

PHILIPS

LED Modules

Fortimo LED Line

2ft 2200lm 1R LV3



Fortimo LED Line Gen 3 will enable you to upgrade your linear LED luminaires to latest high-performance technology while offering the freedom to tune and differentiate on lumen output, efficacy and lifetime while delivering into a common footprint and enabling easy generation change.

The Fortimo LED Line 1R system, with 1 row of LEDs on the module, is ideal for applications requiring beam shaping. The Fortimo LED Line 3R systems have been designed for applications where diffuse lighting is key.

The Fortimo LED Line family was upgraded with better color consistency of 3 SDCM. Light sources with good color consistency are recommended in color-critical applications, such as in hospitals or art galleries.

Commercial Product Name	12NC
Fortimo LED Line 2ft 2200lm 830 1R LV3	929000919906
Fortimo LED Line 2ft 2200lm 835 1R LV3	929000920006
Fortimo LED Line 2ft 2200lm 840 1R LV3	929000920106
Fortimo LED Line 2ft 2200lm 850 1R LV3	929000920206

Fortimo LED Line 2ft 2200lm 1R LV3

Features

- High energy efficiency of up to 152 lm/W
- CRI > 80 and 3 SDCM Color Consistency
- Variation of Color Temperatures (3000K, 3500K, 4000K, 5000K)
- Long product lifetime of > 50,000 hrs¹
- Push-in connectors
- Zhaga compliant²
- 5-year limited system warranty³

Benefits

- Low total cost of ownership through reduced energy consumption
- High quality of light
- Easy wiring
- Backward compatible to previous generations

Applications

- Office
- Industry
- Retail

Optical Characteristics – Table per CCT

Fortimo LED Line 2ft 2200lm 830 1R LV3

Parameter	Min	Typ	Max	Unit
Luminous Flux		2092		Lm
Lumen Efficiency		145		Lm/W
Forward Current		468		mA
Forward Voltage	29.4	30.9	32.4	V
Correlated Color Temperature (CCT) Target		3000		K
CRI	80			-
Radiation Angle		120		deg

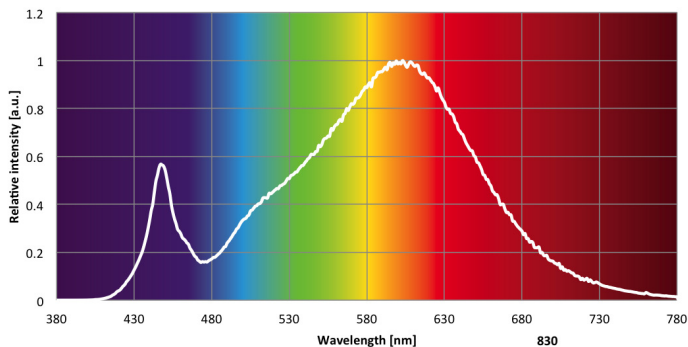
Nominal temperature for performance specification: T_c = 45°C

Color consistency of 3 SDCM, averaged over the module.

Tolerance for flux data is ±7.5%.

Tolerance for efficacy data is ±10%.

Measurement tolerance is ± 2.5% for the flux data and 5% for the efficacy data.



Footnotes on page 10.

Fortimo LED Line 2ft 2200lm 1R LV3

Optical Characteristics – Table per CCT

Fortimo LED Line 2ft 2200lm 835 1R LV3

Parameter	Min	Typ	Max	Unit
Luminous Flux		2157		Lm
Lumen Efficiency		149		Lm/W
Forward Current		468		mA
Forward Voltage	29.4	30.9	32.4	V
Correlated Color Temperature (CCT) Target		3500		K
CRI	80			-
Radiation Angle		120		deg

