

# PHILIPS

## LED Modules

Fortimo LED Strip  
NA LV4

24in 2200lm



Philips Fortimo LED strip module NA LV4 comes with a multitude of performance and product advancements that include higher efficacy, higher lumen output, increased lumen maintenance, additional mechanical designs and additional CCT and CRI options when compared to the previous generation (LV3).

With these advancements, the Fortimo LED strip module is the ideal choice for high-performance high-quality luminaires for direct and indirect lighting in offices, banks, schools, public buildings, supermarkets and other applications to replace high energy efficiency T5 fluorescent lighting.

Commercial Product Name	12NC
Fortimo LED Strip 24in 2200lm 830 NA LV4	929000777813
Fortimo LED Strip 24in 2200lm 835 NA LV4	929000777913
Fortimo LED Strip 24in 2200lm 840 NA LV4	929000778013
Fortimo LED Strip 24in 2200lm 850 NA LV4	929000778113
Fortimo LED Strip 24in 2200lm 927 NA LV4	929000778213
Fortimo LED Strip 24in 2200lm 930 NA LV4	929000778313
Fortimo LED Strip 24in 2200lm 935 NA LV4	929000778413
Fortimo LED Strip 24in 2200lm 940 NA LV4	929000778513

# Fortimo LED strip 24in 2200lm NA LV4

## Features

- High flux density of up to 1500 lm per foot
- Narrow width of only 20mm
- High energy efficacy of up to 181 lm/W
- High lumen maintenance (TM21) of L90 36,000 hours
- CRI 80 and CRI90 color options and 3 SDCM color consistency

## Benefits

- High energy efficacy and long lifetime<sup>1</sup> provide optimized total cost of ownership
- Slim width and 4ft length provide excellent design-in options and assembly
- High quality and warm color temperatures of light enables new application areas like hospitality
- 5-year limited system warranty with Philips Advance Xitanium LED drivers<sup>2</sup>
- Specifications enable DLC Premium category<sup>3</sup>

## Applications

- Retail
- Hospitality
- Office

## Optical Characteristics – Table per CCT

**Fortimo LED Strip 24in 2200lm 830 NA LV4**

Parameter	Min	Typ	Unit
Luminous Flux		2070	Lm
Lumen Efficiency		170	Lm/W
Forward Current		360	mA
Correlated Color Temperature (CCT) Target		3000	K
CRI	80		-
Radiation Angle		120	deg

Parameter at $I_{life}$	Typ	Unit
Luminous Flux	2821	Lm
Lumen Efficiency	149	Lm/W
Forward Current	540	mA

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

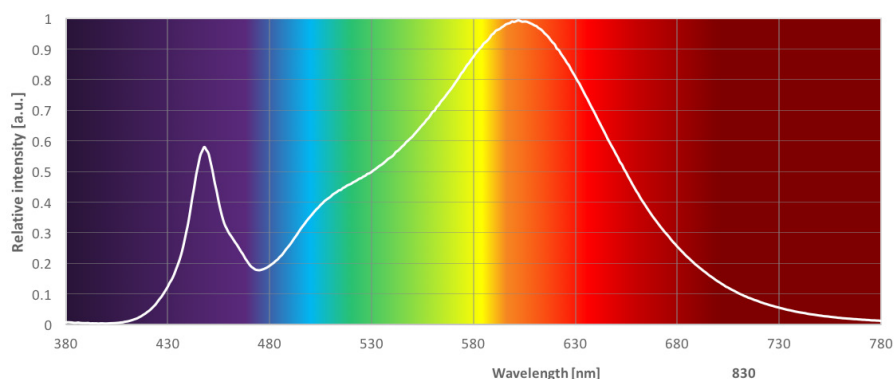
Max performance values at  $I_{life}$ .

Color consistency of 3 SDCM, averaged over the module.

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

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

Philips maintains a tester tolerance of  $\pm 5\%$  on flux,  $\pm 0.005$  on color,  $\pm 1.5$  on CRI,  $\pm 3\%$  on  $V_f$ ,  $\pm 3.3\%$  on power,  $\pm 6\%$  on efficiency.



