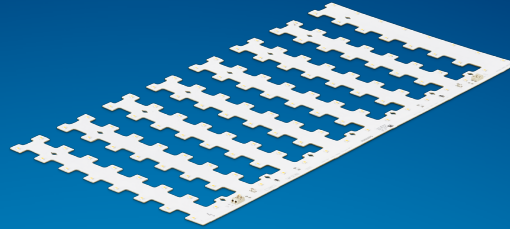


PHILIPS

Fortimo

LED

Fortimo LED Square
2500lm 8xx HV/LV2



Datasheet

Fortimo LED Square

Fortimo LED Square systems consist of white light LED modules with square outer dimensions delivering high energy efficiency and high quality of light. Fortimo LED Square systems are ideal for office applications where the luminaires require a very homogeneous exit surface window. Typical applications are recessed, surface mounted and suspended office luminaires.

Key features and benefits

- LED module efficiency up to 178 lm/W
- Long life-time: >50,000 hours
- High color rendering (CRI >80)
- Excellent color consistency of 3 SDCM
- Choice of color temperatures (3000 K, 4000 K and 6500 K)
- Two lumen packages: 1250lm and 2500lm
- Tunable lumen output, efficacy and lifetime
- Wide temperature (Tc) range from -40 °C to +80 °C
- Push-in connectors enabling automated wiring
- Five year system warranty

December 2016

Ordering data

Commercial product name	EOC	12NC	Box quantity
Fortimo LED Square 2500lm 830 HV/LV2	8718696 673867 00	9290 015 31906	20
Fortimo LED Square 2500lm 840 HV/LV2	8718696 673904 00	9290 015 32006	20
Fortimo LED Square 2500lm 865 HV/LV2	8718696 673942 00	9290 015 32106	20

Drive currents

Parameter	Nominal*	Life**	Max***	Unit
Fortimo LED Square 2500lm 8xx HV/LV2	320	700	700	mA

Module temperatures

Parameter	Nominal*	Life**	Max***	Unit
T _c (case temperature at T _c point)	45	65	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

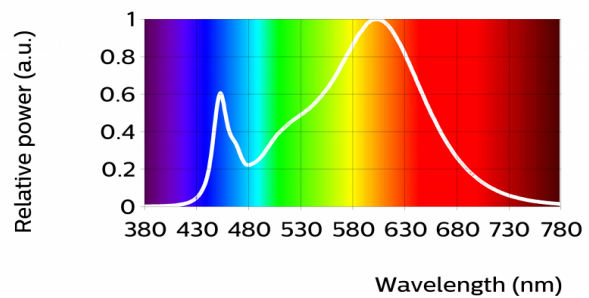
Optical characteristics - table per color (CCT)

Fortimo LED Square 2500lm 830 HV/LV2

Parameter	Min	Typ	Max	Unit
Luminous flux	2174	2350	2526	lm
Module efficacy	149	166	183	lm/W
Correlated color temperature (CCT)		3000		K
Color coordinates (CIEx, CIEy)		(0.434, 0.401)		-
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	

Measurement precision for flux +/- 5%. Measurement precision for efficacy +/- 6%. Measurement precision for x, y +/- 0.005. Measurement precision for CRI 1.5

Operation point	830	lm	lm/W
80% I-nom 256mA	Tc 25 °C	1914	169
	Tc-nom 45 °C	1875	168
	Tc-life 65 °C	1832	166
I-nom 320mA	Tc 25 °C	2396	167
	Tc-nom 45 °C	2350	165
	Tc-life 65 °C	2277	163
I-life 700mA	Tc 25 °C	5084	154
	Tc-nom 45 °C	4929	151
	Tc-life 65 °C	4757	147