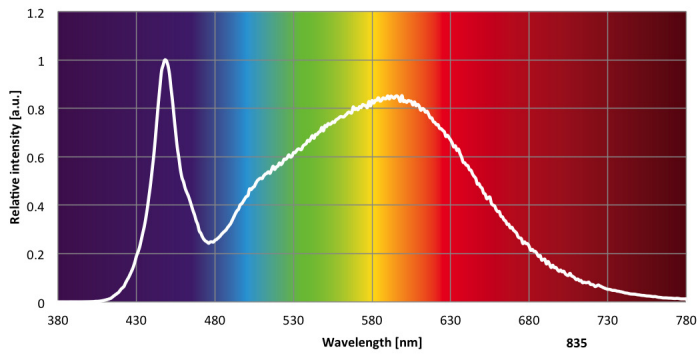
Nominal temperature for performance specification: $T_c = 45^\circ\text{C}$

Color consistency of 3 SDCM, averaged over the module.

Tolerance for flux data is $\pm 7.5\%$.

Tolerance for efficacy data is $\pm 10\%$.

Measurement tolerance is $\pm 2.5\%$ for the flux data and 5% for the efficacy data.



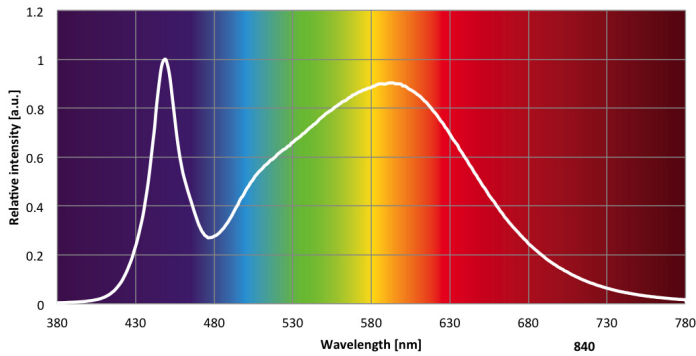
Fortimo LED Line 2ft 2200lm 1R LV3

Optical Characteristics – Table per CCT

Fortimo LED Line 2ft 2200lm 840 1R LV3

Parameter	Min	Typ	Max	Unit
Luminous Flux		2200		Lm
Lumen Efficiency		152		Lm/W
Forward Current		468		mA
Forward Voltage	29.4	30.9	32.4	V
Correlated Color Temperature (CCT) Target		4000		K
CRI	80			-
Radiation Angle		120		deg

Nominal temperature for performance specification: $T_c = 45^\circ\text{C}$
 Color consistency of 3 SDCM, averaged over the module.
 Tolerance for flux data is $\pm 7.5\%$.
 Tolerance for efficacy data is $\pm 10\%$.
 Measurement tolerance is $\pm 2.5\%$ for the flux data and 5% for the efficacy data.



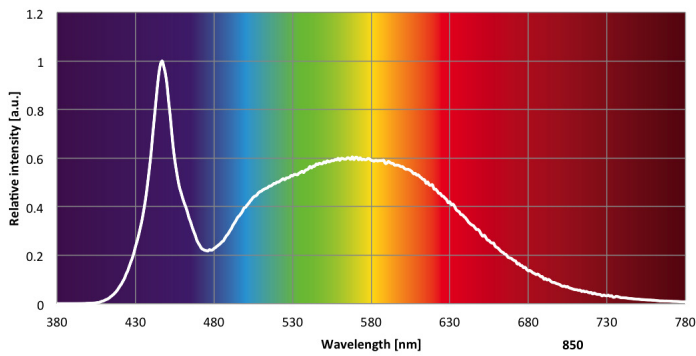
Fortimo LED Line 2ft 2200lm 1R LV3

Optical Characteristics – Table per CCT

Fortimo LED Line 2ft 2200lm 850 1R LV3

Parameter	Min	Typ	Max	Unit
Luminous Flux		2200		Lm
Lumen Efficiency		152		Lm/W
Forward Current		468		mA
Forward Voltage	29.4	30.9	32.4	V
Correlated Color Temperature (CCT) Target		5000		K
CRI	80			-
Radiation Angle		120		deg