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  $T_c$  point.
2. View limited warranty at <http://www.usa.lighting.philips.com/support/support/warranty> for details and restrictions.
3. Fortimo LED strip NA LV4 is not a DesignLights Consortium™ (DLC) qualified product. It is an OEM component that meets certain performance specifications that are geared toward meeting DLC Standard Tier (v4.0) in a fully assembled fixture. The customer is liable for proper design, manufacturing, testing and qualification according to DLC requirements.

# Fortimo LED strip 24in 2200lm NA LV4

## Optical Characteristics – Table per CCT

Fortimo LED Strip 24in 2200lm 835 NA LV4			
Parameter	Min	Typ	Unit
Luminous Flux		2130	Lm
Lumen Efficiency		175	Lm/W
Forward Current		360	mA
Correlated Color Temperature (CCT) Target		3500	K
CRI	80		-
Radiation Angle		120	deg

Parameter at $I_{life}$	Typ	Unit
Luminous Flux	2911	Lm
Lumen Efficiency	153	Lm/W
Forward Current	540	mA

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

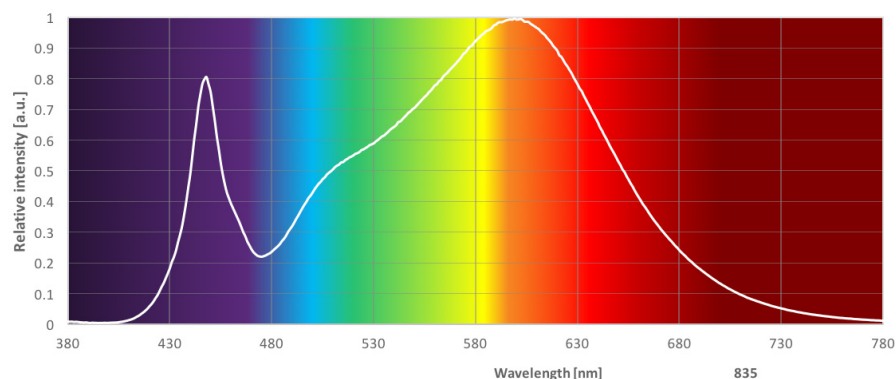
Max performance values at  $I_{life}$ .

Color consistency of 3 SDCM, averaged over the module.

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

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

Philips maintains a tester tolerance of  $\pm 5\%$  on flux,  $\pm 0.005$  on color,  $\pm 1.5$  on CRI,  $\pm 3\%$  on Vf,  $\pm 3.3\%$  on power,  $\pm 6\%$  on efficiency.



# Fortimo LED strip 24in 2200lm NA LV4

## Optical Characteristics – Table per CCT

Fortimo LED Strip 24in 2200lm 840 NA LV4			
Parameter	Min	Typ	Unit
Luminous Flux		2170	Lm
Lumen Efficiency		179	Lm/W
Forward Current		360	mA
Correlated Color Temperature (CCT) Target		4000	K
CRI	80		-
Radiation Angle		120	deg

Parameter at $I_{life}$	Typ	Unit
Luminous Flux	1484	Lm
Lumen Efficiency	156	Lm/W
Forward Current	270	mA

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

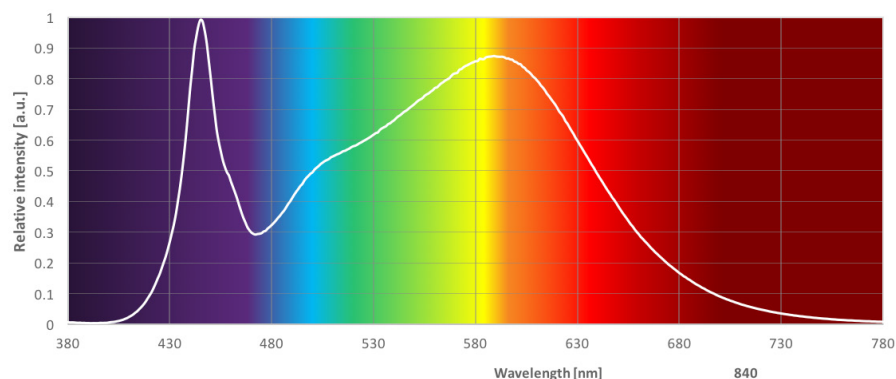
Max performance values at  $I_{life}$ .