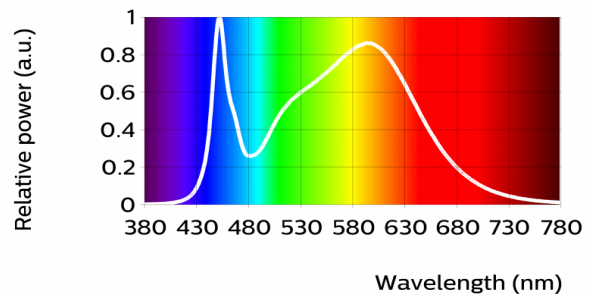


Fortimo LED Square 2500lm 840 HV/LV2

Parameter	Min	Typ	Max	Unit
Luminous flux	2312	2500	2688	lm
Module efficacy	159	177	195	lm/W
Correlated color temperature (CCT)		4000		K
Color coordinates (CIEx, CIEy)		(0.383, 0.380)		-
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	

Measurement precision for flux +/- 5%. Measurement precision for efficacy +/- 6%. Measurement precision for x, y +/- 0.005. Measurement precision for CRI 1.5

Operation point	840	lm	lm/W
80% I-nom 256mA	Tc 25 °C	2045	180
	Tc-nom 45 °C	2004	179
	Tc-life 65 °C	1957	177
I-nom 320mA	Tc 25 °C	2560	178
	Tc-nom 45 °C	2500	177
	Tc-life 65 °C	2433	174
I-life 700mA	Tc 25 °C	5432	164
	Tc-nom 45 °C	5267	161
	Tc-life 65 °C	5083	158

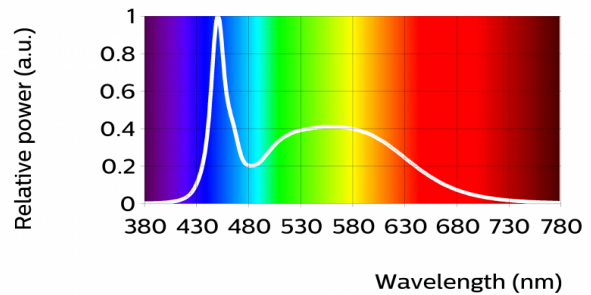


Fortimo LED Square 2500lm 865 HV/LV2

Parameter	Min	Typ	Max	Unit
Luminous flux	2313	2500	2688	lm
Module efficacy	159	177	195	lm/W
Correlated color temperature (CCT)		6500		K
Color coordinates (CIEx, CIEy)		(0.313, 0.328)		-
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	

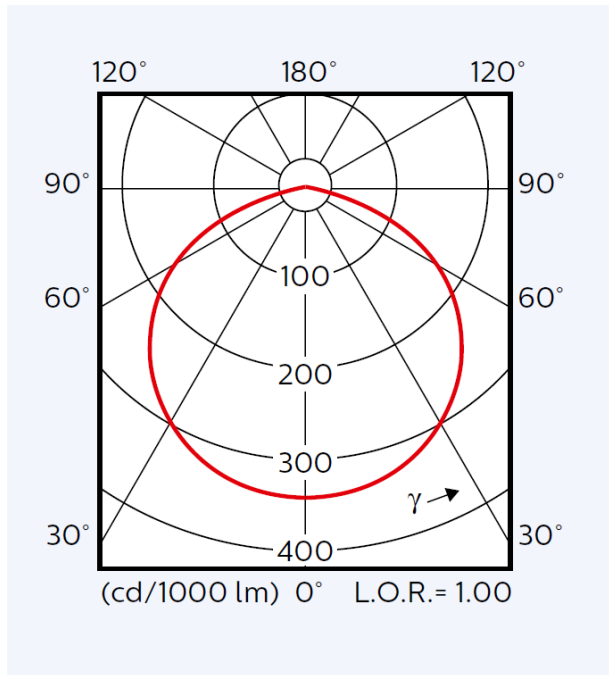
Measurement precision for flux +/- 5%. Measurement precision for efficacy +/- 6%. Measurement precision for x, y +/- 0.005. Measurement precision for CRI 1.5

Operation point	865	lm	lm/W
80% I-nom 256mA	Tc 25 °C	2045	180
	Tc-nom 45 °C	2004	179
	Tc-life 65 °C	1957	177
I-nom 320mA	Tc 25 °C	2560	178
	Tc-nom 45 °C	2500	177
	Tc-life 65 °C	2433	174
I-life 700mA	Tc 25 °C	5433	164
	Tc-nom 45 °C	5269	161
	Tc-life 65 °C	5085	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 Square 2500lm 830 HV/LV2](#)