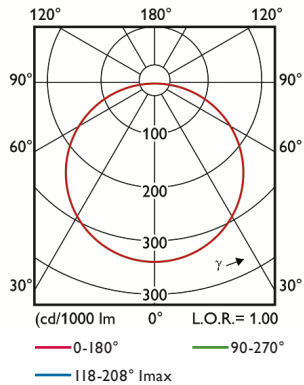
Nominal temperature for performance specification: $T_c = 45^\circ\text{C}$
 Color consistency of 3 SDCM, averaged over the module.
 Tolerance for flux data is $\pm 7.5\%$.
 Tolerance for efficacy data is $\pm 10\%$.
 Measurement tolerance is $\pm 2.5\%$ for the flux data and 5% for the efficacy data.



Fortimo LED Line 2ft 2200lm 1R LV3

Beam Shape

The Philips Fortimo LED Line generates a Lambertian beam shape, which is a pragmatic starting point for OEMs wishing to design secondary optics.



Electrical Characteristics

Parameter	Min	Typ	Max	Unit
Nominal Current		468	700	mA
Forward Voltage	29.4	30.9	32.4	V
Power Consumption	13.8	14.5	15.2	W
Forward Voltage Bins		2 (C and D)		

Note: Specifications stated at Tc nom = 45°C and I nom = 468 mA

Lifetime

Parameter	Nominal *	Life**	Max***
Tc [°C]	45	70	80
Current [mA]	468	600	700

* Nominal value at which typical performance is specified

** Value at which lifetime L70B50 ≥ 50,000hr is specified (max current for warranty)

*** Maximum value for safe operation; do not operate above this value

Parameter	Min	Typ	Max	Units
Δu'v' at 6000 Hours			0.007	—

Note: Specifications stated while Tc < 70°C and I < 600 mA

Abs Max Ratings

Parameter	Min	Typ	Max	Unit
Current Imax			700	mA
Case Temperature Tc Max			80	°C
ESD (Direct Contact)			8	kV
ESD (Air)			15	kV
Working Voltage (Between input to metal mounting plate)			120	Vdc
Voltage Strength (Input to metal mounting plate)			1240	Vdc
Ambient Temperature	-40			°C
Number of Modules per Chain			2	

Fortimo LED Line 2ft 2200lm 1R LV3

Wiring

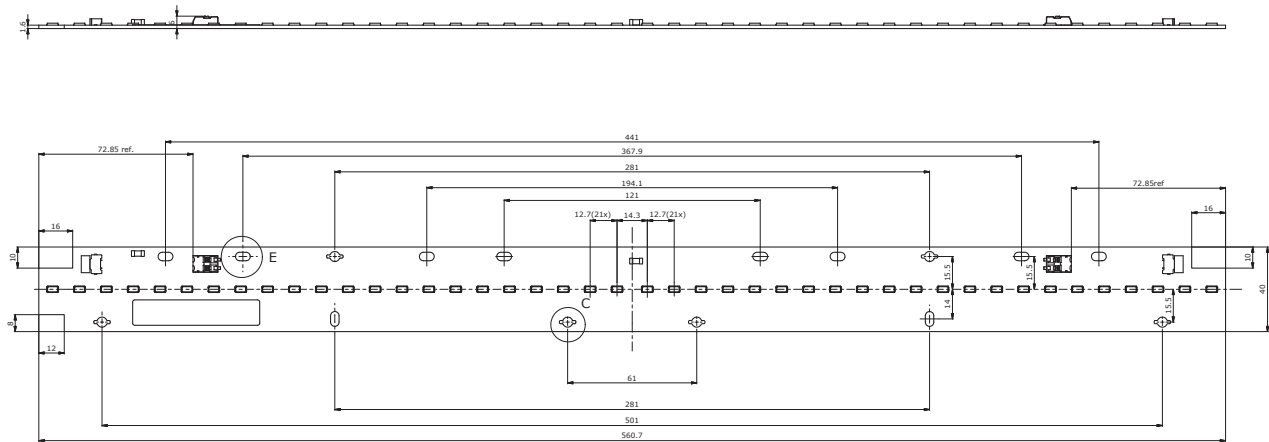
Specification Item	Value	Unit	Condition
Input Wire Cross-Section	0.2...0.75	mm ²	solid
	18...24	AWG	
	0.3...0.5	mm ²	stranded
	20...22	AWG	
Input Wire Strip Length	7.5...8.5	mm	
Tested Cable Length	4000	mm	Total length of wiring including LED modules, one way