Color consistency of 3 SDCM, averaged over the module.

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

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

Philips maintains a tester tolerance of  $\pm 5\%$  on flux,  $\pm 0.005$  on color,  $\pm 1.5$  on CRI,  $\pm 3\%$  on Vf,  $\pm 3.3\%$  on power,  $\pm 6\%$  on efficiency.



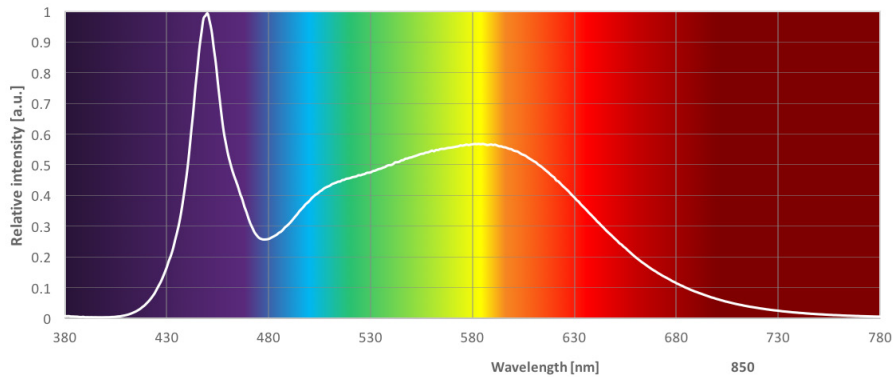
# Fortimo LED strip 24in 2200lm NA LV4

## Optical Characteristics – Table per CCT

Fortimo LED Strip 24in 2200lm 850 NA LV4			
Parameter	Min	Typ	Unit
Luminous Flux		2200	Lm
Lumen Efficiency		181	Lm/W
Forward Current		360	mA
Correlated Color Temperature (CCT) Target		5000	K
CRI	80		-
Radiation Angle		120	deg

Paramter at $I_{life}$	Typ	Unit
Luminous Flux	3000	Lm
Lumen Efficiency	158	Lm/W
Forward Current	540	mA

Nominal temperature for performance specification:  $T_c = 45^{\circ}\text{C}$ .  
Max performance values at  $I_{life}$ .  
Color consistency of 3 SDCM, averaged over the module.  
Tolerance for flux data is  $\pm 7.5\%$ .  
Tolerance for efficacy data is  $\pm 10\%$ .  
Philips maintains a tester tolerance of  $\pm 5\%$  on flux,  $\pm 0.005$  on color,  $\pm 1.5$  on CRI,  $\pm 3\%$  on Vf,  $\pm 3.3\%$  on power,  $\pm 6\%$  on efficiency.



# Fortimo LED strip 24in 2200lm NA LV4

## Optical Characteristics – Table per CCT

Fortimo LED Strip 24in 2200lm 927 NA LV4			
Parameter	Min	Typ	Unit
Luminous Flux		1620	Lm
Lumen Efficiency		133	Lm/W
Forward Current		360	mA
Correlated Color Temperature (CCT) Target		2700	K
CRI	90		-
Radiation Angle		120	deg

Parameter at $I_{life}$	Typ	Unit
Luminous Flux	2217	Lm
Lumen Efficiency	117	Lm/W
Forward Current	540	mA

