

**PHILIPS**

**Fortimo**

**LED**

Fortimo LED Line 2ft  
2200lm 8xx 1R HV4



Datasheet

# Fortimo LED Line Gen4

Fortimo LED Line is designed to produce pure white light for general lighting applications with high efficiency levels. The Fortimo LED Line portfolio consists of 2 main ranges of products, which have been differentiated by the number of rows of LEDs on the module. Both ranges feature a variety of different length modules, lumen packages and color temperatures for all the different types of linear luminaires.

## Key features and benefits

- State-of-the-art LED module efficiency of up to 186 lm/W
- Long life-time: >50,000 hours
- High color rendering (CRI >80 and >90)
- Excellent color consistency of 3 SDCM
- Choice of color temperatures (3000, 4000 and 5000 K)
- Two module lengths: 1 ft/280 mm or 2 ft/560 mm
- Three lumen packages: 650, 1100, and 2000 lm per foot/280 mm
- LED module range with 1 or 3 rows of LEDs
- Tunable lumen output, efficacy and lifetime
- Push-in connectors enabling automated wiring
- Wide temperature (Tc) range from -40 °C up to +90 °C
- Five year system warranty

May 2017

 Zhaga

## Ordering data

Commercial product name	EOC	12NC	Box quantity
Fortimo LED Line 2ft 2200lm 830 1R HV4	8718696 686423 00	9290 015 42606	180
Fortimo LED Line 2ft 2200lm 840 1R HV4	8718696 686447 00	9290 015 42706	180
Fortimo LED Line 2ft 2200lm 850 1R HV4	8718696 686461 00	9290 015 42806	180

## Drive currents

Parameter	Nominal*	Life**	Max***	Unit
Fortimo LED Line 2ft 2200lm 8xx 1R HV4	204	300	380	mA

## Module temperatures

Parameter	Nominal*	Life**	Max***	Unit
T <sub>c</sub> (case temperature at T <sub>c</sub> point)	45	80	80	°C

\* Nominal value at which typical performance is specified

\*\* Value at which life time is specified

\*\*\* Maximum value for safe operation, do not operate above this value

## Optical characteristics - table per color (CCT)

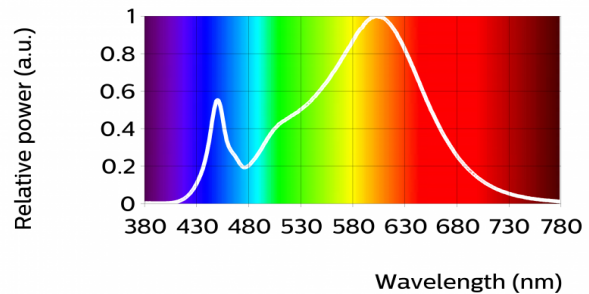
### Fortimo LED Line 2ft 2200lm 830 1R HV4

Parameter	Min	Typ	Max	Unit
Luminous flux	1933	2090	2247	lm
Module efficacy	148	164	180	lm/W
Correlated color temperature (CCT)		3000		K
Color coordinates (CIEx, CIEy)		(0.433, 0.400)		-
Color consistency			3	SDCM
CRI	80			
Radiation angle		120		deg
Photobiological safety			RG1	
Energy efficiency label		A++		
$\Delta u'v'$ at 6000 hours			0.007	

R9=7

Measurement precision  $\pm 5\%$  for the flux data and  $\pm 6\%$  for the efficacy data. Measurement precision for color coordinates  $\pm 0.005$ . Measurement precision for CRI  $\pm 1.5$

Operation point	830	lm	lm/W
80% I-nom 163mA	Tc 25 °C	1735	172
	Tc-nom 45 °C	1696	169
	Tc-life 80 °C	1620	163
I-nom 204mA	Tc 25 °C	2139	167
	Tc-nom 45 °C	2090	164
	Tc-life 80 °C	1996	158
I-life 300mA	Tc 25 °C	3047	157
	Tc-nom 45 °C	2977	154
	Tc-life 80 °C	2840	149



