortimo LED TDLM 1100 20W/830 120V	1100	80	3000	5/6	20	55	120	50k	25k
Fortimo LED TDLM 1100 20W/835 120V	1187	80	3500	5/6	20	59	120	50k	25k
Fortimo LED TDLM 1100 20W/840 120V	1239	80	4000	5/6	20	60	120	50k	25k

*Current specifications, subject to change, for latest specifications please contact your local Philips sales representative.
1. Photometric testing consistent with CIE 127:2007 2nd Edition
2. 100% of all production units fall between –10% and +20% of listed values
3. +/- 3% variance with all CRI above 77
4. Complies with ANSI C78.377A Specifications
5. All production units will fall between +/- 0.2%
6. Average rated life is based on engineering data testing and probability analysis. The hours are at the B50, L70 point (50,000) hours life with 70% lumen maintenance at Tc point of 55° C. Life will be 25K hours at Tc point of 65° C)
8, 10, 11 and 12 see page 23

RoHS COMPLIANT [8] [12] Zhaga [10]

Fortimo LED Downlight Module (DLM) System

The Fortimo LED Downlight Module is equipped with a special remote phosphor technology, that enables very high levels of LED efficacy. This general lighting solution continues on the idea of LED Systems Simplified. Additionally the excellent lumen maintenance and long lifetime of up to 50,000 hours* make frequent re-lamping a thing of the past – a promise that is backed up by a Philips .five-year limited warranty[11].

Peace of mind for manufacturers

The lamp and driver have been developed and rigorously tested in combination with each other, including key enhancements like thermal protection for the module.

Additionally, the module has been successfully implemented using LM-80 guidelines. As a result, they provide a great lumen output and light distribution, while efficacy upgrades can be implemented when available.

Future-proof modules

As energy efficiency advances in LEDs are made and new bins become available, they will be incorporated into the Fortimo LED Modules, offering higher efficacies, without changing the dimensions, shape or lumen output of the system. This allows luminaire manufacturers to plan and design new luminaire ranges for the coming years.

Benefits for the end users

- CRI increased to a minimum of 80
- Color consistency increased to 3 SDCM
- Dimming options include 0-10V, TE and DALI
- Offering expanded to include 2700K and 2800lm packages

Module Performance Specifications*

Description	Approx. Lumens [1, 2]	CRI [3]	CCT [4] (K)	SDCM [5]	Module Rated Power (W)	Module Efficacy (lm/W)	Lifetime (hrs) Tc 65° C [6]
Fortimo LED DLM 1100 14W/827 UL Gen3	1100	80	2700	3	14	79	50,000
Fortimo LED DLM 1100 14W/830 UL Gen3	1100	80	3000	3	14	83	50,000
Fortimo LED DLM 1100 13W/835 UL Gen3	1100	80	3500	3	13	87	50,000
Fortimo LED DLM 1100 13W/840 UL Gen3	1100	80	4000	3	13	91	50,000
Fortimo LED DLM 1300 16W/827 UL Gen3	1300	80	2700	3	16	78	50,000
Fortimo LED DLM 1300 16W/830 UL Gen3	1300	80	3000	3	16	81	50,000
Fortimo LED DLM 1300 15W/835 UL Gen3	1300	80	3500	3	15	86	50,000
Fortimo LED DLM 1300 15W/840 UL Gen3	1300	80	4000	3	15	90	50,000
Fortimo LED DLM 2000 26W/827 UL Gen3	2000	80	2700	3	26	74	50,000
Fortimo LED DLM 2000 26W/830 UL Gen3	2000	80	3000	3	26	76	50,000
Fortimo LED DLM 2000 25W/835 UL Gen3	2000	80	3500	3	25	80	50,000
Fortimo LED DLM 2000 24W/840 UL Gen3	2000	80	4000	3	24	84	50,000
Fortimo LED DLM 2800 42W/827 UL Gen3	2800	80	2700	3	42	70	50,000
Fortimo LED DLM 2800 42W/830 UL Gen3	2800	80	3000	3	42	70	50,000
Fortimo LED DLM 2800 39W/835 UL Gen3	2800	80	3500	3	39	75	50,000
Fortimo LED DLM 2800 39W/840 UL Gen3	2800	80	4000	3	39	78	50,000

*Current specifications are subject to change, for the latest specifications, please contact your local Philips sales representative.