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

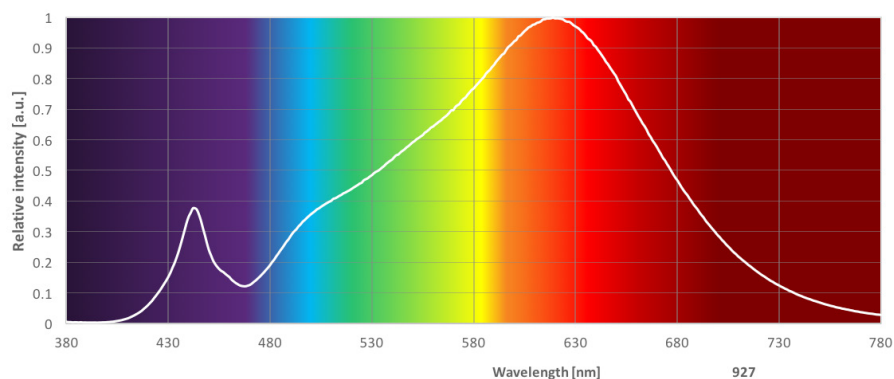
Max performance values at  $I_{life}$ .

Color consistency of 3 SDCM, averaged over the module.

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

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

Philips maintains a tester tolerance of  $\pm 5\%$  on flux,  $\pm 0.005$  on color,  $\pm 1.5$  on CRI,  $\pm 3\%$  on Vf,  $\pm 3.3\%$  on power,  $\pm 6\%$  on efficiency.



# Fortimo LED strip 24in 2200lm NA LV4

## Optical Characteristics – Table per CCT

Fortimo LED Strip 24in 2200lm 930 NA LV4			
Parameter	Min	Typ	Unit
Luminous Flux		1720	Lm
Lumen Efficiency		141	Lm/W
Forward Current		360	mA
Correlated Color Temperature (CCT) Target		3000	K
CRI	90		-
Radiation Angle		120	deg

Parameter at $I_{life}$	Typ	Unit
Luminous Flux	2343	Lm
Lumen Efficiency	123	Lm/W
Forward Current	540	mA

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

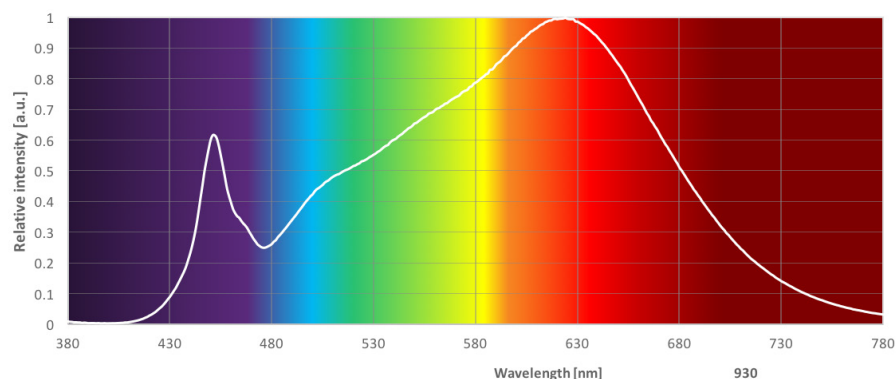
Max performance values at  $I_{life}$ .

Color consistency of 3 SDCM, averaged over the module.

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

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

Philips maintains a tester tolerance of  $\pm 5\%$  on flux,  $\pm 0.005$  on color,  $\pm 1.5$  on CRI,  $\pm 3\%$  on Vf,  $\pm 3.3\%$  on power,  $\pm 6\%$  on efficiency.



# Fortimo LED strip 24in 2200lm NA LV4

## Optical Characteristics – Table per CCT

Fortimo LED Strip 24in 2200lm 935 NA LV4			
Parameter	Min	Typ	Unit
Luminous Flux		1770	Lm
Lumen Efficiency		145	Lm/W
Forward Current		360	mA
Correlated Color Temperature (CCT) Target		3500	K
CRI	90		-
Radiation Angle		120	deg

Parameter at $I_{life}$	Typ	Unit
Luminous Flux	2414	Lm
Lumen Efficiency	127	Lm/W
Forward Current	540	mA