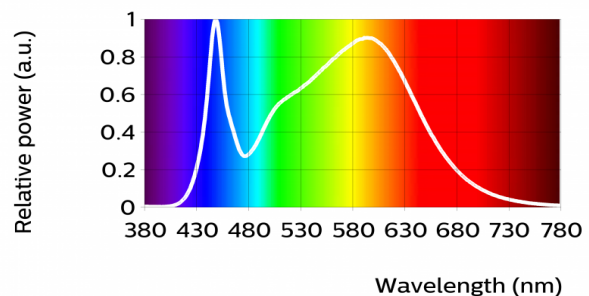
### Fortimo LED Line 2ft 2200lm 840 1R HV4

Parameter	Min	Typ	Max	Unit
Luminous flux	2035	2200	2365	lm
Module efficacy	155	173	190	lm/W
Correlated color temperature (CCT)		4000		K
Color coordinates (CIEx, CIEy)		(0.383, 0.375)		-
Color consistency			3	SDCM
CRI	80			
Radiation angle		120		deg
Photobiological safety			RG1	
Energy efficiency label		A++		
$\Delta u'v'$ at 6000 hours			0.007	

R9=6

Measurement precision  $\pm 5\%$  for the flux data and  $\pm 6\%$  for the efficacy data. Measurement precision for color coordinates  $\pm 0.005$ . Measurement precision for CRI  $\pm 1.5$

Operation point	840	lm	lm/W
80% I-nom 163mA	Tc 25 °C	1826	181
	Tc-nom 45 °C	1785	178
	Tc-life 80 °C	1705	172
I-nom 204mA	Tc 25 °C	2251	176
	Tc-nom 45 °C	2200	173
	Tc-life 80 °C	2101	167
I-life 300mA	Tc 25 °C	3208	165
	Tc-nom 45 °C	3134	162
	Tc-life 80 °C	2991	157



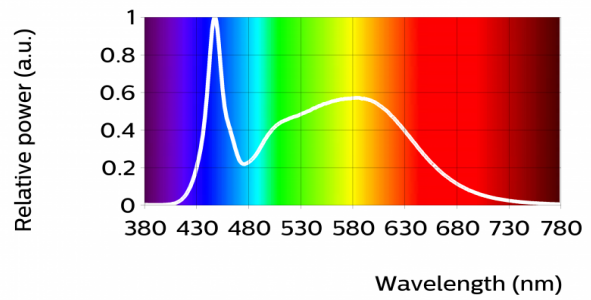
Fortimo LED Line 2ft 2200lm 850 1R HV4

Parameter	Min	Typ	Max	Unit
Luminous flux	2055	2222	2389	lm
Module efficacy	157	174	192	lm/W
Correlated color temperature (CCT)		5000		K
Color coordinates (CIEx, CIEy)		(0.345, 0.352)		-
Color consistency			3	SDCM
CRI	80			
Radiation angle		120		deg
Photobiological safety			RG1	
Energy efficiency label		A++		
$\Delta u'v'$ at 6000 hours			0.007	

R9=8

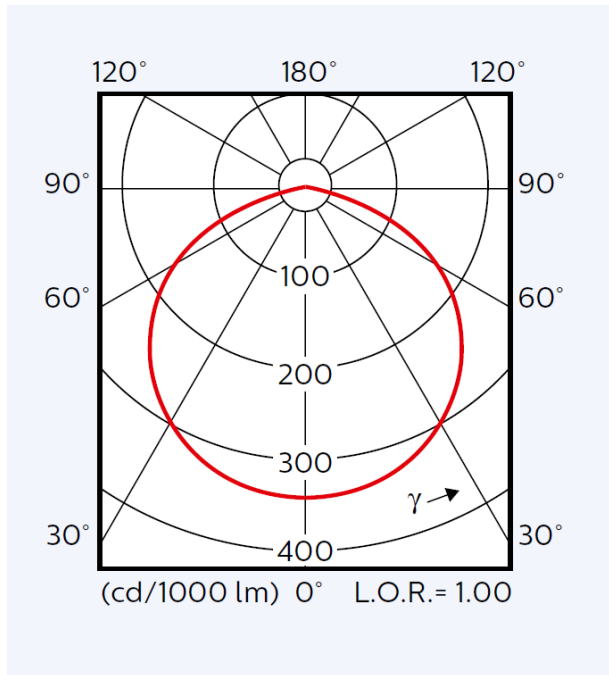
Measurement precision  $\pm 5\%$  for the flux data and  $\pm 6\%$  for the efficacy data. Measurement precision for color coordinates  $\pm 0.005$ . Measurement precision for CRI  $\pm 1.5$