RoHS COMPLIANT [8] [9]

1. Photometric testing consistent with CIE 127:2007 2nd Edition
2. 100% of all production units fall between -10% and +20% of listed values
3. All CRI are 80 or above
4. Complies with ANSI C78.377A Specifications
5. All production units will fall between +/- 0.2 of listed value
6. Average rated life is based on engineering data testing and probability analysis. The hours are at the B50, L70 point - 50,000 hours life with 70% lumen maintenance at Tc point of 65° C

8, 9 and 11 see page 23

Lexel LED Downlight Module Systems

The Philips Lexel LED Downlight Module system is designed for general lighting applications in the professional market, enabling the creation of various atmospheres with changing tones of white light and different colors from a single light source.

The system consists of an module and a dedicated driver, with a cable (optional) designed for use in new luminaries together with a heatsink, reflector design and a user-interface. A unique intelligent feedback system guarantees precise selection of white color temperature (CCT) from 2,700 to 6,500K, color rendering 80(Ra) or higher and color consistency between modules over lifetime of the system. This future-proof system has fixed form and lumen packages along with provisions for mounting external heatsink and optics which can be easily attached to the module. Dimmable and featuring instant 100% light, they run through a unique control interface that allows the same light source to be used on a DALI, DMX/RDM network. Philips Lexel LED DLM System is a comfortable lighting solution that emits no heat or UV which can also benefit retailers looking to preserve the color fastness of their products or garments.

Benefits for the end users

- Various lighting atmospheres with a single source
- Color quality and consistency over time and among modules
- Uniform colors even in shadows
- Long lifetime of 35,000 hrs [4]

Module Performance Specifications*

Description	Approx. Lumens	CRI [2]	CCT (K) [1]	SDCM [3]	Module Rated Power (W)	Module Efficacy (lm/W)	Lifetime (hrs) Tc 65° C [4]
Lexel LED DLM 1100 34W DALI/DMX	1100	> 80	2700-6500	5 to 6	34	29.5	35 K
Lexel LED DLM 2000 40W DALI/DMX	2000	> 80	2700-6500	5 to 6	40	48	35K

*Current specifications, subject to change, for latest specifications please contact your local Philips sales representative.

1. Philips Lexel LED DLM is a dynamic system therefore product specifications as power, light output and color rendering are not constant. For details please consult the Design-in Guide for this system
2. All CRI are 80 or above
3. All production units will fall between 5 and 6 SDCM
4. Average rated life is based on engineering data testing and probability analysis. The hours are at the B50, L70 point - 35,000 hours life with 70% lumen maintenance at Tc point of 65° C

8 and 9 see page 23

RoHS [8] COMPLIANT

[9]

Fortimo LED Spotlight Module (SLM) Gen 2 System

The second generation of Fortimo LED Spotlight Module Systems offers a wider range of tools for both accent lighting and downlighting applications. Merchandise of all kinds can look more attractive and desirable under a Fortimo LED Spotlight Module. What's more, the excellent lumen maintenance and rated average life of 50,000 hours* make frequent relamping a thing of the past: a promise that is backed up by the Philips five-year limited warranty [11].

Future proof system

The new Spotlight modules offers fixed and dimmable lumen output, light distribution, standardized optical, mechanical, electrical and thermal interfaces. The module design is backwards compatible with previous generation modules and drivers.

In expanding the portfolio, the second generation Fortimo LED SLM includes an additional color temperature of 2700K and the choice for high quality of light range products.

High quality of white light and energy efficiency

The second generation Fortimo LED Spotlight Module, provides high quality white light, and is also very energy efficient.

Benefits for the end users

- Ease of design-in via the use of a new optical dome ensuring clean light distribution
- Operating temperature Tc 75° C enabling more passive cooling solutions
- Color consistency 3 SDCM
- Excellent lumen maintenance of 70% at 50K hours