Note: Connector suited for robot wiring

Mechanical Characteristics

Parameter	Min	Typ	Max	Unit
Length	560.2	560.7	561.2	mm
Width	39.5	40	40.5	mm
Height Excl. Connector	2.0	2.1	2.2	mm
Height Incl. Connector	5.6	5.8	6	mm
Warpage (IPC-TM-650)			4	%

Note: Bow & Twist of the PCB after production tested and released according IPC-TM-650 2.4.22



Fortimo LED Line 2ft 2200lm 1R LV3

Application Information

Compliance and Approval

IEC / EN 62031, IEC / EN 62471, UL8750 (UL recognized)

Environmental

RoHS / REACH

Application Information

Zhaga ²	
Designation of the Book-7 LLE Category	L56W4
Luminous Flux Category	C020
CCT Category	3000K, 3500K, 4000K, 5000K
CRI	80
The Position of the Temperature Measurement Point T _p	same as T _c point
The Value of T _p , Max [°C]	45

IP Rating	No IP rating
Overheating Protection	No protection
Luminaire Class	UL Class 2

Warranted Number of Full Thermal Product Cycles @ 25°C Ambient Temperature

Warranted number of full thermal product cycles at which the survival rate of the population $\geq 90\%$, at 25°C ambient temperature.

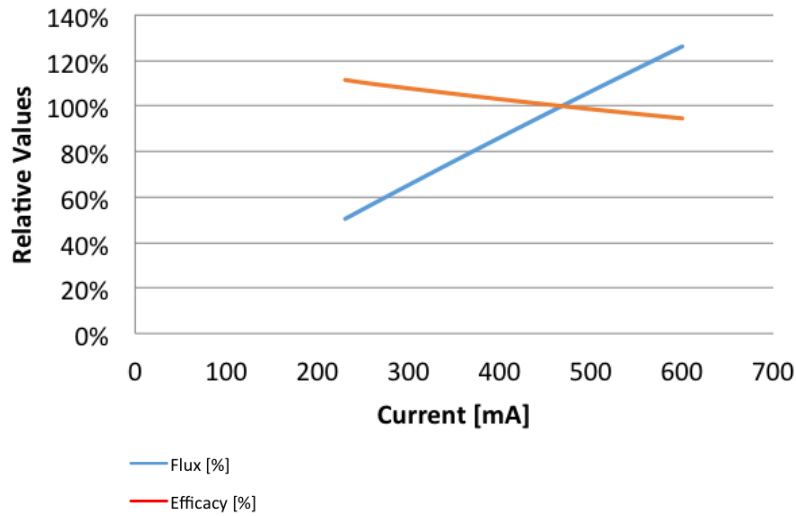
Case Temperature T _c [°C]	Amount of Cycles
70	14600

Footnotes on page 10.