Operation point	850	lm	lm/W
80% I-nom 163mA	Tc 25 °C	1844	182
	Tc-nom 45 °C	1803	179
	Tc-life 80 °C	1722	173
I-nom 204mA	Tc 25 °C	2274	177
	Tc-nom 45 °C	2222	174
	Tc-life 80 °C	2122	168
I-life 300mA	Tc 25 °C	3241	167
	Tc-nom 45 °C	3166	164
	Tc-life 80 °C	3022	158



## Beam shape

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



## Electrical characteristics

[Fortimo LED Line 2ft 2200lm 830 1R HV4](#)  
[Fortimo LED Line 2ft 2200lm 840 1R HV4](#)  
[Fortimo LED Line 2ft 2200lm 850 1R HV4](#)

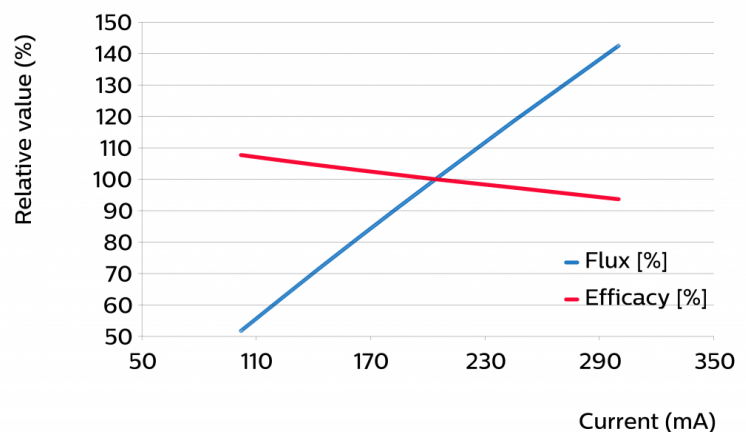
Parameter	Min	Typ	Max	Unit
Forward voltage	60.5	62.5	64.6	V
Power consumption	12.3	12.7	13.2	W
Number of modules in series per chain			4	

Measurement precision for Vf +/- 3%. Measurement precision for power +/- 3.3%  
 Specifications stated at Tc-nom and I-nom  
 Bins D and I

## Tuning information

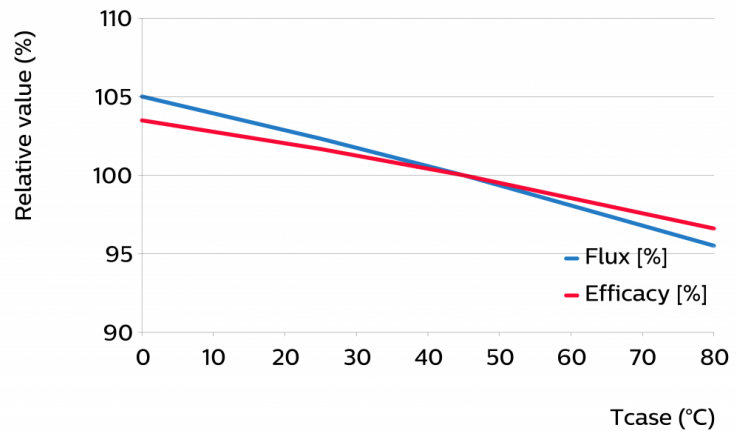
Flux and efficacy versus current (at Tc nominal)

I [mA]	Flux [%]	Efficacy [%]
300	142	94
245	118	97
204	100	100
184	91	101
163	81	103
143	71	104
122	62	106
102	52	108



Flux and efficacy versus temperature at Tc (at I nominal)