Module Performance Specifications*

Fortimo LED SLM Gen 2

Module Description	Approx. Lumens [1, 2]	CRI (min) [3]	CCT [4] (K)	SDCM [5]	Module Rated Power (W)	Module Efficacy (lm/W)	Rated Average Lifetime (hrs) Tc 75° C [6]
Fortimo LED SLM 800 10W/827 L13 G2	800	80	2700	3	9.8	82	50,000
Fortimo LED SLM 800 10W/830 L13 G2	800	80	3000	3	9.2	87	50,000
Fortimo LED SLM 800 9W/835 L13 G2	800	80	3500	3	8.4	95	50,000
Fortimo LED SLM 800 8W/840 L13 G2	800	80	4000	3	7.7	104	50,000
Fortimo LED SLM 800 13W/927 L13 G2	800	90	2700	3	12.8	62	50,000
Fortimo LED SLM 800 12W/930 L13 G2	800	90	3000	3	11.5	69	50,000
Fortimo LED SLM 1100 15W/827 L13 G2	1100	80	2700	3	14.4	76	50,000
Fortimo LED SLM 1100 14W/830 L13 G2	1100	80	3000	3	13.4	82	50,000
Fortimo LED SLM 1100 13W/835 L13 G2	1100	80	3500	3	12.7	87	50,000
Fortimo LED SLM 1100 12W/840 L13 G2	1100	80	4000	3	11.4	96	50,000
Fortimo LED SLM 1100 20W/927 L13 G2	1100	90	2700	3	19.6	56	50,000
Fortimo LED SLM 1100 18W/930 L13 G2	1100	90	3000	3	17.8	62	50,000
Fortimo LED SLM 2000 26W/827 L19 G2	2000	80	2700	3	25.5	78	50,000
Fortimo LED SLM 2000 24W/830 L19 G2	2000	80	3000	3	23.5	85	50,000
Fortimo LED SLM 2000 23W/835 L19 G2	2000	80	3500	3	22.5	89	50,000
Fortimo LED SLM 2000 20W/840 L19 G2	2000	80	4000	3	20	100	50,000
Fortimo LED SLM 2000 35W/927 L19 G2	2000	90	2700	3	34.5	58	50,000
Fortimo LED SLM 2000 32W/930L19 G2	2000	90	3000	3	31.5	63	50,000
Fortimo LED SLM 3000 42W/827 L19 G2	3000	80	2700	3	42	71	50,000
Fortimo LED SLM 3000 39W/830 L19 G2	3000	80	3000	3	39	77	50,000
Fortimo LED SLM 3000 40W/835 L19 G2	3000	80	3500	3	40	75	50,000
Fortimo LED SLM 3000 36W/840 L19 G2	3000	80	4000	3	36	83	50,000

*Current specifications are subject to change, for the latest specifications, please contact your local Philips sales representative. L13 and L19 refers to light emitting diameter in mm.

Module Performance Specifications*

Fortimo LED SLM Tight Beam

Module Description	Approx. Lumens [1, 2]	CRI (min) [3]	CCT [4] (K)	SDCM [5]	Module Rated Power (W)	Module Efficacy (lm/W)	Rated Average Lifetime (hrs) Tc 75° C [6]
Fortimo LED SLM 1100 17W/827 L9 G2	1100	80	2700	3	16.7	66	50,000
Fortimo LED SLM 1100 17W/830 L9 G2	1100	80	3000	3	14.9	74	50,000
Fortimo LED SLM 1100 15W/840 L9 G2	1100	80	4000	3	13.1	84	50,000
Fortimo LED SLM 1100 19W/930 L9 G2	1100	90	3000	3	17.8	59	50,000

*Current specifications are subject to change, for the latest specifications, please contact your local Philips sales representative.
1. Photometric testing consistent with CIE 127:2007 2nd Edition
2. Production units fall between +_6.5% of listed values
3. All CRI are 80 or above and 90 or above as specified in that data chart above
4. Complies with ANSI C78.377A Specifications
5. Production units will fall between +/- 0.2 of listed value
6. Average rated life is based one engineering data testing and probability analysis. The hours are at the B50, L70 point - 50,000 hours life with 70% lumen maintenance at Tc point of 75° C
8, 9, 10 and 11 see page 23

RoHS COMPLIANT [8] [9] Zhaga [10]

Fortimo LED Line Low Voltage Systems

Fortimo LED Line systems are designed to replace conventional lighting in both fixed and dimmable luminaires. They are characterized by breakthrough high energy efficiency levels, up to 132 Lm/W. Fortimo LED Line systems also offer high quality white light in terms of color rendition and color consistency and are part of the Fortimo future proof promise. The Fortimo LED Line portfolio consists of both a three (3R) and a one (1R) row LED module and a Philips Advance Xitanium driver.

The Fortimo LED Line 3R system has been designed to produce high efficacy, pure white light, for applications where diffuse lighting is desired. This is ideal for incorporating into luminaires for use in general office lighting, where energy efficiency and glare control are important.