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

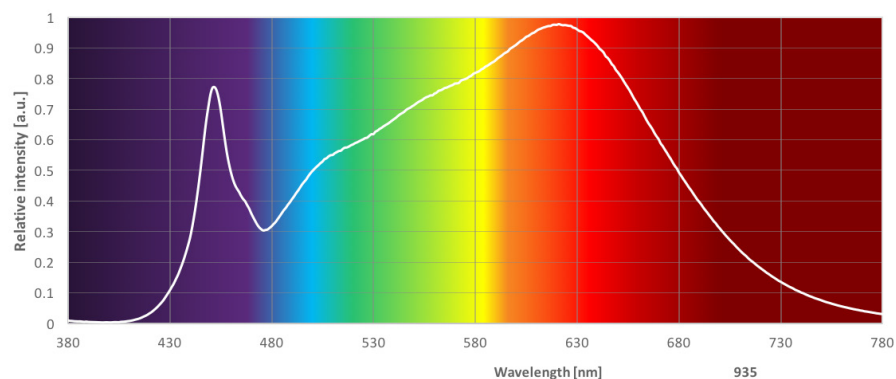
Max performance values at  $I_{life}$ .

Color consistency of 3 SDCM, averaged over the module.

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

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

Philips maintains a tester tolerance of  $\pm 5\%$  on flux,  $\pm 0.005$  on color,  $\pm 1.5$  on CRI,  $\pm 3\%$  on Vf,  $\pm 3.3\%$  on power,  $\pm 6\%$  on efficiency.





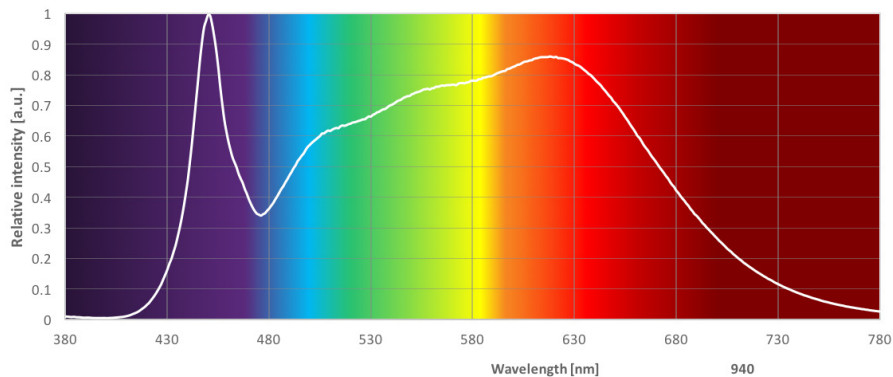
# Fortimo LED strip 24in 2200lm NA LV4

## Optical Characteristics – Table per CCT

Fortimo LED Strip 24in 2200lm 940 NA LV4			
Parameter	Min	Typ	Unit
Luminous Flux		1800	Lm
Lumen Efficiency		148	Lm/W
Forward Current		360	mA
Correlated Color Temperature (CCT) Target		4000	K
CRI	90		-
Radiation Angle		120	deg

Paramter at $I_{life}$	Typ	Unit
Luminous Flux	2464	Lm
Lumen Efficiency	130	Lm/W
Forward Current	540	mA

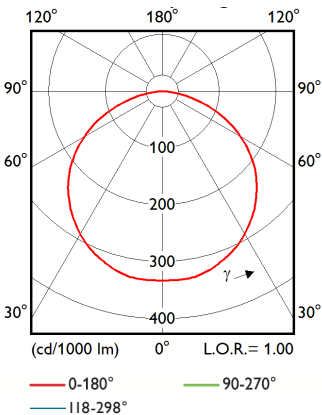
Nominal temperature for performance specification:  $T_c = 45^{\circ}\text{C}$ .  
Max performance values at  $I_{life}$ .  
Color consistency of 3 SDCM, averaged over the module.  
Tolerance for flux data is  $\pm 7.5\%$ .  
Tolerance for efficacy data is  $\pm 10\%$ .  
Philips maintains a tester tolerance of  $\pm 5\%$  on flux,  $\pm 0.005$  on color,  $\pm 1.5$  on CRI,  $\pm 3\%$  on Vf,  $\pm 3.3\%$  on power,  $\pm 6\%$  on efficiency.



