Laboratory
Test report

R-Tech
Rue de Mons 3 – B-4000 Liège – Belgium
Tel.: +32 4 224 71 40 – Fax: +32 4 224 25 90
Member of Schréder Group

FORM L-54 Edition 01 - Revision 03 - Date : 20/05/2020

Electrical measurements

General information

Subject : VOLTANA EVO 1 - 16 Oslon Square Giant - Osram 2DIM 50W - 1000mA - CL I

Asked by : SZÜGYI János Péter

Created on : 11/01/2021

Started on : 20/01/2021

Test number : D210035

Sample(s) : E210028

Folder : P-F21002

Test conditions

Luminaire : VOLTANA EVO 1

Operator : Philippe Léonard

Number of LED : 16

LED : Osram OSLON SQUARE GIANT

Driver : DRIVER_OSRAM_2DIM P_50W_600-1250mA_120-277V_0-10V_
_ / 00-14-565

Number of driver(s) : 1

Driver current (mA) : 1000

SPD : VS SP3/230/10K/i

Conclusion

Digitally signed by Rotari Dmitrii
Date: 2022.09.15 20:27:07 EEST
Reason: MoldSign Signature
Location: Moldova

Informative

Conclusion :

PF : 0.98
Efficiency : 86.9%
THD : 10.7%
Harmonics : OK according to IEC 61000-3-2, Class C, P > 25 W (@100% dimming)

Validated by :

GHYSENS Gilles

Duplicate to : RACANELLI Frank, SZÜGYI János Péter, HORVÁTH Csaba, CSIKÓS Balázs, BEDŐ Péter

LAB : 16/02/2021

Test(s) details

Test(s)

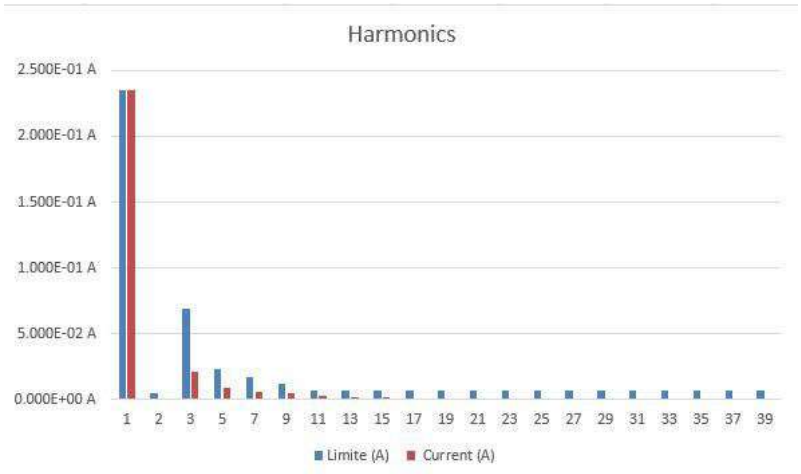
Name	Description	Result
Harmonics @ 1000mA	Measurement of the harmonic currents of the luminaire at thermal stabilization, according IEC 61000-3-2 - Class C (100% dimming).	Success
Measurements @ 1000mA	Characterization of the electrical parameters of the luminaire at thermal stabilization.	Informative

Harmonics @ 1000mA

Result(s)

Harmonic	Current (A)	Limite (A)
1	**2.347E-01 A**	2.347E-01 A
2	6.565E-04 A	4.693E-03 A
3	2.112E-02 A	6.876E-02 A
5	8.896E-03 A	2.347E-02 A
7	6.061E-03 A	1.643E-02 A
9	4.621E-03 A	1.173E-02 A
11	2.944E-03 A	7.040E-03 A
13	1.685E-03 A	7.040E-03 A
15	1.494E-03 A	7.040E-03 A
17	3.828E-04 A	7.040E-03 A
19	5.397E-04 A	7.040E-03 A
21	3.550E-04 A	7.040E-03 A
23	2.237E-04 A	7.040E-03 A
25	4.924E-04 A	7.040E-03 A
27	3.063E-04 A	7.040E-03 A
29	7.290E-04 A	7.040E-03 A
31	2.446E-04 A	7.040E-03 A
33	6.522E-04 A	7.040E-03 A
35	3.168E-04 A	7.040E-03 A
37	3.115E-04 A	7.040E-03 A
39	1.334E-04 A	7.040E-03 A

Annex(es)



Harmonics

Measurements @ 1000mA

Result(s)

input			output 1		
Urms	230.1 V		Urms	46.2 V	
Irms	0.236 A		Irms	0.997 A	
Prms	53.0 W		Prms	46.0 W	
S	54.3 VA				
Q	-11.6 VAR				
PF	0.9767				
$I_{(H01)}$	0.235 A		Uavg	46.2 V	
Cos j (H01)	0.9822		Iavg	0.996 A	
η rms	86.9%		Pavg	46.0 W	
η avg	86.9%				
THD	10.7%				

Test room temperature (°C) :

25.5

Measurement equipment :

Norma 4000 (E110)
APT (E102)

Quantities measured :

Qualification of the thermal limits and measurement of the electrical behavior of a luminaire according to PT-S-07

Uncertainties :

Statement of uncertainties (K=2, 95% of confidence level):
Temperature: 0,6 K
Voltage (AC): 0,33%
Current (AC): 0,33 %
Power (AC): 0,27%
Voltage (DC): 0,3 %
Current (DC): 0,3%
Power (DC): 0,23%
Anemometer: ± 0,27 m/s

Decision rules :

No pass/fail criteria applied on electrical measurements

End of test report :

R-Tech
Rue de Mons 3 – B-4000 Liège – Belgium
Tel.: +32 4 224 71 40 – Fax: +32 4 224 25 90
Member of Schréder Group

Thermal Test LED

General information

Subject : VOLTANA EVO 1 - 16 Oslon Square Giant - Osram 2DIM 50W - 1000mA - CL I

Asked by : SZÜGYI János Péter
Created on : 11/01/2021
Started on : 20/01/2021
Test number : D210034
Reference norm : IEC/EN 60598-1; 60598-2-3; 60598-2-5 Standards
Sample(s) : E210028
Folder : P-F21002

Test conditions

Luminaire : VOLTANA EVO 1

Number of LED : 16
LED : Osram OSLON SQUARE GIANT
Driver : DRIVER_OSRAM_2DIM P_50W_600-1250mA_120-277V_0-10V_ _ / 00-14-565
Number of driver(s) : 1
Driver current (mA) : 1000
SPD : VS SP3/230/10K/i

Operator : Philippe Léonard

IMG_7625

Conclusion

Informative

Conclusion :

ΔTs < 80°C no risk of solder crack

Ta: 45°C limited by driver; according IEC 60598-2-3 and IEC 60598-2-5 (outdoor use only)
Ta: 35°C limited by driver; indoor use and UL standard
Tq: 20°C limited by driver; according IEC 62722-2-1

Tq given for 100 khrs of lifetime

Note : the margins to obtain the Ta and Tq values are below the measurement uncertainties.

Validated by :

GHYSENS Gilles

Duplicate to : SZÜGYI János Péter, HORVÁTH Csaba, CSIKÓS Balázs, BEDŐ Péter

LAB : 16/02/2021

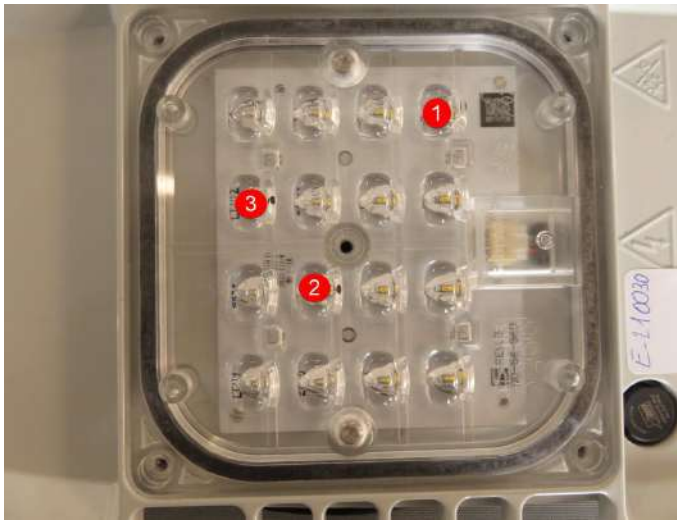
Test(s) details

Test(s)

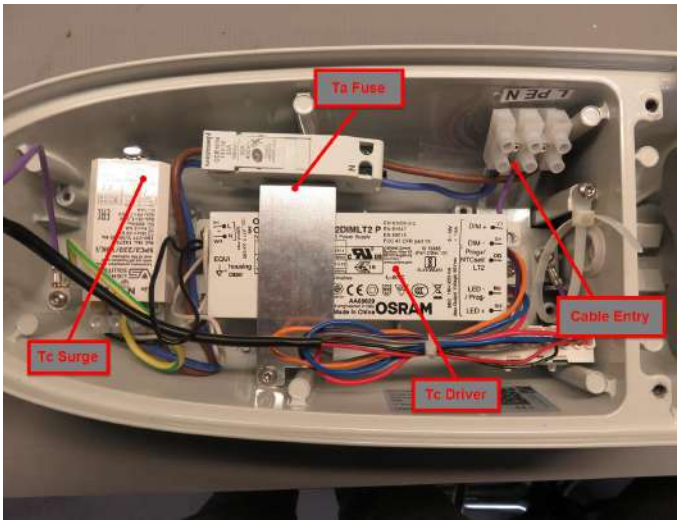
Name	Description	Result
Sensors positions	Disposition of the thermocouples on the DUT.	Informative
Test @ 1000mA	Test according section 12.4 of IEC 60598-1. The DUT is driven until all thermocouples reach thermal stabilization (i.e. variation = 1K/h).	Informative

Sensors positions

Annex(es)



IMG_7605(a)



IMG_7639(a)

Test @ 1000mA

Result(s)

	Ts1	Ts2	Ts3	Driver1	Tc SPD1	Ta Cable entry1	Ta Fuse1
Limit Ta	110.0 °C	110.0 °C	110.0 °C	80.0 °C	80.0 °C	90.0 °C	90.0 °C
Limit Tq	90.0 °C	90.0 °C	90.0 °C	65.0 °C	80.0 °C	90.0 °C	90.0 °C
Thermocouple T°	69.7 °C	72.5 °C	73.6 °C	70.2 °C	44.7 °C	49.0 °C	53.1 °C
Room	25.5 °C	25.5 °C	25.5 °C	25.5 °C	25.5 °C	25.5 °C	25.5 °C
E Led	2.9 V	2.9 V	2.9 V				
I Led	0.996 A	0.996 A	0.996 A				
P Led	2.9 W	2.9 W	2.9 W				
Heating	42.9 °C	45.7 °C	46.8 °C	44.4 °C	18.8 °C	22.6 °C	27.0 °C
Ta Indoor	65.8 °C	63.0 °C	61.9 °C	35.3 °C	60.8 °C	66.5 °C	62.4 °C
Tq	45.8 °C	43.0 °C	41.9 °C	20.3 °C	60.8 °C	66.5 °C	62.4 °C
Solder point temperature used as the image of the lens temperature							
Primary EM		Secondary Em Dr1					
U	230.1 V	U	46.2 V				
I	0.236 A	I	0.996 A				
P	53.0 W	P	46.0 W				
PF	0.977						
Efficiency	86.9%						

Test room temperature (°C) :

25.5

Measurement equipment :

Keithley with thermocouples type K (E097)
Norma 4000 (E110)
APT (E102)

Quantities measured :

Qualification of the thermal limits and measurement of the electrical behavior of a luminaire according to PT-S-07

Uncertainties :

Statement of uncertainties (K=2, 95% of confidence level):
Temperature: 0,6 K
Voltage (AC): 0,33%
Current (AC): 0,33 %
Power (AC): 0,27%
Voltage (DC): 0,3 %
Current (DC): 0,3%
Power (DC): 0,23%
Anemometer: ± 0,27 m/s

Decision rules :

No pass/fail criteria applied on electrical measurements

No pass/fail criteria applied on thermal measurements when performed at 25°C (+/- 5°C), the Ta/Tq values are calculated according GDE-POL-001.