The Fortimo LED Line 1R system has been designed with higher lumen output when compared to the 3R version, which makes it a better choice for higher ceiling applications. This enables the use of a wide variety of optics resulting in beams ranging from batwing to tight beam distribution, making it the better choice for the illumination of vertical surfaces or areas where high lighting levels are desired.

Benefits for the end users

- Flexible, configurable system allowing ease of upgrading conventional technology luminaires with LEDs.
- Minimal heatsink required often achieved within the luminaire design
- Average rated lifetime of 50,000 hours,[7] due to the combination of LEDs and special Philips phosphor technology.
- 5-year limited system warranty [11]
- Driver options include various output power levels (25W, 54W, 75W) and dimming protocols (0-10, step, DALI)

Module Performance Specifications*

Fortimo LED Line System (module and driver)	Approx Lumens [1, 2]	CRI [3]	CCT (K) [4]	Color Consistency (SDCM) [5]	Module Rated Power (W) [6]	Module Efficacy (Lm/W)	Input Voltage (V) range	Module B50 L70 (Hours) T case max °C
Fortimo LED Line 1ft 650lm 830 3R LV1++	610	80	3000	3.5	5.1	120	30.1-33.1	56
Fortimo LED Line 1ft 650lm 835 3R LV1++	640	80	3500	3.5	5.1	127	30.1-33.1	56
Fortimo LED Line 1ft 650lm 840 3R LV1++	650	80	4000	3.5	5.1	129	30.1-33.1	56
Fortimo LED Line 1ft 650lm 850 3R LV1++	670	80	5000	3.5	5.1	132	30.1-33.1	56
Fortimo LED Line 1ft 1100lm 830 1R LV1+	1080	80	3000	3.5	9.1	119	31,2-33.9	61
Fortimo LED Line 1ft 1100lm 835 1R LV1+	1100	80	3500	3.5	9.1	121	31,2-33.9	61
Fortimo LED Line 1ft 1100lm 840 1R LV1+	1120	80	4000	3.5	9.1	124	31,2-33.9	61
Fortimo LED Line 1ft 1100lm 850 1R LV1+	1140	80	5000	3.5	9.1	126	31,2-33.9	61
Fortimo LED Line 1ft 1100lm 865 1R LV1+	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

*Current specifications are subject to change, for the latest specifications, please contact your local Philips sales representative.
++ All specifications defined at Tcase 35° C, current 160mA
+ All specifications defined at Tcase 35° C, current 280mA
1. Photometric testing consistent with CIE 127:2007 2nd Edition
2. Production units fall between +/-7.5% of listed values
3. All CRI are 80 or above
4. 3000K = +/-100K, 3500K = +/-120K, 4000K = +/-140K, 5000K = +/-160K
5. Production units will fall between +/- 0.2 of listed value
6. Product units fall between +/-10%
7. Average rated life is based one engineering data testing and probability analysis. The hours are at the B50, L70 point - 50,000 hours life with 70% lumen maintenance at Tc point of 56° C for 3R and 61° C for 1R
8, 9, 10 and 11 see page 23

RoHS [8] COMPLIANT [9] Zhaga [10]

Fortimo LED High Brightness Module (HBMT) System

The Fortimo LED High Brightness Module (HBMT) System is a high efficacy, easy to design-in, future-proof solution for OEMs looking to incorporate LEDs into their outdoor, high bay or industrial luminaire portfolios. With a compact rectangular light engine and non-integrated driver, the Fortimo LED HBMt System allows for creation of different light distributions using a metal reflector, similar to HID lamps. OEMs with experience in traditional luminaire design can easily leverage that expertise in developing a LED-based luminaire.

Benefits for the end users

- LED Module that provides high lumen output from a small area
- Cost-effective LED light engine
- Luminaire design based on traditional reflector optics
- Interchangeability of light engines from different manufacturers

Module Performance Specifications*

Fortimo LED HBMT Module System	Module Descr	Approx. Lumens 1, 2	CRI (min) 3	CCT 4 (K)	Color Consistency SDCM 5	Module Rated Power (W)	Module Efficacy (lm/W)	Rated Average Lifetime (hrs) Tc 85° C 6
Fortimo LED HBMt 4000 35W/757	4000	70	5700	4000	<7	35	114	50K
Fortimo LED HBMt 4000 35W/740	4000	70	4000	4000	<7	35	114	50K
Fortimo LED HBMt 6000 54W/757	6000	70	5700	6000	<7	35	111	50K
Fortimo LED HBMt 6000 54W/740	6000	70	4000	6000	<7	35	112	50K