Tcase [°C]	Flux [%]	Efficacy [%]
80	96	97
45	100	100
25	102	102
0	105	103



## Lumen maintenance

Operation point	Lumen maintenance x 1000 hours	L70			L80			L90		
		B50	B20	B10	B50	B20	B10	B50	B20	B10
80% I-nom 163mA	Tc 25°C	>70	>70	>70	>70	>70	>70	36	35	34
	Tc-nom 45°C	>70	>70	>70	64	63	61	30	29	29
	Tc-life 80°C	70	70	68	45	43	42	21	21	20
I-nom 204mA	Tc 25°C	>70	>70	>70	>70	70	69	34	33	32
	Tc-nom 45°C	>70	>70	>70	61	58	57	28	28	27
	Tc-life 80°C	68	65	64	42	41	40	20	19	19
I-life 300mA	Tc 25°C	>70	>70	>70	66	64	62	31	30	29
	Tc-nom 45°C	>70	>70	>70	55	53	52	26	25	25
	Tc-life 80°C	61	59	58	35	37	36	18	17	17

Values in the table are based on available LM80 LED data (12000 hours). Lumen maintenance will be updated once additional measurement data becomes available.

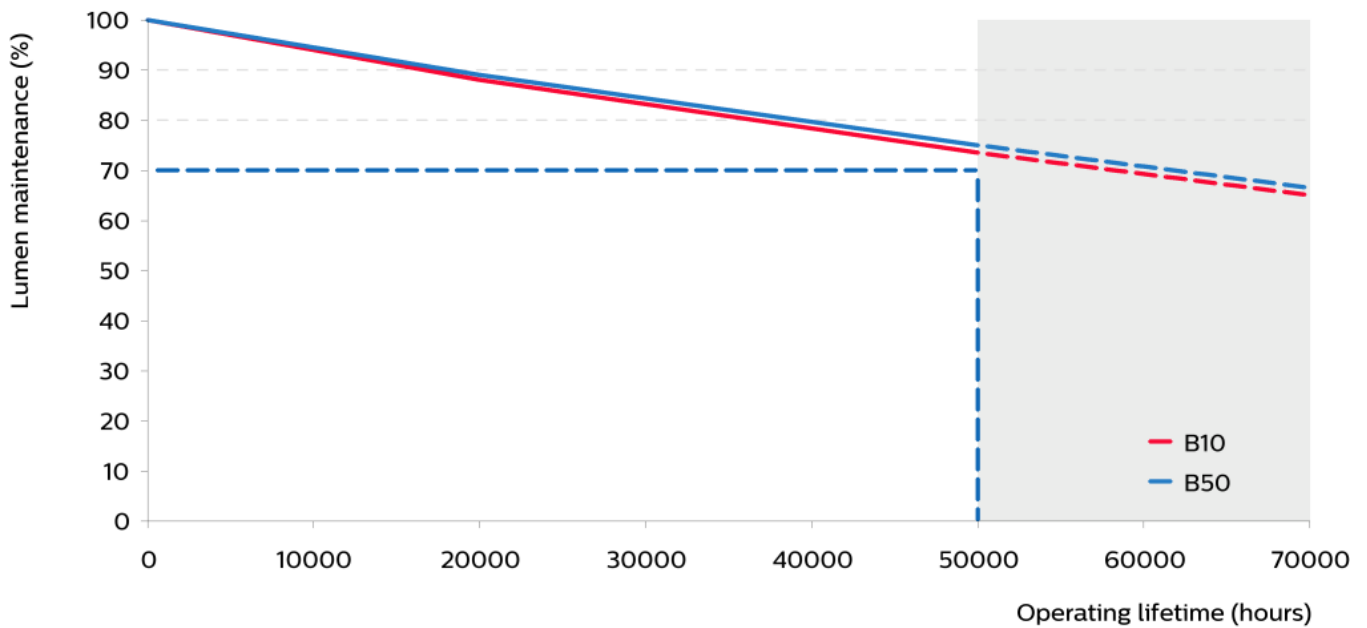
## Thermal switching table

Calculated number of switches at which the survival rate of the population  $\geq 90\%$ , at a given ambient temperature and delta T with respect to Tc (where  $T_c = T_{\text{ambient}} + \Delta T$ )