[Fortimo LED Square 2500lm 840 HV/LV2](#)

[Fortimo LED Square 2500lm 865 HV/LV2](#)

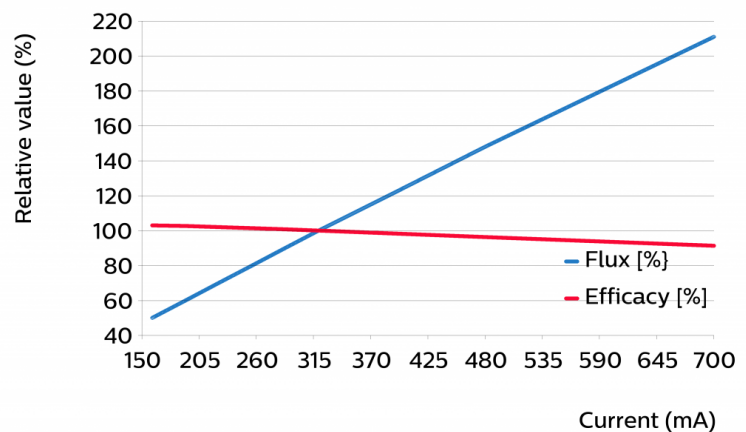
Parameter	Min	Typ	Max	Unit
Forward voltage	43.4	44.2	49.9	V
Power consumption	13.9	14.1	16.0	W
Number of modules in series per chain			6	
Number of modules in parallel per chain			2	

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

Tuning information

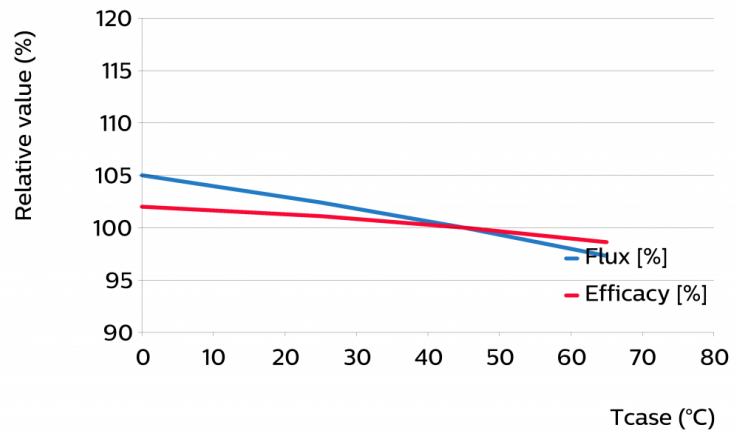
Flux and efficacy versus current (at Tc nominal)

I [mA]	Flux [%]	Efficacy [%]
700	211	91
480	148	96
384	119	99
320	100	100
288	90	101
256	80	101
224	70	102
192	60	103
160	50	103



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

Tcase [°C]	Flux [%]	Efficacy [%]
65	97	99
45	100	100
25	102	101
0	105	102



Lumen maintenance

Operation point	Lumen maintenance x 1000 hours	L70			L80			L90		
		B50	B20	B10	B50	B20	B10	B50	B20	B10
80% I-nom 256mA	Tc 25°C	>72	>72	>72	63	61	61	29	29	28
	Tc-nom 45°C	>72	>72	>72	63	61	61	29	29	28
	Tc-life 65°C	>72	>72	>72	54	52	52	25	24	24
I-nom 320 mA	Tc 25°C	>72	>72	>72	63	61	61	29	29	28
	Tc-nom 45°C	>72	>72	>72	63	61	61	29	29	28
	Tc-life 65°C	>72	>72	>72	54	52	52	25	24	24
I-life 700 mA	Tc 25°C	>72	>72	>72	63	61	61	29	29	28
	Tc-nom 45°C	>72	>72	>72	63	61	61	29	29	28
	Tc-life 65°C	>72	>72	>72	54	52	52	25	24	24

Values in the table are based on available LM80 LED data (12,000h). Lumen maintenance will be updated once additional measurement data becomes available.