*Current specifications are subject to change, for the latest specifications, please contact your local Philips sales representative.
1. +/-10% tolerance is applicable to lumen/watt performance characteristics
2. Photometric testing consistent with CIE 127:2007 2nd Edition
3. +/- 3% tolerance with CRI
4. Complies with ANSI C78.377A Specifications
5. Production units will fall between +/- 0.2 of listed value
6. Rated average life is based on engineering data testing and probability analysis. The hours are at the B50, L70 point--50,000 hours of life with 70% lumen maintenance at a Tc point of 85° C
8, 9, see page 23

RoHS[8] COMPLIANT

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Complementary Partners

In order to make the Fortimo LED module systems more easily accessible to all luminaire manufacturers, whether small or large, Philips Lighting has set up links with our complementary partners.

These are companies who have developed either reflectors or heat sinks specifically for the Fortimo LED systems. These complementary partners have regular contact with Philips Lighting and receive early information about the Philips Fortimo product roadmap. We recommend that you visit the websites of these companies and contact them directly about their Fortimo related product ranges.

The following are suggestions of products that can be used with certain Philips Fortimo Module Systems. References to these products does not constitute their endorsement by Philips. Philips makes no warranties regarding these products and assumes no legal liability or responsibility for loss or damage resulting from the use of the information herein.

The list of partners below is current as of November 2012. Please contact your local Philips sales representative for a complete listing.

Cooling Systems:

Corporate Headquarters, Worldwide Sales Office
4635 Boston Lane, Austin, Texas 78735
Tel: 512 382 8100, Fax: 512 382 8101
Web: www.nuventix.com/products/led-cooling
email: jkelley@nuventix.com

Asia Vital Components (AVC) CO., Ltd
7F-3, No.24, Wucyuan 2 Rd., Sinjhuang District, New Taipei City 24892, Taiwan
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Xitanium LED Drivers

Versatility Delivered

Long-lasting and low maintenance, LED-based light sources are an excellent solution for all lighting applications. For optimal performance, these solutions require reliable drivers matching the long lifetime of the LEDs. The Philips Xitanium LED driver portfolio offers a range of products specially designed to operate LED solutions for a variety of lighting applications such as office, retail, industrial and outdoor and meet wide variety of customer needs, but they can all provide certain common benefits.

Benefits include:

- Reliable and consistent operation
- High efficiency drivers - >90% in some cases
- Greater than 0.9 PF and Less than 20% THD
- Greater that 50k Hrs lifetime
- 5 year limited warranty[11]
- ROHS compliance[8]
- Safety approbations (UL, CSA, CE, ENEC, PSE, SELV or CQC)

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Xitanium LED Driver Categories

Based on the features that each driver has to offer the Philips Xitanium LED drivers can be classified into three main categories:

Fixed LED Drivers

These are designed to meet the basic needs of LED lighting. Available in either dedicated input voltage or intelivolt options, these drivers can address wide variety of output current and power requirements

Benefits include:

- Cost effective
- Reliable
- 5 year limited warranty[11]

Dimmable LED Drivers

Along with the benefits of fixed drivers, these drivers are designed to address the growing demand for controllability and flexibility

The adjustable output current feature enables operation of various LED configurations from different LED manufactures as well as offers "future proof" solutions for new LED generations. There are specific dimmable versions enabling use of lighting controls to increase energy saving through a wide variety of protocols, such as 0-10V and Trailing Edge (Step Dim & Leading Edge coming soon). In most of the cases the indoor drivers also integrate a 12V output for active cooling and NTC feedback for LED module temperature protection.

Benefits include:

- Wide variety of dimming interfaces (0-10V, Phase cut, step dim)
- Helps you address code requirements for energy efficient buildings
- Offers fixture design flexibility with the AOC feature
- Models offering features such as fan output and module temperature protection

Programmable LED Drivers

Optimized to meet the ever evolving needs of today's LED lighting customers, Xitanium Programmable LED Drivers are a one-stop solution for the varying power needs of industrial high bay, office, or retail lighting. Offering an unparalleled level of flexibility, these drivers provide a large number of features which can be customized based on the desired functionality of the luminaire design with simple programming interface. With multiple choices for current output levels, module temperature control settings and a network-ready DALI interface, this is an easily integrated driver solution. Luminaire designers and manufactures are also able to streamline logistics without compromising on performance.