Pass/fail criteria on thermal qualification (test performed at announced Ta or Tq)
At the announced Ta, no component is above its maximum limit of operation reduced by the uncertainty on the temperature measurement: pass
At the announced Ta, at least 1 component is above its maximum limit of operation augmented by the uncertainty on the temperature measurement: fail
At the announced Ta, at least 1 component is at its maximum limit of operation ± the uncertainty on the temperature measurement and no other component is above its maximum limit of operation augmented by the uncertainty on the temperature measurement: pass with remark
According to IEC 60598-2-3 and IEC 60598-2-5 Standards, the maximum limit of every component can be augmented by 10 K provided that the luminaire is intended for outdoor use only.
At the announced Tq, no component is above its selected performance limit of operation reduced by the uncertainty on the temperature measurement: pass
At the announced Tq, at least 1 component is above its selected performance limit of operation augmented by the uncertainty on the temperature measurement: fail
At the announced Tq, at least 1 component is at its selected performance limit of operation ± the uncertainty on the temperature measurement and no other component is above its selected performance limit of operation augmented by the uncertainty on the temperature measurement: pass with remark
According to IEC 62722-2-1, the selected performance limit cannot be augmented by 10 K even if the luminaire is intended for outdoor use.
Any Ta/Tq defined value will be rounded down to the nearest multiple of 5.

In any case, test at 25°C or test at Ta or Tq, if delta Ts is above the recommended value of the GDE-POL-001, the test is failed.

End of accredited report :

Laboratory
Test report

226-TEST

NBN EN ISO/IEC 17025 :2017

R-Tech
Rue de Mons 3 – B-4000 Liège – Belgium
Tel.: +32 4 224 71 40 – Fax: +32 4 224 25 90
Member of Schréder Group

FORM L-54 Edition 01 - Revision 03 - Date : 20/05/2020

Mechanical impact resistance test

General information

Subject : VOLTANA EVO 1 - 16 Oslon Square Giant - Philips 75W

Asked by : SZÜGYI János Péter

Created on : 12/01/2021

Started on : 13/01/2021

Test number : D210050

Reference norm : IEC/EN 60598-1 & 62696 Standards

Sample(s) : E210035, E210036, E210037

Folder : P-F21002

Test conditions

Luminaire : VOLTANA EVO 1

Quantity of sample under test : 5

Protector Material : PC

Serigraphy : None

Protector supplier : External - Gaggione

Operator : Philippe Léonard

IMG_7602

Conclusion

Success

Conclusion :

Conformity statement according to TR 62696:2011 and section 4.13 of IEC 60598-1:2014, AMD1:2017 :

IK10 passed.

Validated by :

GHYSENS Gilles

Duplicate to : RACANELLI Frank, SZÜGYI János Péter, HORVÁTH Csaba, CSIKÓS Balázs, BEDŐ Péter

LAB : 15/03/2021

Test(s) details

Test(s)

Name	Description	Result
Impact points	At pendulum hammer 5 impact points distributed on protector surface One impact on each point 2 supplementary impacts on the most fragile point	Informative
IK08	Impact energy : 5 joules Hammer weight : 1.7 Kg Height of fall : 30 Cm	Informative
IK09	Impact energy: 10 joules Hammer weight: 5 kg Height of fall: 20 cm	Informative
IK10	Impact Energy: 20 joules Hammer Weight: 5 Kg Height of fall: 40 cm	Informative

Impact points

Annex(es)

IK08

Result(s)

IK 08	Impact	1			2			3			4			5		
Sample	Shot	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
1		Pass	-	-	Pass	-	-	Pass	-	-	Pass	-	-	Pass	Pass	Pass
2		Pass	-	-	Pass	-	-	Pass	-	-	Pass	-	-	Pass	Pass	Pass
3		Pass	-	-	Pass	-	-	Pass	-	-	Pass	-	-	Pass	Pass	Pass
4		Pass	-	-	Pass	-	-	Pass	-	-	Pass	-	-	Pass	Pass	Pass
5		Pass	-	-	Pass	-	-	Pass	-	-	Pass	-	-	Pass	Pass	Pass
		-	NOT TESTED													

IK09

Result(s)

IK 09	Impact	1			2			3			4			5		
Sample	Shot	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
1		Pass	-	-	Pass	-	-	Pass	-	-	Pass	-	-	Pass	Pass	Pass
2		Pass	-	-	Pass	-	-	Pass	-	-	Pass	-	-	Pass	Pass	Pass
3		Pass	-	-	Pass	-	-	Pass	-	-	Pass	-	-	Pass	Pass	Pass
4		Pass	-	-	Pass	-	-	Pass	-	-	Pass	-	-	Pass	Pass	Pass
5		Pass	-	-	Pass	-	-	Pass	-	-	Pass	-	-	Pass	Pass	Pass
		-	NOT TESTED													

IK10

Result(s)

IK 10	Impact	1			2			3			4			5		
Sample	Shot	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
1		Pass	-	-	Pass	-	-	Pass	-	-	Pass	-	-	Pass	Pass	Pass
2		Pass	-	-	Pass	-	-	Pass	-	-	Pass	-	-	Pass	Pass	Pass
3		Pass	-	-	Pass	-	-	Pass	-	-	Pass	-	-	Pass	Pass	Pass
4		Pass	-	-	Pass	-	-	Pass	-	-	Pass	-	-	Pass	Pass	Pass
5		Pass	-	-	Pass	-	-	Pass	-	-	Pass	-	-	Pass	Pass	Pass
		-	NOT TESTED													

Test room temperature (°C) :

22

Measurement equipment :

Pendulum hammer with chariot (M062)
Thermometer (A039/3)

Quantities measured :

For IK 04/05/06: Verification of the mechanical strength of a luminaire according to PT-S-13
For IK07/08/09/10/10+: Verification of the mechanical strength of a luminaire according to PT-S-05

Uncertainties :

Temperature: 0,6 °K
Mass: 0,25 %
Dynamometric key :
- **From 0.5 to 2.5 Nm : 0,15 Nm**
- **From 2.5 to 5 Nm : 0,22 Nm**
- **From 5 to 25 Nm : 0,83 Nm**
- **From 25 to 60 Nm : 2,73 Nm**
- **From 60 to 100 Nm : 3,55 Nm**

For IK 04/05/06, Impact energy: ± 10%
For IK07/08/09/10/10+, Impact energy: ± 1%

Decision rules :

Pass/fail criteria according to GDE-GUI-003

By visual inspection (or other means if necessary):
Luminaire shows dangerous behavior: fail
Luminaire shows no dangerous behavior: pass
When several luminaires are tested, 4 out of 5 samples need to show positive result for compliance of the batch

End of accredited report :

R-Tech
Rue de Mons 3 – B-4000 Liège – Belgium
Tel.: +32 4 224 71 40 – Fax: +32 4 224 25 90
Member of Schréder Group

Tightness test

General information

Subject : VOLTANA EVO 1 - 16 Oslon Square Giant - Philips FP 75W - 1200mA - CL II (central screw modified 1Nm)

Asked by : SZÜGYI János Péter

Created on : 08/01/2021

Started on : 11/01/2021

Test number : D210026

Reference norm : IEC/EN 60598-1 Standard

Sample(s) : E210017

Folder : P-F21002

Test conditions

Luminaire : VOLTANA EVO 1

Number of LED : 16

LED : Osram OSLON SQUARE GIANT

Driver current (mA) : 1200

Protector Material : PC

Operator : Philippe Léonard

IMG_7592

Conclusion

Success

Conclusion :

According section 9.2 of IEC 60598-1:2014, AMD1:2017 :

IP66 passed.

Validated by :

GHYSENS Gilles

Duplicate to : SZÜGYI János Péter, HORVÁTH Csaba, CSIKÓS Balázs, BEDŐ Péter

LAB : 15/02/2021

Test(s) details

Test(s)

Name	Description	Result
IP6x	- Luminaire switched ON until stable T° - Talcum in suspension (blowing ON) - After 1', luminaire OFF - Talcum for 3 hours	Success
IPx6	- Luminaire switched ON until stable T° - Luminaire switched OFF and immediately sprayed with water jet - Hose diam. 12,5 mm - Water flow: 100 l/min - Spraying distance: 3 m - Duration of test: 3 minutes	Success

IP6x

Result(s)

Pre-conditioning time :

- 60minutes

Test result :

- Passed : No talcum entry in the enclosure of the luminaire

IPx6

Result(s)

Pre-conditioning time :

- 60 minutes

Test result :

- Passed : No water entry in the enclosure of the luminaire

Test room temperature (°C) :

23.2

Measurement equipment :

Talcum chamber (A003)
Thermometer (A039/2)
Rotating table (A001/2)
Chronometer (A043/3)
Thermometer (A039/1)
Flowmeter (A001/10)
IPx6 nozzle (A001/5)

Quantities measured :

Verification of water/dust ingress within a luminaire enclosure according to
For IP2X: PT-S-14
For IP3X/4X: PT-S-15
For IP5X/6X: PT-S-06
For IPX3/X4: PT-S-01
For IPX5/X6: PT-S-08
For IPX7/X8: PT-S-09

Uncertainties :

Statement of uncertainties (K=2, 95% of confidence level):
Time: 0,35 seconds per 10 minutes
Temperature: 0,6 °K
Calipers: 0,005 mm
Measuring tape: ± 1,13 mm
Dynamometric key :
From 0.5 to 2.5 Nm : 0,15 Nm
From 2.5 to 5 Nm : 0,22 Nm
From 5 to 25 Nm : 0,83 Nm
From 25 to 60 Nm : 2,73 Nm
From 60 to 100 Nm : 3,55 Nm

For solid ingress test:
IP2X:
Probe dimensions: ± 0,6 mm
Applied force: ± 0,4 N
IP3X:
Probe dimensions: ± 0,3 mm
Applied force:± 0,13 N
IP4X:
Probe dimensions: ± 0,1 mm
Applied force: :± 0,11 N

IP5X/6X
Test duration (talcum suspension time): ± 3 seconds
Talcum mass: 0,02 %

For liquid ingress test:
IPX3/X4
Table rotation: ± 6 sec/rotation
Arms Rotation angle: ± 3°
Water flow: ± 4 %
IPX5/X6
Table rotation: ± 6 sec/rotation
Water flow: ± 4 %
Test Distance: +0 / -50 cm
IPX7/X8
Test depth: +10 cm / -0 cm

Decision rules :

Pass/fail criteria
For solid ingress test:
IP2X:
If contact possible with live parts: fail
Otherwise: pass
IP3X/4X:
For luminaires without draining holes, nor ventilation slots for forced cooling, penetration of the test probe in the enclosure: fail
For luminaires with draining holes, or ventilation slots for forced cooling, if contact possible with live part: fail
Otherwise: pass
IP5X/6X
By visual inspection:
If possible hazard due to presence of conductive dust: fail
If no possible hazard due to the presence of conductive dust: IP5X granted
No presence of talcum: IP6X granted
For liquid ingress test:
IPX3/X4/X5/X6:
By visual inspection:
If possible hazard due to presence of water: fail
If no possible hazard due to the presence of water and no efficient way to evacuate the water: fail
If no possible hazard due to the presence of water and an efficient way to evacuate the water: pass
No presence of water: pass
IPX7/X8:
By visual inspection:
Presence of water: fail
No presence of water: pass

End of accredited report :

14/09/2022

Schréder
Experts in lightability™

VOLTANA EVO 1

5294

Optic	5294
Protector	Integrated lenses
Source	16 Osram OSLON SQUARE GIANT
Matrix	481252

Characteristics

416	170	104	2.8	IP 66	IK 10	I EU, II EU	0.013
Length (mm)	Width (mm)	Height (mm)	Weight (kg)	Tightness level*	Impact resistance*	Electrical class*	CxS (m²)

** According to IEC-EN60598 and IEC-EN62262*

Features

The compact, cost-effective LED solution for your urban spaces

- Cost-effective and efficient lighting solution for a fast return on investment
- Compact design
- ProFlex™ photometric engines offering high efficiency lighting, comfort and safety
- Adjustable inclination on-site
- Side-entry and post-top (with accessory) mounting

Types of application

- Square and park
- Car park
- Bike path
- Urban road

Information for 1000 lm matrix

Efficacy (%)	92.0
DLOR (%)	92.0
ULOR (%)	0.0
ULR (%)	0.0
Incl ULR 4%	-40/37°

G Class (EN 13201-2)	G3
G* (EN 13201 2015)	G*3
Imax (cd)	590
Aperture 0-180°	51 - 51
Aperture 90-270°	X - X