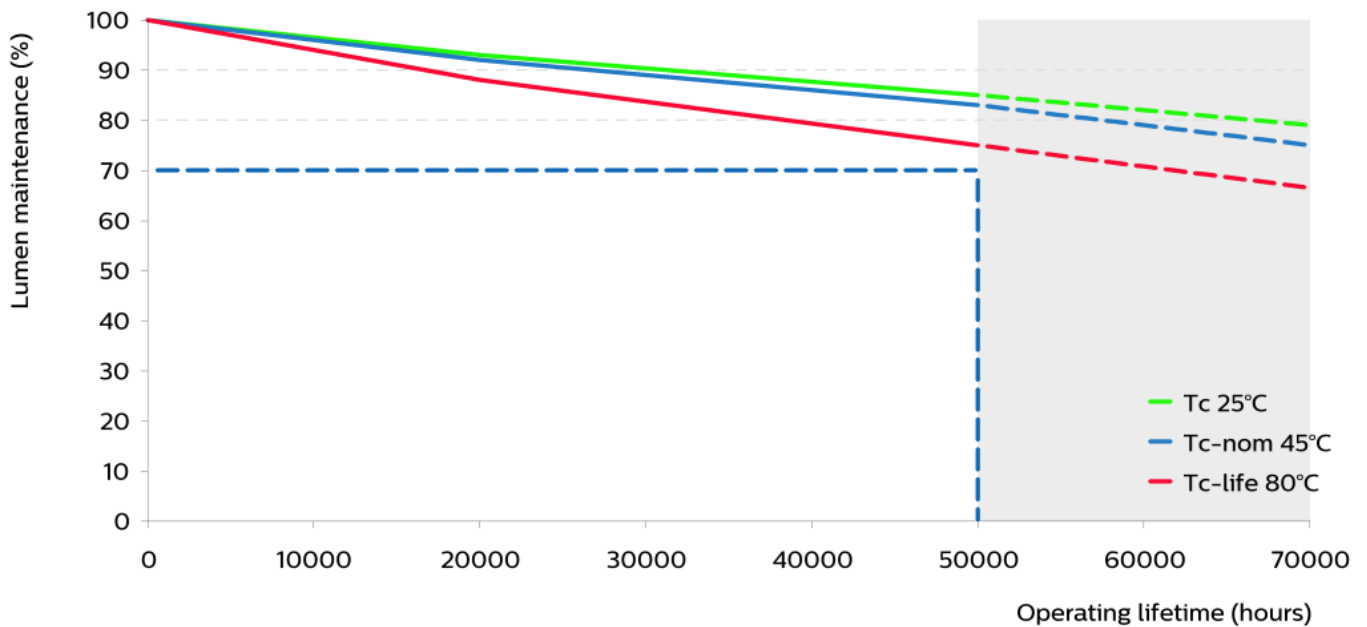
		Tambient [°C]											
		-40	-30	-20	-10	0	10	20	30	40	50	60	70
delta T [°C] (delta T = Tc - Tambient)	Continuous operation or dimming only	10	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k
		20	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	X
		30	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	X	X
		40	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	X	X	X
		50	57 k	57 k	57 k	57 k	57 k	57 k	57 k	X	X	X	X
		60	28 k	28 k	28 k	28 k	28 k	28 k	X	X	X	X	X
		70	16 k	16 k	16 k	16 k	16 k	X	X	X	X	X	X
		80	10 k	10 k	10 k	10 k	X	X	X	X	X	X	X
		90	6 k	6 k	6 k	X	X	X	X	X	X	X	X
		100	4 k	4 k	X	X	X	X	X	X	X	X	X

## Lumen maintenance graphs

### Lumen maintenance at I-life and Tc-life conditions

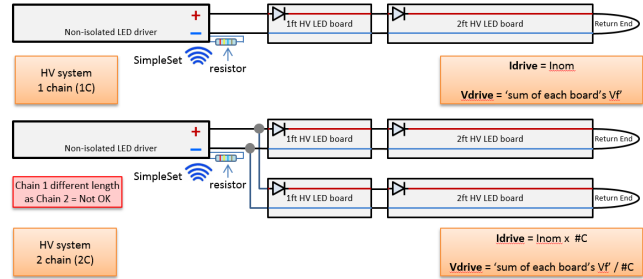


### Lumen maintenance for B50 at current I-life conditions



## Wiring

Specification item	Value	Unit	Condition
Input wire cross-section	0.33...0.5	mm <sup>2</sup>	stranded wire
	20...22	AWG	stranded wire
Input wire strip length	7.5...8.5	mm	
Input wire cross-section	0.33...0.75	mm <sup>2</sup>	solid, fused, stranded
	18...22	AWG	solid, fused, stranded
Input wire strip length	7.5...8.5	mm	