Benefits include:

- Robust programmable solution that offers ultimate design flexibility with a reliable long lifetime
- Reduced SKU complexity and simplified logistics management (one driver to serve many needs)
- Multiple dimming options provide energy savings and can help reduce light pollution and CO^2 impact
- Easily programmable user interface for onsite customization of driver requirements
- Optimized life expectancies of up to 100,000 hours*
- Driver programmability provides features for the ever-evolving improvements in LED efficacy, removing the need to design-in a new LED driver as technology improves or changes

*Minimum 90% survivals based on MTBF modeling

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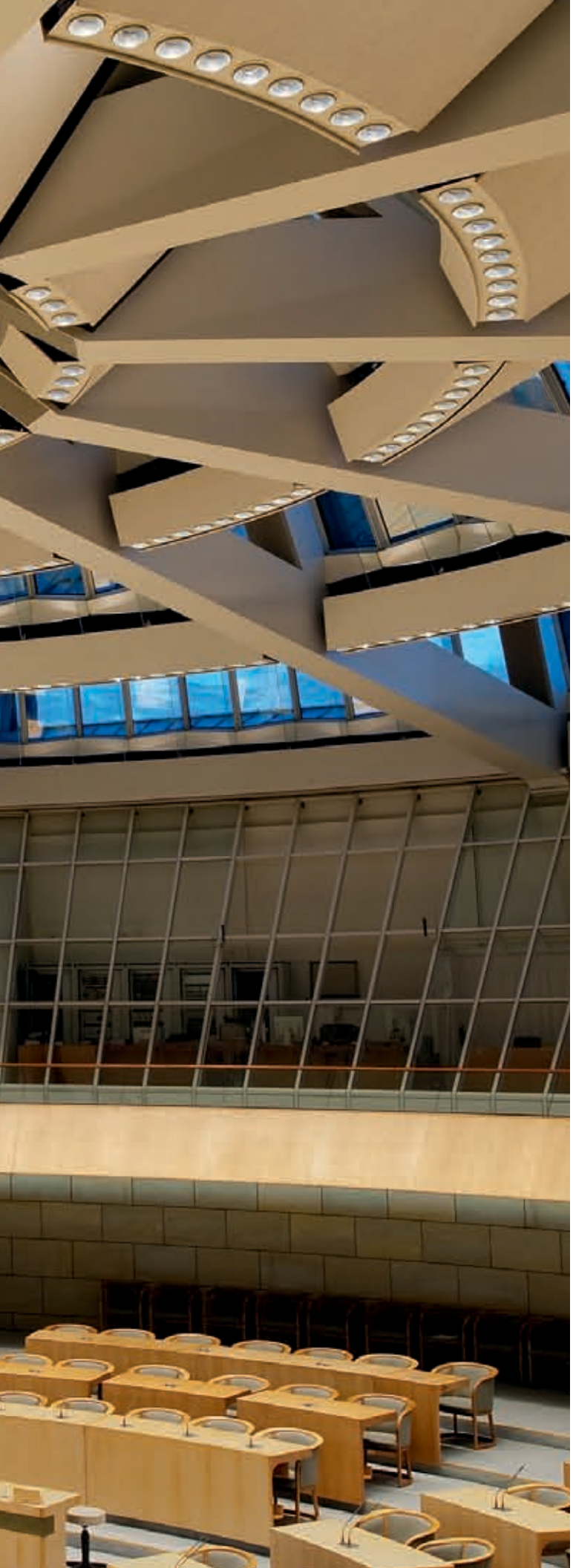
For a full list of available drivers for indoor and outdoor applications, please visit www.philips.com/advance-literature.



Coming Soon New Products

Fortimo LED Downlight System DLM Gen4

Fortimo LED Spotlight System SLM Gen3 COB

Fortimo LED Twistable Downlight Systems Gen2

Fortimo LED Line: Gen 2, Two-Foot, and High Lumen Module Systems

8. Restrictions on Hazardous Substances (RoHS) is a European directive (2002/95/EC) designed to limit the content of 6 substances [lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE)] in electrical and electronic products For products used in North America compliance to RoHS is voluntary and self-certified
9. Indicates that the LEDs are components recognized with UL and complies with UL8750 Standard for LEDs
10. Philips Fortimo _____Module is a Zhaga certified light engine. For more information visit www.zhagastandard.org
11. See www.philips.com/ledmodulesna and click on the appropriate product for complete warranty details
12. Product is listed with Underwriters Laboratories, Inc. Go to www.ul.com for more information

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