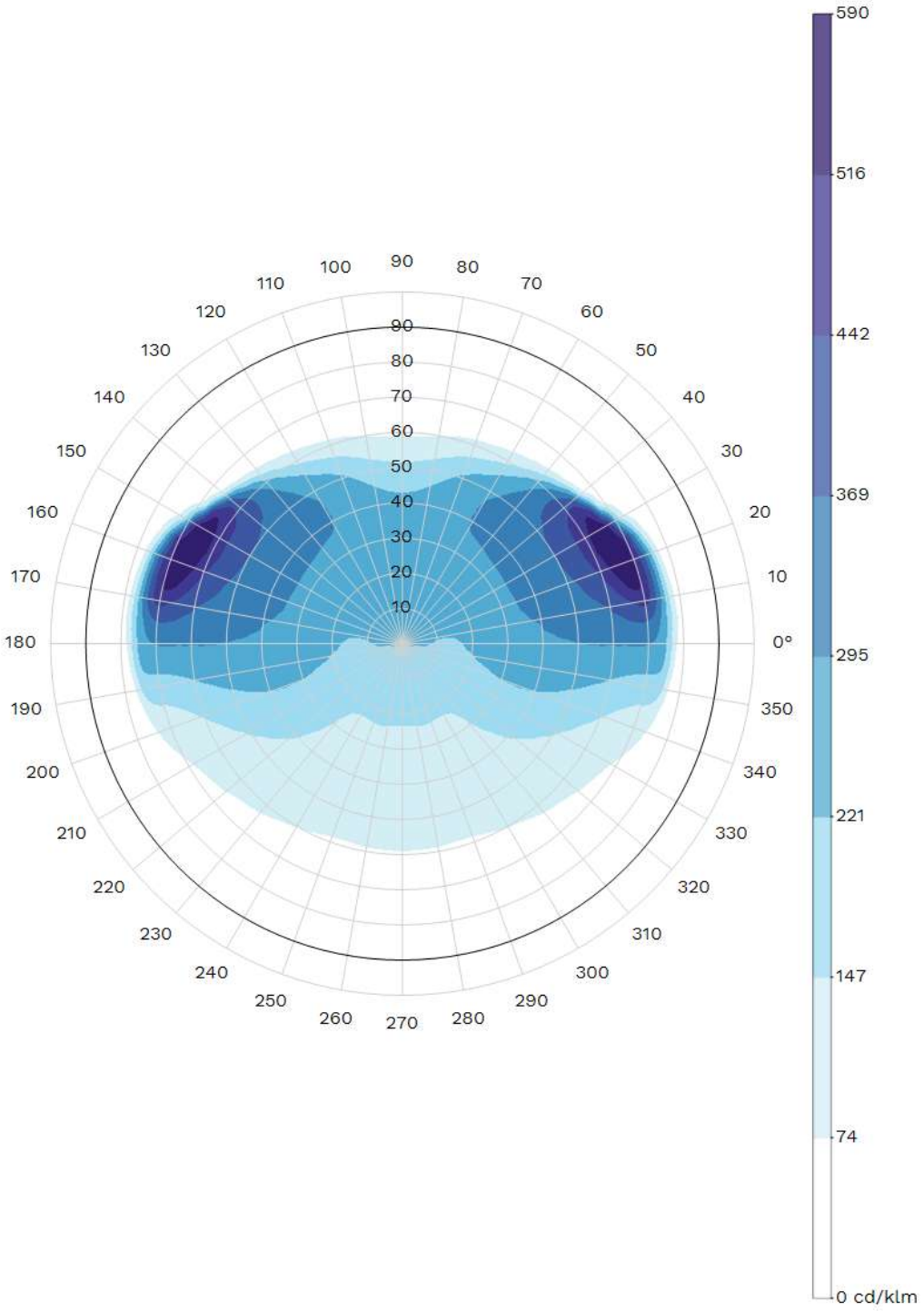
I 70-80-90-95 (cd)	534 - 32 - X - X
CIE flux code N 1→5 (%)	38.0 - 75.0 - 98.1 - 100.0 - 92.0
Gradient 90°	11cd
Gradient 270°	7cd

Photometrical characteristics

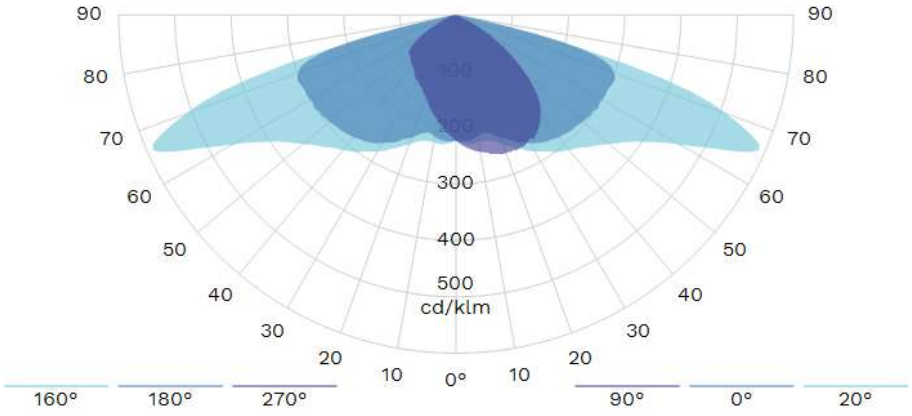
LED count	Colour code	Current (mA)	Luminaire power (W)	Source flux (lm)	Luminaire output flux (lm)	Luminaire efficacy (lm/W)	Peak (cd)	BUG Rating	Voltage (V)
			Ambient temp = 25°						
16	NW 740	200	11	1859	1711	156	1096	B1 U0 G1	230
16	NW 740	350	18	3104	2856	159	1830	B1 U0 G1	230
16	NW 740	500	26	4256	3916	151	2509	B1 U0 G1	230
16	NW 740	700	38	5655	5204	137	3335	B1 U0 G1	230
16	NW 740	1050	56	7717	7100	127	4550	B2 U0 G2	230
16	NW 740	1200	62	8449	7774	125	4982	B2 U0 G2	230
16	WW 730	200	11	1639	1508	137	966	B1 U0 G1	230
16	WW 730	350	18	2736	2517	140	1613	B1 U0 G1	230
16	WW 730	500	26	3751	3451	133	2212	B1 U0 G1	230
16	WW 730	700	38	4985	4587	121	2940	B1 U0 G1	230
16	WW 730	1050	56	6802	6258	112	4011	B2 U0 G1	230
16	WW 730	1200	62	7447	6852	111	4392	B2 U0 G2	230

Tolerance on flux +- 7% - Tolerance on power +- 5%

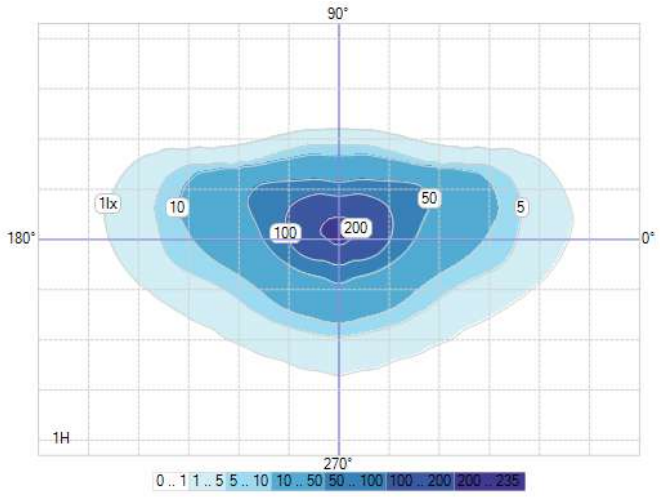
Hypergon view



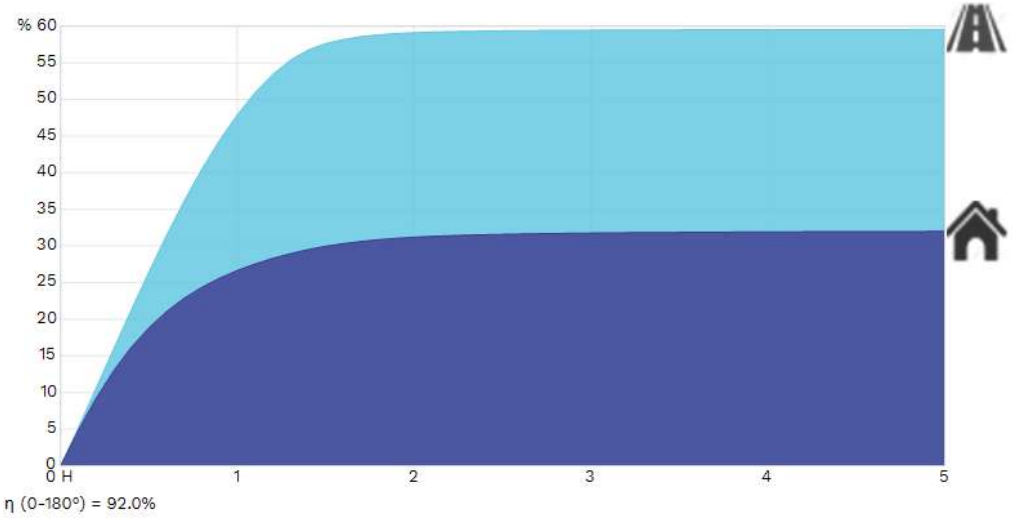
Polar/Cartesian diagram



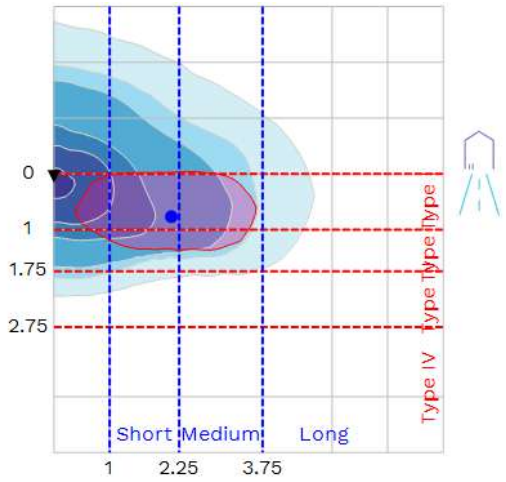
Isolux



K-Curve

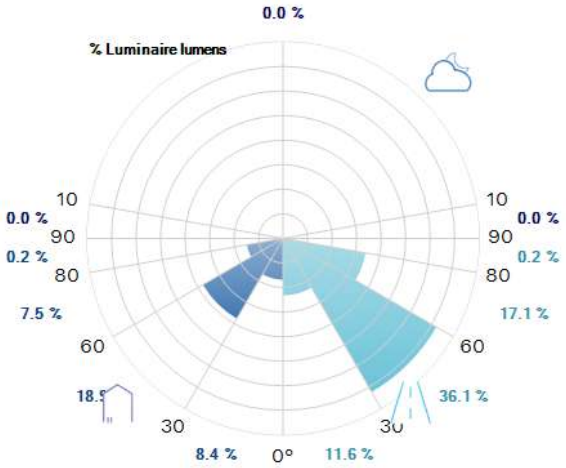


IES Roadway Classification / Nema Classification

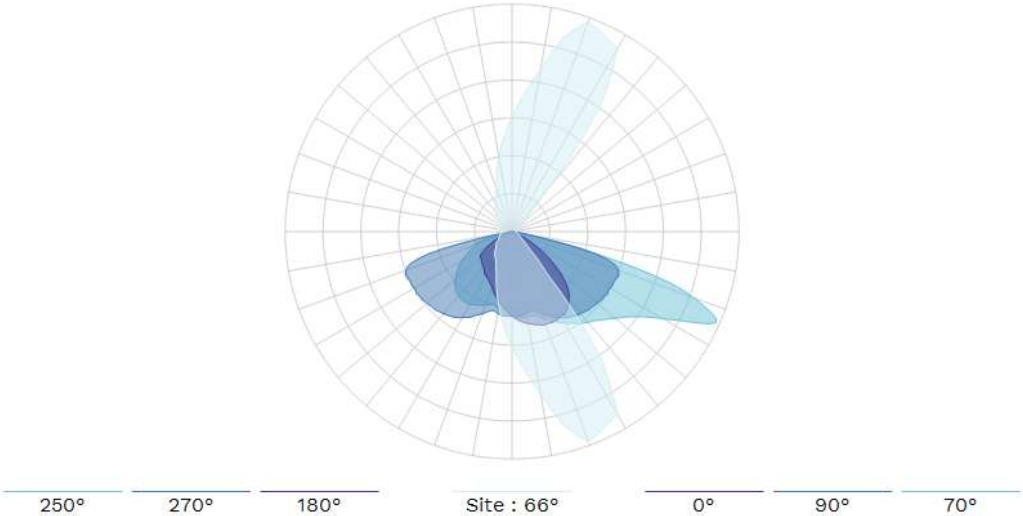


II - Short

Luminaire classification system (LCS)