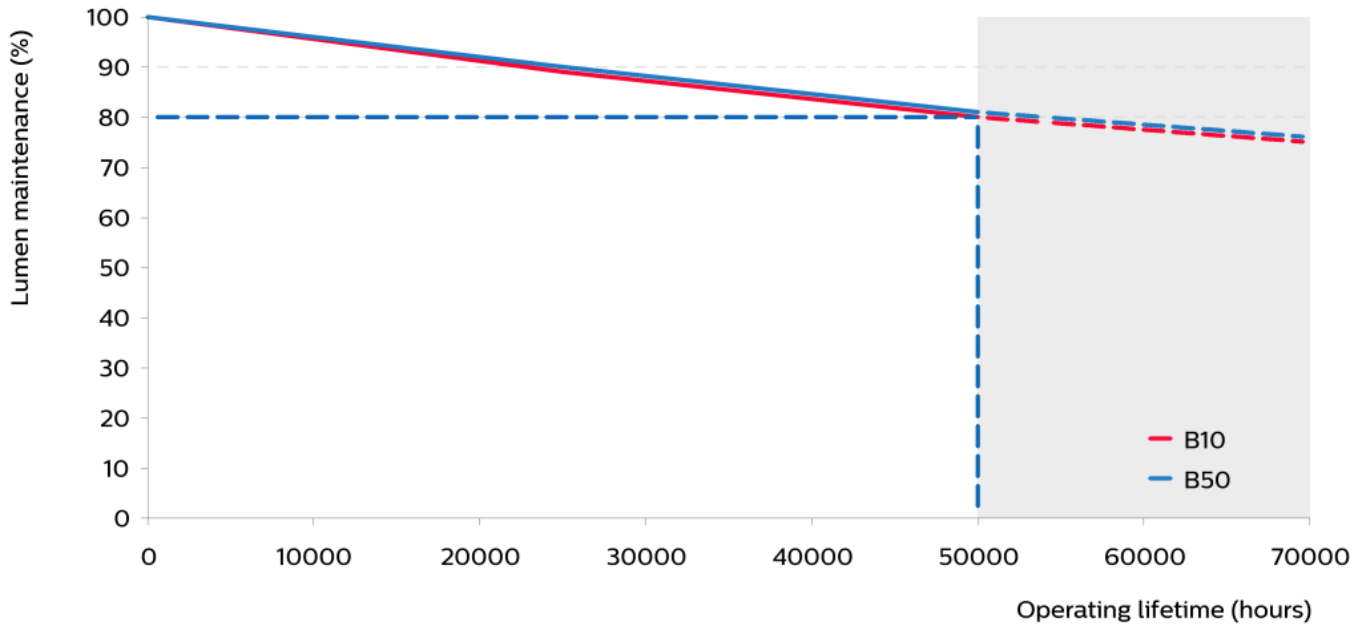
Thermal switching table

Calculated number of switches at which the survival rate of the population > 90%, at a given ambient temperature and delta T with respect to Tc (where Tc = Tambient + delta T)