# Fortimo LED strip 24in 2200lm NA LV4

## Beam Shape

The Philips Fortimo LED strip 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		360	560	mA
Forward Voltage	32.2	33.8	34.7	V
Power Consumption		12.2		W

## Forward Voltage Range

@ I <sub>nom</sub> and 45°C	Min.	Max.
Bin A [V]	32.2	33.5
Bin B [V]	33.4	34.7

## Lifetime

Parameter	Nominal *	Life**	Max***
T <sub>c</sub> [°C]	45	80	95
Current [mA]	360	540	560

\* Nominal value at which performance is specified

\*\* Value at which lifetime is specified (max current for warranty)

\*\*\* Maximum value for safety

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

Note: Specifications stated while T<sub>c</sub> < 80°C and I < 540 mA.

## Abs Max Ratings

Parameter	Min	Typ	Max	Unit
Current I <sub>max</sub>			560	mA
Case Temperature T <sub>c</sub> Max			95	°C
ESD (Direct Contact)			8	kV
ESD (Air)			15	kV
Isolation Breakdown Voltage	500			V <sub>dc</sub>
Ambient Temperature	-20 <sup>4</sup>			°C
Number of Modules per Chain			2	

4. There cannot be any ice/fog/mist on any part of the L2 surface during the application at -20°C.



# Fortimo LED strip 24in 2200lm NA LV4

## Application Information

### Compliance and Approval

UL & cUL – UL8750

### Environmental

RoHS / REACH

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

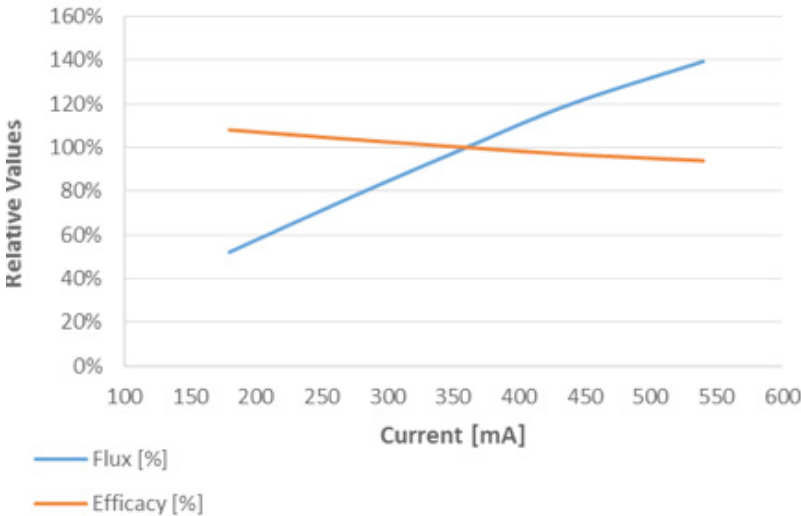
### Warranted Number of Full Thermal Product Cycles @ 25°C Ambient Temperature

Case Temperature Tc [°C]	Amount of Cycles
35	
40	
45	100,000
50	
55	100,000
60	
65	58,100
70	
75	27,600
80	14,200
85	
90	
95	