Intensity diagram in max Cone and in CPlane



http://www.schreder.com

14/09/2022

Schréder
Experts in lightability™

VOLTANA EVO 1

5296

Optic	5296
Protector	Integrated lenses
Source	8 Osram OSLON SQUARE GIANT
Matrix	481272

Characteristics

416	170	104	2.8	IP 66	IK 10	I EU, II EU	0.013
Length (mm)	Width (mm)	Height (mm)	Weight (kg)	Tightness level*	Impact resistance*	Electrical class*	CxS (m²)

** According to IEC-EN60598 and IEC-EN62262*

Features

The compact, cost-effective LED solution for your urban spaces

- Cost-effective and efficient lighting solution for a fast return on investment
- Compact design
- ProFlex™ photometric engines offering high efficiency lighting, comfort and safety
- Adjustable inclination on-site
- Side-entry and post-top (with accessory) mounting

Types of application

- Square and park
- Car park
- Bike path
- Urban road

Information for 1000 lm matrix

Efficacy (%)	89.3
DLOR (%)	89.3
ULOR (%)	0.0
ULR (%)	0.0
Incl ULR 4%	-42/42°

G Class (EN 13201-2)	G3
G* (EN 13201 2015)	G*3
Imax (cd)	1088
Aperture 0-180°	64 - 64
Aperture 90-270°	X - X

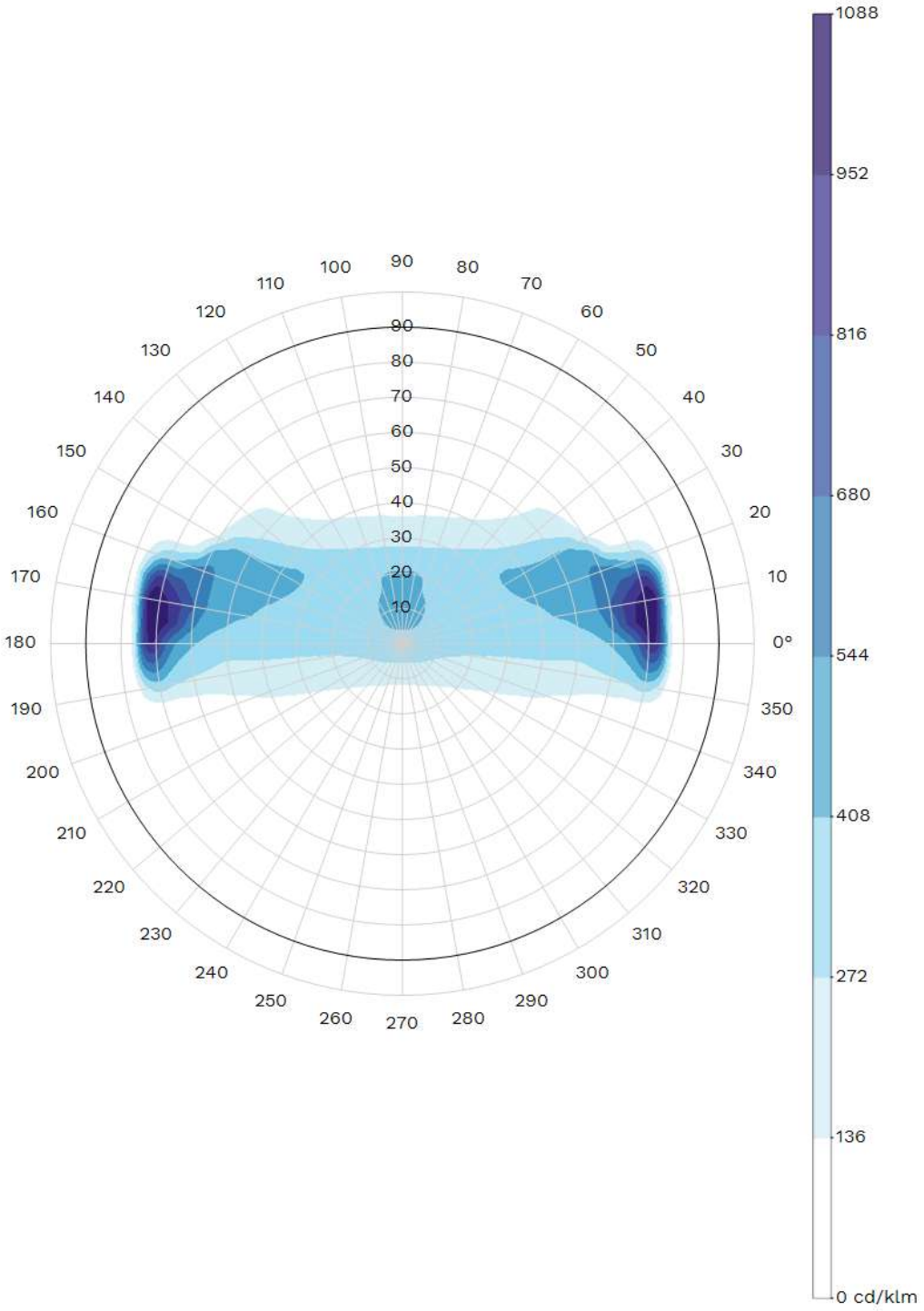
I 70-80-90-95 (cd)	1082 - 35 - X - X
CIE flux code N 1→5 (%)	40.9 - 70.6 - 97.3 - 100.0 - 89.3
Gradient 90°	28cd
Gradient 270°	31cd

Photometrical characteristics

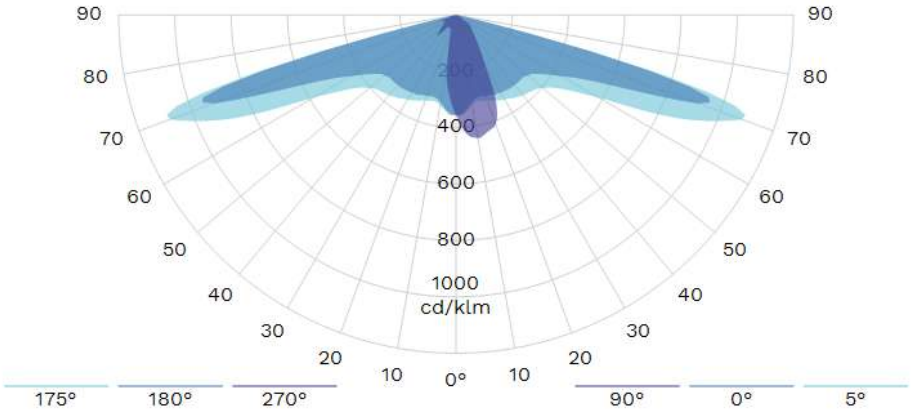
LED count	Colour code	Current (mA)	Luminaire power (W)	Source flux (lm)	Luminaire output flux (lm)	Luminaire efficacy (lm/W)	Peak (cd)	BUG Rating	Voltage (V)
			Ambient temp = 25°						
8	NW 740	200	6	930	830	138	1012	B0 U0 G0	230
8	NW 740	350	10	1552	1386	139	1689	B1 U0 G1	230
8	NW 740	500	13	2128	1901	146	2316	B1 U0 G1	230
8	NW 740	700	18	2828	2526	140	3078	B1 U0 G1	230
8	NW 740	1050	28	3858	3446	123	4199	B1 U0 G1	230
8	NW 740	1250	36	4336	3873	108	4719	B1 U0 G1	230
8	NW 740	1400	40	4644	4148	104	5054	B1 U0 G1	230
8	WW 730	200	6	819	732	122	892	B0 U0 G0	230
8	WW 730	350	10	1368	1222	122	1489	B1 U0 G1	230
8	WW 730	500	13	1876	1675	129	2041	B1 U0 G1	230
8	WW 730	700	18	2492	2226	124	2713	B1 U0 G1	230
8	WW 730	1050	28	3401	3038	109	3701	B1 U0 G1	230
8	WW 730	1250	36	3822	3414	95	4160	B1 U0 G1	230
8	WW 730	1400	40	4093	3656	91	4455	B1 U0 G1	230

Tolerance on flux +- 7% - Tolerance on power +- 5%

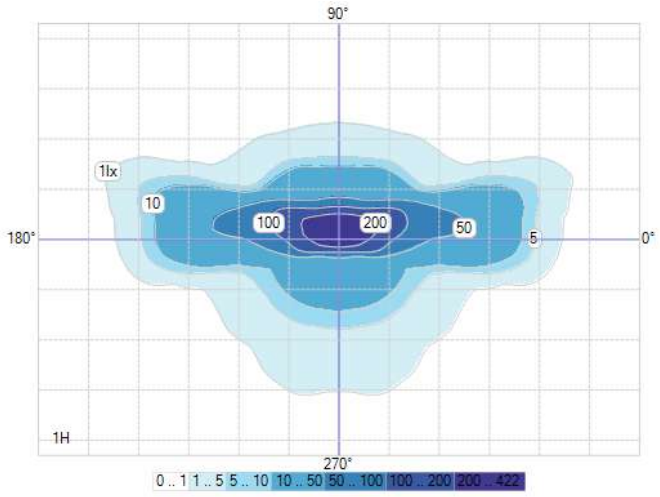
Hypergon view



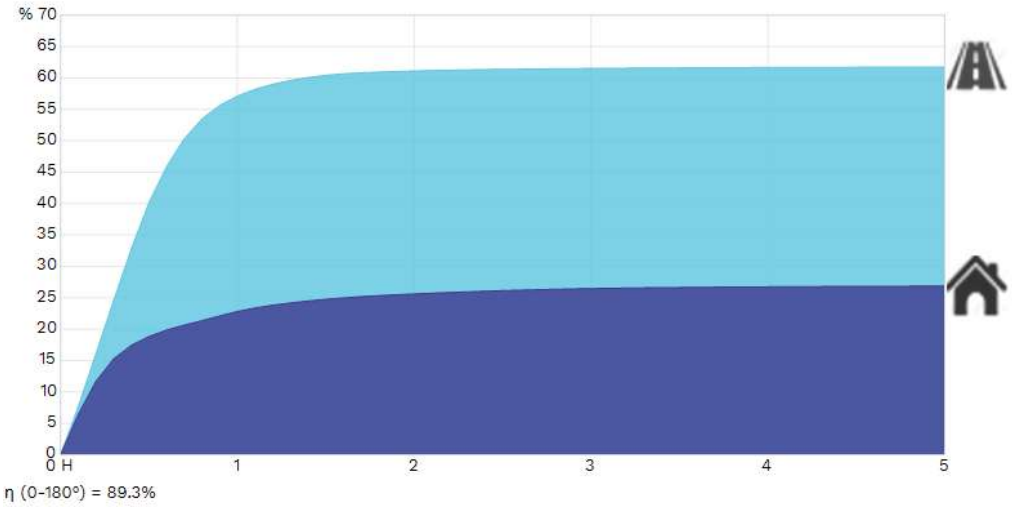
Polar/Cartesian diagram



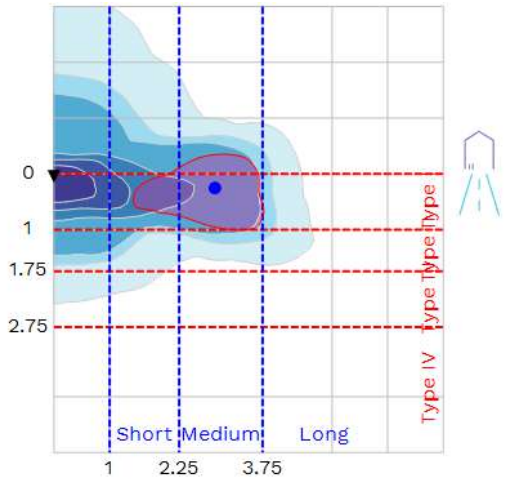
Isolux



K-Curve

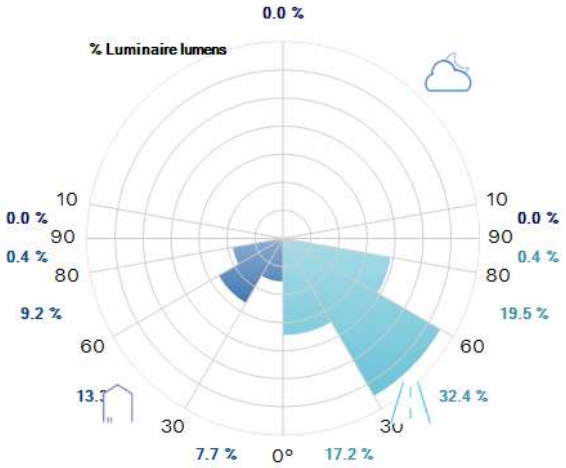


IES Roadway Classification / Nema Classification

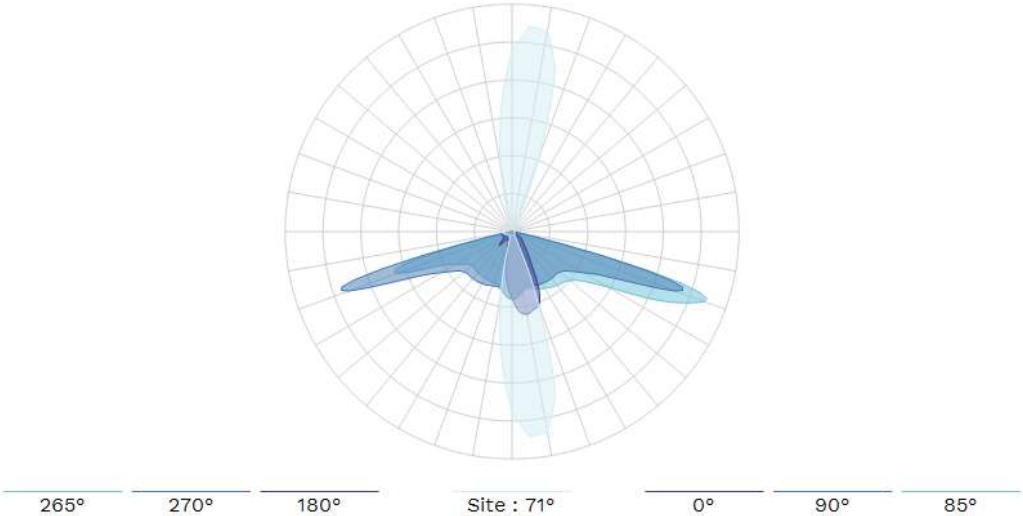


I - Medium

Luminaire classification system (LCS)