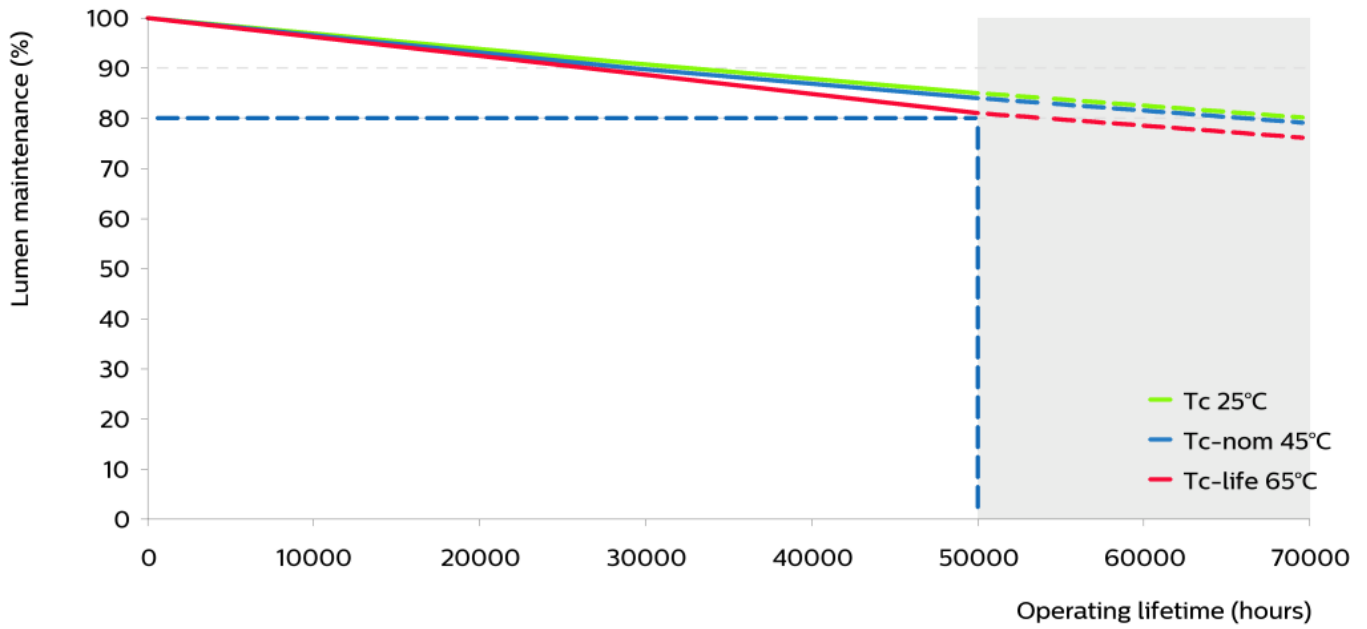
		Tambient [°C]											
		-40	-30	-20	-10	0	10	20	30	40	50	60	70
delta T [°C] (delta T = Tc - Tambient)	10	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k
	20	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	X
	30	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	X	X	X
	40	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	> 100 k	X	X	X	X
	50	64 k	64 k	64 k	64 k	64 k	64 k	64 k	X	X	X	X	X
	60	37 k	37 k	37 k	37 k	37 k	37 k	X	X	X	X	X	X
	70	23 k	23 k	23 k	23 k	23 k	X	X	X	X	X	X	X
	80	16 k	16 k	16 k	16 k	X	X	X	X	X	X	X	X
	90	11 k	11 k	11 k	X	X	X	X	X	X	X	X	X
	100	8 k	8 k	X	X	X	X	X	X	X	X	X	X

Lumen maintenance graphs

Lumen maintenance at I-life and Tc-life conditions

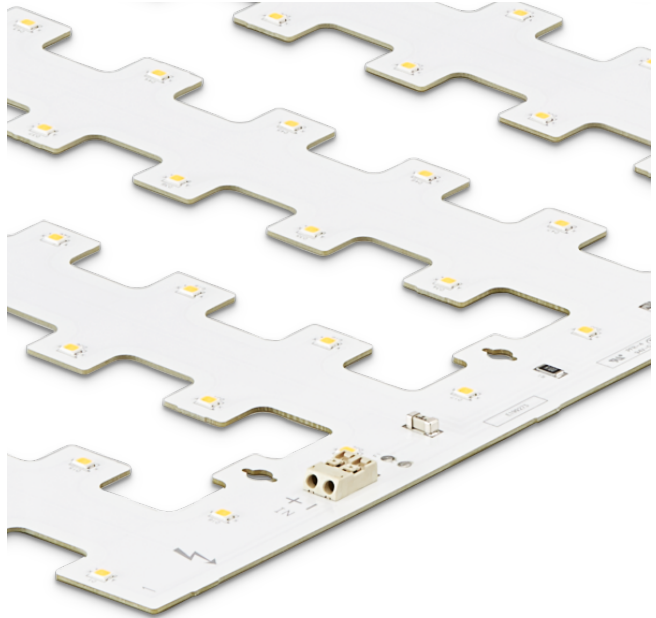
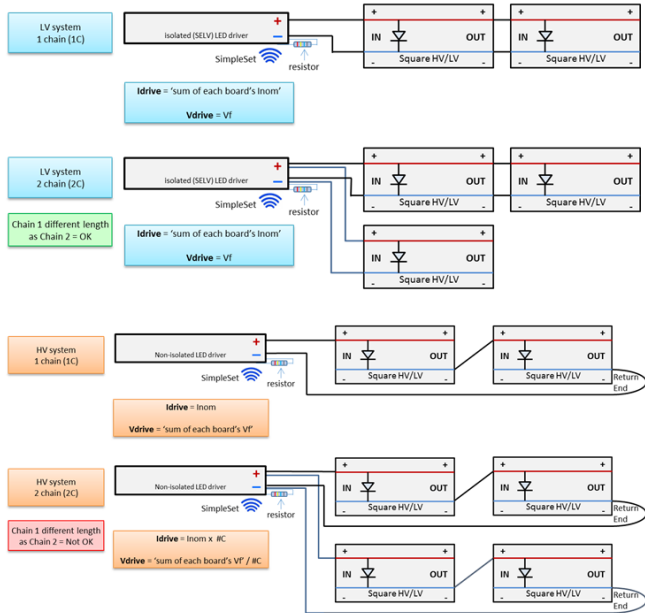