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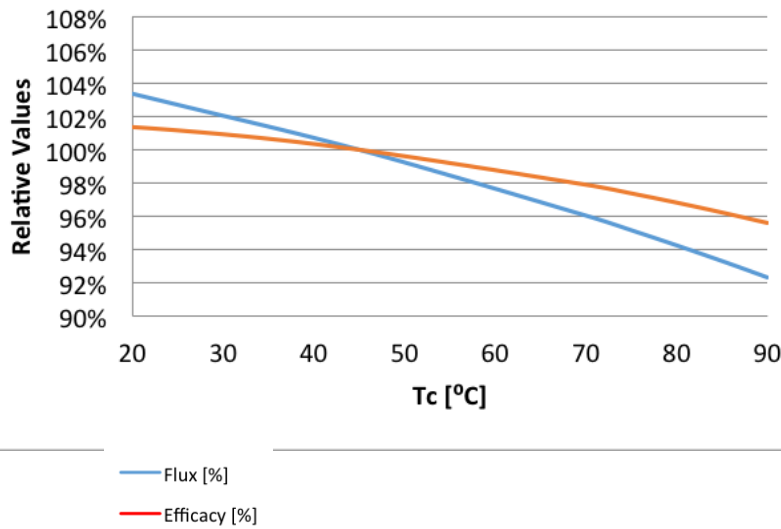
Tuning Information

Flux and Efficacy Vs. Current



I [A]	Flux [%]	Efficacy [%]
230	50%	111%
280	61%	109%
340	74%	106%
400	86%	103%
468	100%	100%
520	110%	98%
600	126%	95%

Flux and Efficacy Vs. Temperature at Tc



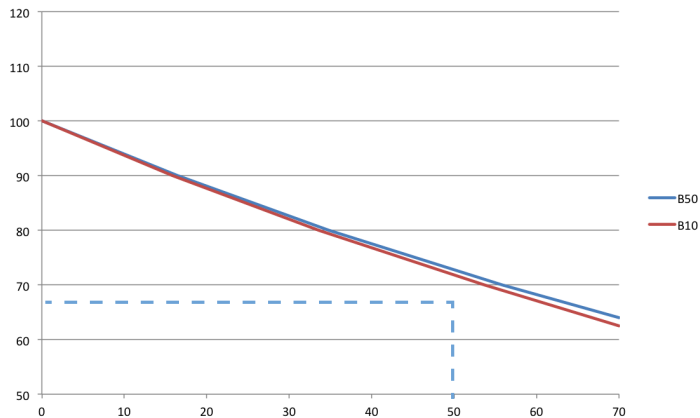
Tc [°C]	Flux [%]	Efficacy [%]
70	96%	98%
45	100%	100%
25	103%	101%
0	106%	102%

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Lumen Maintenance

Lumen Maintenance: at I Life and Tc Life Conditions

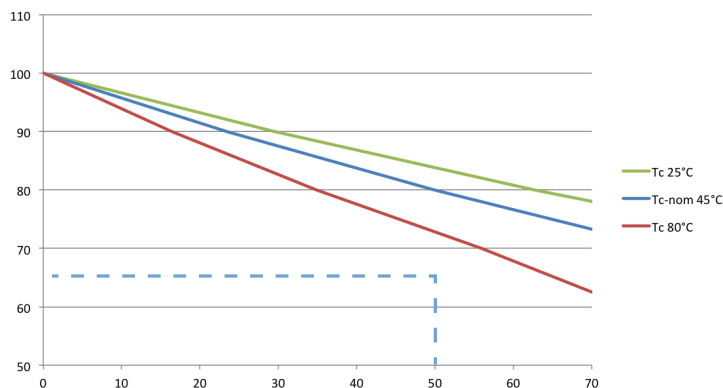
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Lumen depreciation as a function of operating hours for I-life and Tc-life.

Lumen Maintenance (B50): at Current I Life

Fortimo LED Line 2ft 2200lm 1R LV3



Lumen depreciation as a function of operating hours at different Tc values and I-life.

1. 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 56°C for 3R and 61°C for 1R.
2. Philips Fortimo LED Line 2ft 2200lm 3R LV3 Module is a Zhaga certified light engine. Visit www.zhagastandard.org for more information.
3. View limited warranty at http://www.usa.lighting.philips.com/connect/tools_literature/warranties.wpd for details and restrictions.



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