Intensity diagram in max Cone and in CPlane



http://www.schreder.com

LICENCE

No. 21181/3 replaces No.21181/2

Issued to:
Applicant:
R-Tech
Rue de Mons, 3
4000 LIEGE
Belgium

Licensee:
Schréder SA
Rue de Lusambo, 67
1190 BRUXELLES
Belgium

Product	:	road, square, street, flood lighting
Trade name(s)	:	SCHREDER
Type(s)/model(s)	:	VOLTANA 0, VOLTANA 1, VOLTANA 2, VOLTANA 3, VOLTANA 4, VOLTANA EVO 1

The product and any acceptable variation thereto is specified in the annex to this licence and the documents therein referred to.

SGS CEBEC hereby declares that the above-mentioned product has been certified on the basis of:
- a type test according to the standard specified in annex
- an inspection of the production location
- a certification agreement with the number 1173

SGS CEBEC hereby grants the right to use the CEBEC certification mark
The ENEC/CEBEC certification mark may be applied to the product as specified in this licence for the duration of the ENEC/CEBEC certification agreement and under the conditions of the ENEC/CEBEC certification agreement.

This licence is issued on : 29/04/2022

ir. C. Lana,
Certification Manager

SGS Belgium NV-Division SGS CEBEC
Business Riverside Park
Bld Internationalelaan 55 Build. K
B-1070 Brussels
Tel.+32(0)2 556 00 20 Fax.+32(0)2 556 00 36

SPECIFICATION OF THE CERTIFIED PRODUCT

Product data

Product	:	road, square, street, flood lighting
Trade name(s)	:	SCHREDER
Type(s)/Model(s)	:	VOLTANA 0, VOLTANA 1, VOLTANA 2, VOLTANA 3, VOLTANA 4, VOLTANA EVO 1
description	:	Street lighting
rated voltage (Un)	:	200-240 V
rated frequency	:	50-60 Hz
rated secondary current (In SEC)	:	max. 1400 mA (LED)
class	:	class I
degree of protection	:	IP66
lamp(s)	:	LED (3535 G4L, XP-G3, LH351C, OSLON)

Additional information

Voltana 0 :
6 LEDs :
ta 55°C with Control gear Meanwell model PLD-40W
ta 50°C with Control gear Signify model LP/FP 22W C123

8 LEDs:
ta 45°C with Control gear Meanwell model PLD-40W

VOLTANA EVO 1 = VOLTANA GEN 2

Product data - type VOLTANA 1

design	:	8 LEDs
rated ambient temperature (ta)	:	max. 55°C
rated power	:	max. 41 W
rated current (In)	:	max. 1400 mA
resistance to impact (IK)	:	IK08

SGS Belgium NV-Division SGS CEBEC
Business Riverside Park
Bld Internationalelaan 55 Build. K
B-1070 Brussels
Tel.+32(0)2 556 00 20 Fax.+32(0)2 556 00 36

Product data - type VOLTANA 2

design	:	16 LEDs
rated ambient temperature (ta)	:	max. 45°C
rated power	:	max. 58 W
rated current (In)	:	max. 1050 mA
resistance to impact (IK)	:	IK08

Product data - type VOLTANA 3

design	:	24 LEDs
rated ambient temperature (ta)	:	max 50°C
rated power	:	max. 80 W
rated current (In)	:	max. 1000 mA
resistance to impact (IK)	:	IK08

Product data - type VOLTANA 4

design	:	32 LEDs
rated ambient temperature (ta)	:	max. 55°C
rated power	:	max. 105 W
rated current (In)	:	max. 1000 mA
resistance to impact (IK)	:	IK08

Product data - type VOLTANA 0

design	:	6, 8 LEDs
rated ambient temperature (ta)	:	max. 55°C
rated power	:	max. 39 W
rated current (In)	:	max. 1400 mA
resistance to impact (IK)	:	IK09 (PC), IK10 (Glass)

Product data - type VOLTANA EVO 1

design	:	8, 16 LEDs
rated ambient temperature (ta)	:	max. 55°C
rated power	:	max. 62 W
rated current (In)	:	max. 1400 mA
resistance to impact (IK)	:	IK10

TESTS

Test requirements

EN 60598-1:2015 + A1:2018
EN 60598-2-3:2003 + A1:2011

Test results

The test results are laid down in certification file 618719/30.

Remarks

This certificate is based on test report No. P1540-44-Ie.

Conclusion

The examination proved that all certification requirements were met.

Reviewed by, project leader : Christian Maes - 29/04/2022

Certification Manager :

2022-04-29

FACTORY LOCATION(S)

Schreder TOV
Vul. Mykulynetska 46B
46000 TERNOPIL
Ukraine

Schreder (China) Lighting Industrial Co., Ltd
No.40 Xinye 2 Street
Tianjin Economic Technological Development Zone West Zone
300462 Tianjin City, P.R.China
China

Socelec S.A.
Av. de Roanne, 66
Poligono Industrial "EL HENARES"
19180 MARCHAMALO (GUADALAJARA)
Spain

Schréder Iluminação S.A.
Rua da Fraternidade Operária, n° 3
2795-491 CARNAXIDE, OEIRAS
Portugal

Schréder Hungary Plc.
Tópart 2
2084 PILISSZENTIVAN
Hungary

ENEC Certification Body registered under ID # 02. Validity of ENEC and ENEC+ licences can be checked at www.enec.com

LICENCE

to use the ENEC+ Mark

ENEC+ Licence No.: 22299

Under the conditions given in the "Rules concerning the use of the CEBEC mark" complemented by the ENEC+ Agreement under contract 1173/2, the licence to use the ENEC+ Mark with suffix 02, as shown above, has been issued to:

Schréder S.A
Rue de Lusambo, 67
1190 Brussels
Belgium

For the product:

Street lighting luminaire

Trade name(s):

SCHREDER

Type(s)/Model(s):

VOLTANA EVO 1, VOLTANA 0, VOLTANA 1, VOLTANA 2, VOLTANA 3, VOLTANA 4

Complying with the following EPRS for performance:

EPRS 003 2018

Based on test reports n° : P1540-98_3535-LH351C-OSLON_062021

This licence is conditional to the validity of the ENEC Licence No.: 21181

Date: 2021-09-03

Signature:

Name: Calogero LANA
Position: Certification Manager

This licence has been issued under the presumption and conditional on the fact that the licensee holds all necessary legal rights with regard to the product presented for testing and certification.

Characteristics :

Rated voltage	:	200-240 V
Rated frequency	:	50-60 Hz
Degree of protection	:	IP66
Class	:	Class I
Colour rendering index (CRI):	:	70,80
Colour temperature (CCT)	:	3000K, 4000 K

Type / Model VOLTANA 0 :

Lamp(s)	:	6-8 LEDs LH 351C
Luminous flux	:	Max. 3819 lm
Efficacy (lm/W)	:	Max.136 lm/W
Rated power	:	Max. 37 W

Type / Model VOLTANA EVO 1 :

Lamp(s)	:	8-16 LEDs OSLON
Luminous flux	:	Max. 7345 lm
Efficacy (lm/W)	:	Max . 150 lm/W
Rated power	:	Max. 62 W

Type / Model VOLTANA 1 :

Lamp(s)	:	8 LEDs LH351C
Luminous flux	:	Max. 4168 lm
Efficacy (lm/W)	:	Max . 133 lm/W
Rated power	:	Max. 41 W

Type / Model VOLTANA 2 :

Lamp(s)	:	16 LEDs LH 351C
Luminous flux	:	Max. 6802 lm
Efficacy (lm/W)	:	Max . 145 lm/W
Rated power	:	Max. 58 W

Type / Model VOLTANA3 :

Lamp(s)	:	24 LEDs LH 351C, 3535 G4L
Luminous flux	:	Max. 9697 lm
Efficacy (lm/W)	:	Max . 152 lm/W
Rated power	:	Max. 80 W

Type / Model VOLTANA 4 :

Lamp(s)	:	32 LEDs LH 351C, 3535 G4L
Luminous flux	:	Max. 13179 lm
Efficacy (lm/W)	:	Max . 156 lm/W
Rated power	:	Max. 105 W

Test Report issued under the responsibility of:

TEST REPORT
IEC 60598-2-3
Luminaires
Part 2: Particular requirements
Section 3: Luminaires for road and street lighting

Report Number. ..... :	P1540-44-Ie
Date of issue..... :	2022-04-29
Total number of pages	60+1
Name of Testing Laboratory preparing the Report ..... :	SGS BELGIUM division SGS CEBEC
Applicant's name..... :	R-TECH
Address..... :	Rue de Mons, 3,B-4000 LIEGE
Test specification:	
Standard ..... :	IEC 60598-2-3:2002, AMD1:2011 used in conjunction with IEC 60598-1:2014, AMD1:2017
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC60598_2_3L
Test Report Form(s) Originator.... :	Intertek Semko AB
Master TRF..... :	Dated 2018-03-09

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description	Street lighting
Trade Mark	SCHREDER
Manufacturer	SCHREDER
Model/Type reference	VOLTANA EVO 1, VOLTANA 0, VOLTANA 1, VOLTANA 2, VOLTANA 3, VOLTANA 4.
Ratings	200-240 V, 50-60 Hz, Cl. I , IP66, LED. VOLTANA 1-4: IK08 VOLTANA 0: IK09 (PC), IK10 (Glass) VOLTANA EVO 1: IK10 Version with 32, 24, 16, 8, 6 led's Led: max 1400 mA

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☐	**CB Testing Laboratory:**		
Testing location/ address.....:			
☐	**Associated CB Testing Laboratory:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address.....:			
Tested by (name + signature) .....:			
Witnessed by (name, function, signature)..:			
Approved by (name, function, signature)...:			
☒	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address.....:		R-Tech , Rue de Mons, 3,B-4000 LIEGE	
Tested by (name, function, signature).....:		Ghysens Gilles	
Witnessed by (name, function, signature)..:		Christian Maes	
Approved by (name, function, signature)...:		Cheuvart Geoffrey	
Supervised by (name, function, signature) :			

List of Attachments (including a total number of pages in each attachment):
EU deviations
Pictures
Instructions

Summary of testing:

Additional endurance test §12.3 and IP test §9.2. IPX6 with new additional

Additional optional NEMA socket JL-240 (alternative to M400) in VOLTANA 2, 3 and 4.
Additional optional of LVS socket in VOLTANA EVO 1 & VOLTANA 0, 1, 2, 3, 4
Addition of EBS 40W into VOLTANA EVO 1, VOLTANA 2, 3, 4
Addition of EBS 80W into VOLTANA 4

Tests performed (name of test and test clause):	**Testing location:**
IEC 60598-2-3:2002, AMD1:2011 used in conjunction with IEC 60598-1:2014, AMD1:2017	R-tech sa Rue de Mons, 3 B-4000 LIEGE Belgium.