Lumen maintenance for B50 at current I-life conditions



Wiring

Specification item	Value	Unit	Condition
Input wire cross-section	0.25...0.75	mm ²	solid wire
	18...24	AWG	solid wire
Input wire strip length	7.5...8.5	mm	
Input wire cross-section	0.33...0.5	mm ²	stranded wire
	20...22	AWG	stranded wire
Input wire strip length	7.5...8.5	mm	

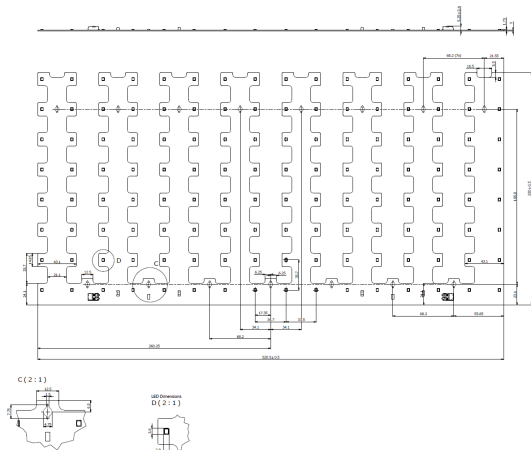


Connector suited for robot wiring.

Mechanical characteristics

Fortimo LED Square 2500lm 830 HV/LV2
 Fortimo LED Square 2500lm 840 HV/LV2
 Fortimo LED Square 2500lm 865 HV/LV2

Parameter	Min	Typ	Max	Unit
Length	520	520.5	521	mm
Width	259.5	260	260.5	mm
Height excl. connector	1.65	1.75	1.95	mm
Height incl. connector	4.85	5.25	5.65	mm
Warpage (IPC-TM-650)			1.5	%



Absolute ratings

Parameter	Min	Typ	Max	Unit
Current through the LED module (I-max)			700	mA
Case temperature (Tc-max)			80	°C
Power at rated Vf-max and I-max			38.5	W
ESD (direct contact)			8	kV
ESD (air)			15	kV
Working voltage			350	V _{dc}
Voltage strength	1700			V _{dc}
Ambient temperature	-40			°C

The combined driver/system must be suitable for working at the sub-zero minimum temperature application

Application information

Certificates and Standards

CE

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

EN 62031:2008 (First Edition) + A1:2013 + A2:2015

Relevant clauses of IEC 62471:2006 (Incl. IEC/TR 62471-2: 2009 and IEC/TR 62778: 2014)

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

ENEC+

ENEC

Environmental

RoHS/REACH

Application

IP rating	no IP-rating
Overheating protection	No protection
Luminaire class	IEC Class I or II, see Design-In Guide LED Linear & Area modules for directions
Dimming	Yes