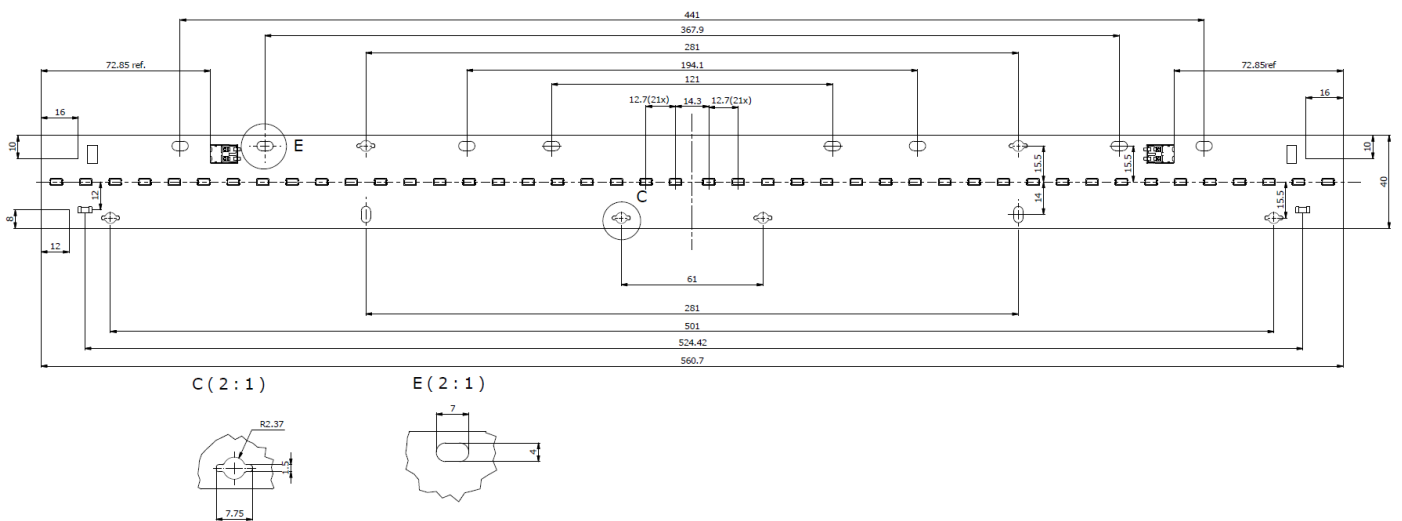


More information in the design-in guide of LED Linear modules.

## Mechanical characteristics

Fortimo LED Line 2ft 2200lm 830 1R HV4  
 Fortimo LED Line 2ft 2200lm 840 1R HV4  
 Fortimo LED Line 2ft 2200lm 850 1R HV4

Parameter	Min	Typ	Max	Unit
Length	560.2	560.7	561.2	mm
Width	39.5	40	40.5	mm
Height excl. connector	4.19	4.29	4.39	mm
Height incl. connector	5.6	5.8	6	mm
Warpage (IPC-TM-650)			0.75	%





## Absolute ratings

Parameter	Min	Typ	Max	Unit
Current through the LED module (I-max)			380	mA
Case temperature (Tc-max)			80	°C
Power at rated Vf-max and I-max			26.6	W
ESD (direct contact)			8	kV
ESD (air)			15	kV
Working voltage			420	V <sub>dc</sub>
Voltage strength	1840			V <sub>ac</sub>
Ambient temperature	-40			°C

## Application information

### Certificates and Standards

IEC 62384

IEC/TR 62278:2014

IEC 62031:2008 (First Edition) + A1:2012 + A2:2014

Relevant clauses of EN 62471:2008 (With IEC/TR 62471-2: 2009 and IEC/TR 62778: 2014)

ENEC+

CE

ENEC

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Compliant\*

\*L56W4

### Application

IP rating	No IP-rating
Overheating protection	No protection
Luminaire class	IEC Class I and IEC Class II
Dimming	Yes



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