Summary of compliance with National Differences: Europe

List of countries addressed

☒ **The product fulfils the requirements of**

IEC 60598-2-3:2002, AMD1:2011 used in conjunction with IEC 60598-1:2014, AMD1:2017

EN 60598-2-3:2003 + A1:2011 used in conjunction with EN 60598-1:2015+A1:2018

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

Test item particulars .....:	
Classification of installation and use.....: **Supply Connection .....:** **.....:**	
Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement..... :	P (Pass)
- test object does not meet the requirement..... :	F (Fail)
Testing ..... :	
Date of receipt of test item..... :	November 2018
Date (s) of performance of tests ..... :	December 2018 – February 2019
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. **Throughout this report a ☒ comma / ☐ point is used as the decimal separator.** This report updates previous report version d : P1540-44-Id to include the use of Additional optional NEMA socket JL-240 (alternative to M400) in VOLTANA 2, 3 and 4. Additional optional of LVS socket in VOLTANA EVO 1 & VOLTANA 0, 1, 2, 3, 4 Addition of EBS 40W into VOLTANA EVO 1, VOLTANA 2, 3, 4 Addition of EBS 80W into VOLTANA 4 The other test and criteria are covered by previous test report Test performed see summary of tests;	
Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....:	☒ **Yes** ☐ **Not applicable**
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies)..... :	
	Socelec S.A. Av. de Roanne, 66 Poligono Industrial "EL HENARES" 19180 MARCHAMALO (GUADALAJARA),Spain
Schréder Iluminação S.A. Apartado, 132 2790-076 CARNAXIDE,Portugal	Schréder Hungary Plc. Tópart 2 , 2084 PILISSZENTIVAN,Hungary
Schreder TOV Vul. Mykulynetska 46B 46000 TERNOPIL,Ukraine	Schreder (China) Lighting Industrial Co., Ltd No.40 Xinye 2 Street, Tianjin Economic Technological Development Zone West Zone, 300462 Tianjin City, P.R.China,China

General product information:

Rating :

	Leds count	current @ LEDs (mA)	Max Power (W)	ta (°C)	note
EVO 1	8	0 < I ≤ 1400	39	55	
	16	0 < I ≤ 1050	55	45	
		1050 < I ≤ 1200	62	40	
0	6	0 < I ≤ 1050	23	45	ta 55°C with Control gear Meanwell model PLD-40W ta 50°C with Control gear Signify model LP/FP 22W C123
		1050 < I ≤ 1400	30	55	
	8	0 < I ≤ 1050	29	45	
		1050 < I ≤ 1250	37	40	ta 45°C with Control gear Meanwell model PLD-40W
		1250 < I ≤ 1400	39	45	
1	8	0 < I ≤ 1000	29	55	
		1000 < I ≤ 1250	37	50	
		1250 < I ≤ 1400	41	45	
2	16	0 < I ≤ 1050	58	45	
3	24	0 < I ≤ 700	55	50	
		700 < I ≤ 1000	80	35	
4	32	0 < I ≤ 700	73	55	
		700 < I ≤ 1000	105	45	

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

3.2 (0)	**GENERAL TEST REQUIREMENTS**		
3.2 (0.3)	More sections applicable..... :	Yes ☐ No ☒ Section/s:	—
3.2 (0.5)	Components	(see Annex 1)	—
3.2 (0.7)	**Information for luminaire design in light sources standards**		—
3.2 (0.7.2)	Light source safety standard ..... :		—
	Luminaire design in the light source safety standard		N/A

3.4 (2)	**CLASSIFICATION**		P
3.4 (2.2)	Type of protection ..... :	Class I	—
3.4 (2.3)	Degree of protection..... :	IP 66	—
3.4 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces..... :	Yes ☒ No ☒	—
3.4 (2.5)	Luminaire for normal use ..... :	Yes ☒ No ☐	—
	Luminaire for rough service ..... :	Yes ☐ No ☒	—
3.4 (-)	Modes of installation of road or street lighting		—
	a) on a pipe	Yes ☒ No ☐	—
	b) on a mast arm	Yes ☒ No ☐	—
	c) on a post top	Yes ☐ No ☒	—
	d) on span or suspension wires	Yes ☐ No ☒	—
	e) on a wall	Yes ☐ No ☒	—

3.5 (3)	**MARKING**		
3.5 (3.2)	Mandatory markings		P
	Position of the marking		P
	Format of symbols/text		P
3.5 (3.3)	Additional information		P
	Language of instructions		P
3.5 (3.3.1)	Combination luminaires		N/A
3.5 (3.3.2)	Nominal frequency in Hz	50-60 Hz	P
3.5 (3.3.3)	Operating temperature		N/A
3.5 (3.3.4)	Symbol or warning notice		N/A
3.5 (3.3.5)	Wiring diagram		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.5 (3.3.6)	Special conditions		N/A
3.5 (3.3.7)	Metal halide lamp luminaire – warning		N/A
3.5 (3.3.8)	Limitation for semi-luminaires		N/A
3.5 (3.3.9)	Power factor and supply current		P
3.5 (3.3.10)	Suitability for use indoors		N/A
3.5 (3.3.11)	Luminaires with remote control		N/A
3.5 (3.3.12)	Clip-mounted luminaire – warning		N/A
3.5 (3.3.13)	Specifications of protective shields		N/A
3.5 (3.3.14)	Symbol for nature of supply		N/A
3.5 (3.3.15)	Rated current of socket outlet		N/A
3.5 (3.3.16)	Rough service luminaire		N/A
3.5 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments		P
3.5 (3.3.18)	Non-ordinary luminaires with PVC cable		N/A
3.5 (3.3.19)	Protective conductor current in instruction if applicable		N/A
3.5 (3.3.20)	Provided with information if not intended to be mounted within arm's reach		N/A
3.5 (3.3.21)	Non-replaceable and non-user replaceable light sources information provided		P
	Cautionary symbol		P
3.5 (3.3.22)	Controllable luminaires, classification of insulation provided		N/A
3.5 (3.4)	Test with water		P
	Test with hexane		P
	Legible after test		P
	Label attached		P
3.5 (-)	Additional information in instruction leaflet		
	a) Design attitude	See attached Installation Notice	P
	b) Weight	See attached Installation Notice	P
	c) Overall dimensions	See attached Installation Notice	P
	d) Maximum projected area if applicable	See attached Installation Notice	P
	e) Cross-sectional area of wires if applicable		N/A
	f) Suitability for indoors use		N/A
	g) Dimensions of the compartment		N/A
	h) Torque setting to be applied to bolts or screws	See attached Installation Notice	P

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	i) Maximum mounting height	>6 m	P

3.6 (4)	**CONSTRUCTION**		
3.6 (4.2)	Components replaceable without difficulty		N/A
3.6 (4.3)	Wireways smooth and free from sharp edges		P
3.6 (4.4)	**Lampholders**		
3.6 (4.4.1)	Integral lampholder		N/A
3.6 (4.4.2)	Wiring connection		N/A
3.6 (4.4.3)	Lampholder for end-to-end mounting		N/A
3.6 (4.4.4)	Positioning		N/A
	- pressure test (N) ..... :		—
	After test the lampholder comply with relevant standard sheets and show no damage		N/A
	After test on single-capped lampholder the lampholder have not moved from its position and show no permanent deformation		N/A
	- bending test (N) ..... :		—
	After test the lampholder have not moved from its position and show no permanent deformation		N/A
3.6 (4.4.5)	Peak pulse voltage		N/A
3.6 (4.4.6)	Centre contact		N/A
3.6 (4.4.7)	Parts in rough service luminaires resistant to tracking		N/A
3.6 (4.4.8)	Lamp connectors		N/A
3.6 (4.4.9)	Caps and bases correctly used		N/A
3.6 (4.4.10)	Light source for lampholder or connection according IEC 60061 not connected another way		N/A
3.6 (4.5)	**Starter holders**		
	Starter holder in luminaires other than class II		N/A
	Starter holder class II construction		N/A
3.6 (4.6)	**Terminal blocks**		
	Tails	Provided with internal connector	N/A
	Unsecured blocks	Fixed	N/A
3.6 (4.7)	**Terminals and supply connections**		
3.6 (4.7.1)	Contact to metal parts		P

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.6 (4.7.2)	Test 8 mm live conductor		P
	Test 8 mm earth conductor		P
3.6 (4.7.3)	Terminals for supply conductors		P
3.6 (4.7.3.1)	Welded method and material		
	- stranded or solid conductor		N/A
	- spot welding		N/A
	- welding between wires		N/A
	- Type Z attachment		N/A
	- mechanical test according to 15.8.2		N/A
	- electrical test according to 15.9		N/A
	- heat test according to 15.9.2.3 and 15.9.2.4		N/A
3.6 (4.7.4)	Terminals other than supply connection		N/A
3.6 (4.7.5)	Heat-resistant wiring/sleeves		N/A
3.6 (4.7.6)	Multi-pole plug		N/A
	- test at 30 N		N/A
3.6 (4.8)	**Switches**		
	- adequate rating		N/A
	- adequate fixing		N/A
	- polarized supply		N/A
	- compliance with IEC 61058-1 for electronic switches		N/A
3.6 (4.9)	**Insulating lining and sleeves**		
3.6 (4.9.1)	Retainment		N/A
	Method of fixing..... :		—
3.6 (4.9.2)	Insulated linings and sleeves:		
	Resistant to a temperature > 20 °C to the wire temperature or		N/A
	a) & c) Insulation resistance and electric strength		N/A
	b) Ageing test. Temperature (°C)..... :		N/A
3.6 (4.10)	**Double or reinforced insulation**		
3.6 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		N/A
	Safe installation fixed luminaires		N/A
	Capacitors and switches		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Interference suppression capacitors according to IEC 60384-14		P
3.6 (4.10.2)	Assembly gaps:		
	- not coincidental		N/A
	- no straight access with test probe		N/A
3.6 (4.10.3)	Retainment of insulation:		
	- fixed		N/A
	- unable to be replaced; luminaire inoperative		N/A
	- sleeves retained in position		N/A
	- lining in lampholder		N/A
3.6 (4.11)	**Electrical connections and current-carrying parts**		
3.6 (4.11.1)	Contact pressure		P
3.6 (4.11.2)	Screws:		
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
3.6 (4.11.3)	Screw locking:		
	- spring washer		P
	- rivets		N/A
3.6 (4.11.4)	Material of current-carrying parts		P
3.6 (4.11.5)	No contact to wood or mounting surface		P
3.6 (4.11.6)	Electro-mechanical contact systems		N/A
3.6 (4.12)	**Screws and connections (mechanical) and glands**		
3.6 (4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N/A
	Torque test: torque (Nm); part ..... :	2Nm (case)	P
	Torque test: torque (Nm); part ..... :	1.2Nm (drivers)	N/A
	Torque test: torque (Nm); part ..... :	1.2Nm (glass)	N/A
3.6 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
3.6 (4.12.4)	Locked connections:		
	- fixed arms; torque (Nm)..... :		P
	- lampholder; torque (Nm) ..... :		N/A
	- push-button switches; torque 0,8 Nm ..... :		N/A
3.6 (4.12.5)	Screwed glands; force (Nm) ..... :		P
3.6 (4.13)	**Mechanical strength**		