# Fortimo LED strip 24in 2200lm NA LV4

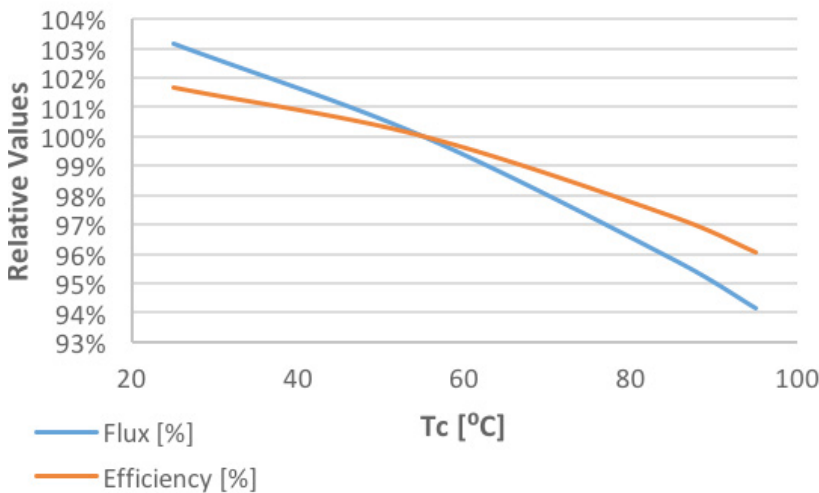
## Tuning Information

### Flux and Efficacy Vs. Current (at Nominal Temperature)



I [mA]	Flux [%]	Efficacy [%]
180	52%	108%
270	77%	104%
360	100%	100%
440	120%	97%
540	139%	94%

### Flux and Efficacy Vs. Tc



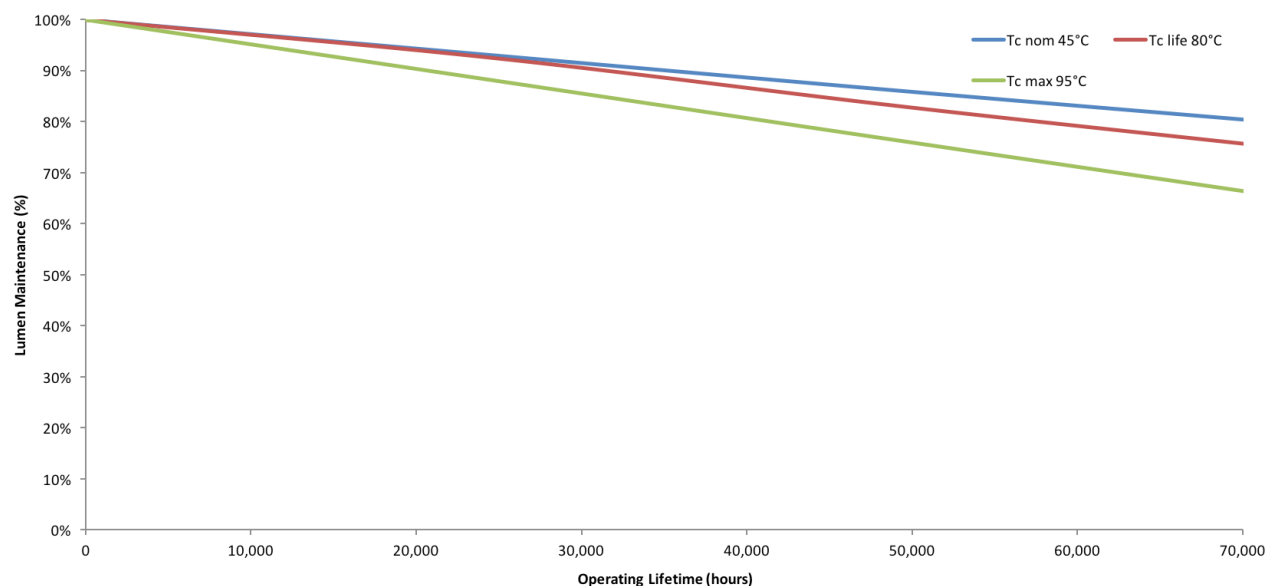
Tc [°C]	Flux [%]	Efficacy [%]
95	94%	96%
85	96%	97%
55	100%	100%
25	103%	102%

# Fortimo LED strip 24in 2200lm NA LV4

## Lumen Maintenance

### Lumen Maintenance: at I Life and Tc Life Conditions

Fortimo LED strip 24in 2200lm NA LV4



Lumen depreciation as a function of operating hours for I-life and Tc. 50,000 hours proven by certified laboratory.

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