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

3.6 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm)..... :	0,5 Nm	P
	- other parts; energy (Nm) ..... :	0,7 Nm	P
	1) live parts		P
	2) linings		P
	3) protection		P
	4) covers		P
3.6 (4.13.3)	Straight test finger		P
3.6 (4.13.4)	Rough service luminaires		
	- IP54 or higher		N/A
	a) fixed		N/A
	b) hand-held		N/A
	c) delivered with a stand		N/A
	d) for temporary installations and suitable for mounting on a stand		N/A
3.6 (4.13.6)	Tumbling barrel		N/A
3.6 (4.14)	**Suspensions, fixings and means of adjusting**		
3.6 (4.14.1)	Mechanical load:		
	A) four times the weight		N/A
	B) torque 2,5 Nm		P
	C) bracket arm; bending moment (Nm)..... :		N/A
	D) load track-mounted luminaires		N/A
	E) clip-mounted luminaires, glass-shelve. Thickness (mm) ..... :		N/A
	Metal rod. diameter (mm) ..... :		N/A
	Fixed luminaire or independent control gear without fixing devices		N/A
3.6 (4.14.2)	Load to flexible cables		N/A
	Mass (kg) ..... :		—
	Stress in conductors (N/mm²) ..... :		N/A
	Mass (kg) of semi-luminaire ..... :		—
	Bending moment (Nm) of semi-luminaire ..... :		N/A
3.6 (4.14.3)	Adjusting devices:		
	- flexing test; number of cycles ..... :		N/A
	- strands broken..... :		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- electric strength test afterwards		N/A
3.6 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N/A
3.6 (4.14.5)	Guide pulleys		N/A
3.6 (4.14.6)	Strain on socket-outlets		N/A
3.6 (4.15)	**Flammable materials**		
	- glow-wire test 650°C ..... :	See Test Table 3.15 (13.3.2)	N/A
	- spacing ≥30 mm		N/A
	- screen withstanding test of 13.3.1		N/A
	- screen dimensions		N/A
	- no fiercely burning material		P
	- thermal protection		N/A
	- electronic circuits exempted		N/A
3.6 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		
	a) construction		P
	b) temperature sensing control	110	P
	c) surface temperature		N/A
3.6 (4.16)	**Luminaires for mounting on normally flammable surfaces**		
	No lamp control gear ..... :	(compliance with Section 12)	N/A
3.6 (4.16.1)	Lamp control gear spacing:		
	- spacing 35 mm		N/A
	- spacing 10 mm		N/A
3.6 (4.16.2)	Thermal protection:		
	- in lamp control gear		N/A
	- external		N/A
	- fixed position		N/A
	- temperature marked lamp control gear		P
3.6 (4.16.3)	Design to satisfy the test of 12.6	(see clause 12.6)	P
3.6 (4.17)	**Drain holes**		
	Clearance at least 5 mm		N/A
3.6 (4.18)	**Resistance to corrosion**		
3.6 (4.18.1)	- rust-resistance		P
3.6 (4.18.2)	- season cracking in copper		P
3.6 (4.18.3)	- corrosion of aluminium		P

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.6 (4.19)	Igniters compatible with ballast		N/A
3.6 (4.20)	Rough service vibration		N/A
3.6 (4.21)	**Protective shield**		
3.6 (4.21.1)	Shield fitted if tungsten halogen lamps or metal halide lamps		N/A
	Shield of glass if tungsten halogen lamps		N/A
3.6 (4.21.2)	Particles from a shattering lamp not impair safety		N/A
3.6 (4.21.3)	No direct path		N/A
3.6 (4.21.4)	Impact test on shield		N/A
	Glow-wire test on lamp compartment..... :	See Test Table 3.15 (13.3.2)	N/A
3.6 (4.22)	Attachments to lamps not cause overheating or damage		N/A
3.6 (4.23)	Semi-luminaires comply Class II		N/A
3.6 (4.24)	**Photobiological hazards**		
3.6 (4.24.1)	No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P)		P
3.6 (4.24.2)	Retinal blue light hazard		
	Luminaires with E_{thr} :		
	a) Fixed luminaires		P
	- distance x m, borderline between RG1 and RG2 .. :	RG1@80cm	P
	- marking and instruction according 3.2.23		P
	b) Portable and handheld luminaires		
	- marking according 3.2.23 if RG1 exceeded at 200 mm according to IEC/TR 62778		N/A
	Portable luminaires for children IEC 60598-2-10 and Mains socket outlet nightlights IEC 60598-2-12 not exceed RG1 at 200 mm according to IEC/62778		N/A
3.6 (4.25)	**Mechanical hazard**		
	No sharp point or edges		P
3.6 (4.26)	**Short-circuit protection**		
3.6 (4.26.1)	Adequate means of uninsulated accessible SELV parts		N/A
3.6 (4.26.2)	Short-circuit test with test chain according 4.26.3		N/A
	Test chain not melt through		N/A
	Test sample not exceed values of Table 12.1 and 12.2		N/A
3.6 (4.27)	**Terminal blocks with integrated screwless earthing contacts**		

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Test according Annex V		N/A
	Pull test of terminal fixing (20 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Pull test of mechanical connection (50 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Voltage drop test, resistance < 0,05 Ω		N/A
3.6 (4.28)	**Fixing of thermal sensing control**		
	Not plug-in or easily replaceable type		N/A
	Reliably kept in position		N/A
	No adhesive fixing if UV radiations from a lamp can degrade the fixing		N/A
	Not outside the luminaire enclosure		N/A
	Test of adhesive fixing:		N/A
	Max. temperature on adhesive material (°C)..... :		—
	100 cycles between t min and t max		N/A
	Temperature sensing control still in position		N/A
3.6 (4.29)	**Luminaires with non-replaceable light source**		
	Not possible to replace light source		N/A
	Live part not accessible after parts have been opened by hand or tools		N/A
3.6 (4.30)	**Luminaires with non-user replaceable light source**		
	If protective cover provide protection against electric shock and marked with “caution, electric shock risk” symbol:		P
	Minimum two fixing means		P
3.6 (4.31)	**Insulation between circuits**		
	Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3	SELV/IEC 61347-2-13	P
	Controllable luminaires requiring same level of insulation for all components, the insulation between control terminals and LV supply fulfil requirements according 4.31.1 – 4.31.3		N/A
3.6 (4.31.1)	SELV circuits		P
	Used SELV source		P
	Voltage ≤ ELV		P
	Insulating of SELV circuits from LV supply	Double/reinforced	P
	Insulating of SELV circuits from other non SELV circuits		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Insulating of SELV circuits from FELV		N/A
	Insulating of SELV circuits from other SELV circuits		N/A
	SELV circuits insulated from accessible parts according Table X.1		P
	Plugs not able to enter socket-outlets of other voltage systems		N/A
	Socket outlets does not admit plugs of other voltage systems		N/A
	Plugs and socket-outlets does not have protective conductor contact		N/A
3.6 (4.31.2)	FELV circuits		
	Used FELV source		N/A
	Voltage ≤ ELV		N/A
	Insulating of FELV circuits from LV supply		N/A
	FELV circuits insulated from accessible parts according Table X.1		N/A
	Plugs not able to enter socket-outlets of other voltage systems		N/A
	Socket outlets does not admit plugs of other voltage systems		N/A
	Socket-outlets does not have protective conductor contact		N/A
3.6 (4.31.3)	Other circuits		
	Other circuits insulated from accessible parts according Table X.1		N/A
	Class II construction with equipotential bonding for protection against indirect contacts with live parts:		
	- conductive parts are connected together		N/A
	- test according 7.2.3 of above		N/A
	- conductive part not cause an electric shock in case of an insulation fault		N/A
	- equipotential bonding in master/slave applications		N/A
	- master luminaire provided with terminal for accessible conductive parts of slave luminaires		N/A
	- slave luminaire constructed as class I		N/A
3.6 (4.32)	**Overvoltage protective devices**		
	Comply with IEC 61643-11	CB	P
	External to controlgear and connected to earth:		

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- only in fixed luminaires		P
	- only connected to protective earth		P
3.6.1 (-)	At least IP X3 or X5 respectively. IP .....:	IP66	P
	Column-integrated luminaires:		
	- parts below 2,5 m. IP .....:		N/A
	- parts above 2,5 m. IP .....:		N/A
3.6.2 (-)	Suspension on span wires		N/A
3.6.3 (-)	Means for attaching the luminaire or external parts to its support appropriate to the weight		P
3.6.3.1 (-)	Static load test		
	- drag coefficient .....:	1.225Kg/m³	P
	- loaded area (m²) .....:	0.34m²	P
	- used load (N) .....:	675.7N	P
	- measured deformation (cm/m) .....:	1.2cm/m	P
	- no rotation		P
3.6.4 (-)	Adjustable lampholders		N/A
3.6.5 (-)	Luminaires installed above 5 m, glass covers shall be:		
	a) glass that fractures into small pieces (test according to 3.6.5.1), or	Safety Glass	P
	b) glass having a high impact shock resistance (test according to 3.6.5.2), or		P
	c) protected by any means to retain glass fragments		N/A
	For tunnel luminaires 3.6.5.1 apply		N/A
	Method of protection declared by the manufacturer		N/A
3.6.5.1 (-)	Protection by the use of glass that fractures into small pieces		P
	- number of particles is more than 40.....:	48	P
3.6.5.2 (-)	Protection by the use of high impact resistant glass		P
3.6.5.2.1 (-)	Glass covers have high mechanical strength		P
	Test according IEC 62262 with test apparatus according IEC 60068-2-75 with impact energy of 5J on preconditioned sample	VOLTANA 1-4: IK08 according IEC 62262 VOLTANA 0: IK09 (PC), IK10 (Glass) according IEC 62262 VOLTANA EVO 1: IK10 according IEC 62262	P
3.6.5.2.2 (-)	Glass covers not break into large pieces		P
	- test according 3.6.5.1, number of particles is more than 20.....:	50	P

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.6.6 (-)	Connection compartment of column-integrated luminaire		
	- provides adequate space		N/A
	- means for attachment		N/A
	- means for attachment of metal corrosion-resistant		N/A
3.6.7 (-)	Compliance with ISO standard or other .....:		N/A
3.6.8 (-)	Doors of column-integrated luminaires:		
	- corrosion-resistant		N/A
	- opening only possible for an authorized person		N/A
	- impact test 5 Nm		N/A
	- sample show no damage		N/A
3.6.9 (-)	Column-integrated luminaire:		
	- dimension of the cable entry slot (mm) .....:		N/A
	- cable path from the slot to the connection compartment (mm) .....:		N/A
	- cable path free from obstruction that might cause abrasion of the cable		N/A
3.7 (11)	**CREEPAGE DISTANCES AND CLEARANCES**		P
3.7 (11.2.1)	Impulse withstand category (Normal category II)	Category II ☒ Category III ☐	—
	Category III according Annex U		N/A
	Protected against pollution, reduced creepage and clearance according Annex P of IEC 61347-1		N/A
3.7 (11.2.2)	Creepage distances for frequency up to 30 kHz	See Test Table 3.7 (11.2) I	P
	Creepage distances for frequency over 30 kHz:		N/A
	- Controlgear marked with $\hat{U}_{OUT}$ and f_{UOUT} according IEC 61347-1, clause 7.1, item w	See Test Table 3.7 (11.2) II	N/A
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 3.7 (11.2) II	N/A
3.7 (11.2.3)	Clearances for frequency up to 30 kHz	See Test Table 3.7 (11.2) I	P
	Clearances distances for frequency over 30 kHz:		N/A
	- Controlgear marked with U_P	See Test Table 3.7 (11.2) II	N/A
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 3.7 (11.2) II	N/A
3.8 (7)	**PROVISION FOR EARTHING**		
3.8 (7.2.1 + 7.2.3)	Accessible metal parts		P

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Metal parts in contact with supporting surface		P
	Resistance < 0,5 Ω..... :		P
	Self-tapping screws used		N/A
	Thread-forming screws		N/A
	Thread-forming screw used in a grove		N/A
	Earth makes contact first		P
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
	Protective earthing of the luminaire not via built-in control gear		P
3.8 (7.2.2 + 7.2.3)	Earth continuity in joints, etc.		P
3.8 (7.2.4)	Locking of clamping means		P
	Compliance with 4.7.3		P
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
3.8 (7.2.5)	Earth terminal integral part of connector socket		P
3.8 (7.2.6)	Earth terminal adjacent to mains terminals		P
3.8 (7.2.7)	Electrolytic corrosion of the earth terminal		P
3.8 (7.2.8)	Material of earth terminal		P
	Contact surface bare metal		P
3.8 (7.2.10)	Class II luminaire for looping-in		N/A
	Double or reinforced insulation to functional earth		N/A
3.8 (7.2.11)	Earthing core coloured green-yellow		P
	Length of earth conductor		N/A
3.8.1 (-)	Attachment prevented from rotation		N/A
3.9 (14)	**SCREW TERMINALS**		P
	Separately approved; component list..... :	(see Annex 1)	P
	Part of the luminaire ..... :	(see Annex 3)	N/A
3.9 (15)	**SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS**		P
	Separately approved; component list..... :	(see Annex 1)	P
	Part of the luminaire ..... :	(see Annex 4)	N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

3.10 (5)	**EXTERNAL AND INTERNAL WIRING**		
3.10 (5.2)	**Supply connection and external wiring**		**P**
3.10 (5.2.1)	Means of connection ..... :	Internal connector	P
	Outdoor luminaire has not PVC insulated external wiring if not class III or SELV ≤ 25 V a.c./60 V d.c. or protected from outdoor environment		N/A
3.10 (5.2.2)	Type of cable ..... :	H07RN-F (if provided)	P
	Nominal cross-sectional area (mm²) ..... :	1,5 mm²	P
	Cables equal to IEC 60227 or IEC 60245		P
3.10 (5.2.3)	Type of attachment, X, Y or Z		N/A
3.10 (5.2.5)	Type Z not connected to screws		N/A
3.10 (5.2.6)	Cable entries:		
	- suitable for introduction		P
	- adequate degree of protection		P
3.10 (5.2.7)	Cable entries through rigid material have rounded edges		P
3.10 (5.2.8)	Insulating bushings:		
	- suitably fixed		N/A
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- tubes or guards made of insulating material		N/A
3.10 (5.2.9)	Locking of screwed bushings		N/A
3.10 (5.2.10)	Cord anchorage:		
	- covering protected from abrasion		P
	- clear how to be effective		P
	- no mechanical or thermal stress		P
	- no tying of cables into knots etc.		P
	- insulating material or lining		P
3.10 (5.2.10.1)	Cord anchorage for type X attachment:		
	a) at least one part fixed		N/A
	b) types of cable		N/A
	c) no damaging of the cable		N/A
	d) whole cable can be mounted		N/A
	e) no touching of clamping screws		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	f) metal screw not directly on cable		N/A
	g) replacement without special tool		N/A
	Glands not used as anchorage		N/A
	Labyrinth type anchorages		N/A
3.10 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment		N/A
3.10 (5.2.10.3)	Tests:		
	- impossible to push cable; unsafe		P
	- pull test: 25 times; pull (N) ..... :	60	P
	- torque test: torque (Nm) ..... :	0.25Nm	P
	- displacement ≤ 2 mm		P
	- no movement of conductors		P
	- no damage of cable or cord		P
	- function independent of electrical connection		N/A
3.10 (5.2.11)	External wiring passing into luminaire		N/A
3.10 (5.2.12)	Looping-in terminals		N/A
3.10 (5.2.13)	Wire ends not tinned		N/A
	Wire ends tinned: no cold flow		N/A
3.10 (5.2.14)	Mains plug same protection		N/A
	Class III luminaire plug		N/A
	No unsafe compatibility		N/A
3.10 (5.2.16)	Appliance inlets (IEC 60320)		P
	Installation couplers (IEC 61535)		N/A
	Other appliance inlet or connector according relevant IEC standard		N/A
3.10 (5.2.17)	No standardized interconnecting cables properly assembled		N/A
3.10 (5.2.18)	Used plug in accordance with		
	- IEC 60083		N/A
	- other standard		N/A
3.10 (5.3)	**Internal wiring**		

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.10 (5.3.1)	Internal wiring of suitable size and type		P
	Through wiring		
	- not delivered/ mounting instruction		N/A
	- factory assembled		N/A
	- socket outlet loaded (A)..... :		N/A
	- temperatures..... :	(see Annex 2)	N/A
	Green-yellow for earth only		N/A
3.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		
	Cross-sectional area (mm²)..... :		P
	Insulation thickness		P
	Extra insulation added where necessary		N/A
3.10 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		
	Adequate cross-sectional area and insulation thickness		N/A
3.10 (5.3.1.3)	Double or reinforced insulation for class II		N/A
3.10 (5.3.1.4)	Conductors without insulation		N/A
3.10 (5.3.1.5)	SELV current-carrying parts		P
3.10 (5.3.1.6)	Insulation thickness other than PVC or rubber		P
3.10 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		N/A
	Joints, raising/lowering devices		N/A
	Telescopic tubes etc.		N/A
	No twisting over 360°		N/A
3.10 (5.3.3)	Insulating bushings:		
	- suitable fixed		N/A
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- cables with protective sheath		N/A
3.10 (5.3.4)	Joints and junctions effectively insulated		N/A
3.10 (5.3.5)	Strain on internal wiring		P
3.10 (5.3.6)	Wire carriers		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.10 (5.3.7)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		N/A
3.10.1 (-)	Cord anchorage if applicable		P
	- pull test: 25 times; pull (N).....:	60 N	P
	- torque test: torque (Nm) .....:	0.25 Nm	P
3.11 (8)	**PROTECTION AGAINST ELECTRIC SHOCK**		
3.11 (8.2.1)	Live parts not accessible		P
	Basic insulated parts not used on the outer surface without appropriate protection		P
	Basic insulated parts not accessible with standard test finger on portable, settable and adjustable luminaires		P
	Basic insulated parts not accessible with Ø 50 mm probe from outside, other types of luminaires		P
	Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N/A
	Basic insulation only accessible under lamp or starter replacement		N/A
	Protection in any position		N/A
	Double-ended tungsten filament lamp		N/A
	Insulation lacquer not reliable		N/A
	Double-ended high pressure discharge lamp		N/A
	Relevant warning according to 3.2.18 fitted to the luminaire		N/A
3.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N/A
3.11 (8.2.3.a)	Class II luminaire:		
	- basic insulated metal parts not accessible during starter or lamp replacement		N/A
	- basic insulation not accessible other than during starter or lamp replacement		N/A
	- glass protective shields not used as supplementary insulation		N/A
3.11 (8.2.3.b)	BC lampholder of metal in class I luminaires shall be earthed		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

3.11 (8.2.3.c)	SELV circuits with exposed current carrying parts:		
	Ordinary luminaire:		
	- touch current ..... :		N/A
	- no-load voltage ..... :		N/A
	Other than ordinary luminaire:		
	- nominal voltage ..... :		N/A
3.11 (8.2.4)	Portable luminaire have protection independent of supporting surface		N/A
3.11 (8.2.5)	Compliance with the standard test finger or relevant probe		P
3.11 (8.2.6)	Covers reliably secured		P
3.11 (8.2.7)	Discharging of capacitors ≥ 0,5 μF		N/A
	Portable plug connected luminaire with capacitor		N/A
	Other plug connected luminaire with capacitor		N/A
	Discharge device on or within capacitor		N/A
	Discharge device mounted separately		N/A

3.12 (12)	**ENDURANCE TEST AND THERMAL TEST**		P
3.12.2 (-)	If IP > IP 20 relevant test of (12.4), (12.5) and (12.6) after (9.2) before (9.3) specified in 3.13		—
3.12 (12.2)	**Selection of lamps and ballasts**		**—**
	Lamp used according Annex B	(Lamp used see Annex 2)	—
	Controlgear if separate and not supplied	(Controlgear used see Annex 2)	—
3.12 (12.3)	**Endurance test**		**P**
	a) mounting-position ..... :	Post-Top	—
	b) test temperature (°C) ..... :	55°C	—
	c) total duration (h) ..... :	240H	—
	d) supply voltage (V) ..... :	250V	—
	d) if not equipped with controlgear, constant voltage/current (V) or (A) ..... :	N/A	—
	e) luminaire ceases to operate	N/A	—
3.12 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- no damage to track system		N/A
	- marking legible		N/A
	- no cracks, deformation etc.		N/A
3.12 (12.4)	**Thermal test (normal operation)**	(see Annex 2)	**P**
3.12 (12.5)	**Thermal test (abnormal operation)**	(see Annex 2)	**N/A**
3.12 (12.6)	**Thermal test (failed lamp control gear condition):**		**N/A**
3.12 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A) ..... :		—
	- case of abnormal conditions..... :		—
	- electronic lamp control gear		N/A
	- measured winding temperature (°C): at 1,1 Un .... :		—
	- measured mounting surface temperature (°C) at 1,1 Un ..... :		N/A
	- calculated mounting surface temperature (°C) ..... :		N/A
	- track-mounted luminaires		N/A
3.12 (12.6.2)	Temperature sensing control		N/A
	- case of abnormal conditions..... :		—
	- thermal link		N/A
	- manual reset cut-out		N/A
	- auto reset cut-out		N/A
	- measured mounting surface temperature (°C) ..... :		N/A
	- track-mounted luminaires		N/A
3.12 (12.7)	**Thermal test (failed lamp control gear in plastic luminaires):**		N/A
3.12 (12.7.1)	Luminaire without temperature sensing control		N/A
3.12 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		N/A
	Test method 12.7.1.1 or Annex W ..... :		—
	Test according to 12.7.1.1:		N/A
	- case of abnormal conditions..... :		—
	- Ballast failure at supply voltage (V) ..... :		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
	Test according to Annex W:		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- case of abnormal conditions..... :		—
	- measured winding temperature (°C): at 1,1 Un..... :		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un..... :		—
	- calculated temperature of fixing point/exposed part (°C)..... :		—
	Ball-pressure test.....:	See Test Table 3.15 (13.2.1)	N/A
3.12 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		N/A
	- case of abnormal conditions..... :		—
	- measured winding temperature (°C): at 1,1 Un..... :		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un..... :		—
	- calculated temperature of fixing point/exposed part (°C)..... :		—
	Ball-pressure test..... :	See Test Table 3.15 (13.2.1)	N/A
3.12 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N/A
	- case of abnormal conditions..... :		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
3.12 (12.7.2)	Luminaire with temperature sensing control		N/A
	- thermal link..... :	Yes ☐ No ☐	—
	- manual reset cut-out..... :	Yes ☐ No ☐	—
	- auto reset cut-out..... :	Yes ☐ No ☐	—
	- case of abnormal conditions..... :		—
	- highest measured temperature of fixing point/ exposed part (°C):..... :		—
	Ball-pressure test:..... :	See Test Table 3.15 (13.2.1)	N/A
3.12.1 (-)	Temperature reduction if for outdoor use only		N/A
3.12.2 (-)	(See above)		—
3.12.3 (-)	Glass covers used within the thermal limits declared by the glass manufacturer		N/A

3.13 (9)	**RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE**	P
3.13.1 (-)	If IP > IP 20 the order of tests as specified in clause 3.12	P

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.13 (9.2)	Tests for ingress of dust, solid objects and moisture:		—
	- classification according to IP ..... :	IP66	—
	- mounting position during test..... :	Acc. to mounting instruction	—
	- fixing screws tightened; torque (Nm) ..... :	Acc. to mounting instruction	—
	- tests according to clauses ..... :		—
	- electric strength test afterwards		P
	a) no deposit in dust-proof luminaire		P
	b) no talcum in dust-tight luminaire		P
	c) no trace of water on current-carrying parts or on insulation where it could become a hazard		P
	d) i) For luminaires without drain holes – no water entry		P
	d) ii) For luminaires with drain holes – no hazardous water entry		N/A
	e) no water in watertight luminaire		P
	f) no contact with live parts (IP 2X)		P
	f) no entry into enclosure (IP 3X and IP 4X)		P
	f) no contact with live parts (IP3X and IP4X)		P
	g) no trace of water on part of lamp requiring protection from splashing water		N/A
	h) no damage of protective shield or glass envelope		N/A
3.13 (9.3)	Humidity test 48 h		P
3.14 (10)	**INSULATION RESISTANCE AND ELECTRIC STRENGTH**		P
3.14 (10.2.1)	Insulation resistance test		P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø ..... :		—
	Insulation resistance (MΩ)..... :		—
	SELV		
	- between current-carrying parts of different polarity :		N/A
	- between current-carrying parts and mounting surface..... :		N/A
	- between current-carrying parts and metal parts of the luminaire ..... :		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :		N/A
	- Insulation bushings as described in Section 5 ..... :		N/A
	Other than SELV		
	- between live parts of different polarity ..... :	>2,6 MΩ	P
	- between live parts and mounting surface..... :		N/A
	- between live parts and metal parts ..... :	>2,6 MΩ	P
	- between live parts of different polarity through action of a switch ..... :		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :		N/A
	- Insulation bushings as described in Section 5 ..... :		N/A
3.14 (10.2.2)	Electric strength test		P
	Dummy lamp		N/A
	Luminaires with ignitors after 24 h test		N/A
	Luminaires with manual ignitors		N/A
	Test voltage (V)..... :		P
	SELV		
	- between current-carrying parts of different polarity :		N/A
	- between current-carrying parts and mounting surface..... :		N/A
	- between current-carrying parts and metal parts of the luminaire ..... :		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :		N/A
	- Insulation bushings as described in Section 5 ..... :		N/A
	Other than SELV		
	- between live parts of different polarity ..... :	1480V	P
	- between live parts and mounting surface..... :		N/A
	- between live parts and metal parts ..... :	1480V	P
	- between live parts of different polarity through action of a switch ..... :		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- Insulation bushings as described in Section 5 ..... :		N/A
3.14 (10.3)	Touch current or protective conductor current (mA) :	<0,5	P
12 (14)	**FAULT CONDITIONS (IEC 62031)**		**P**
12.2	**Overpower condition**		**P**
	Module withstands overpower condition >15 min.		P
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		N/A
	No fire, smoke or flammable gas is produced		P
	Molten material does not ignite tissue paper, spread below the module		P
3.15 (13)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		
3.15 (13.2.1)	Ball-pressure test ..... :	See Test Table 3.15 (13.2.1)	N/A
3.15 (13.3.1)	Needle-flame test (10 s) ..... :	See Test Table 3.15 (13.3.1)	N/A
3.15 (13.3.2)	Glow-wire test (650°C) ..... :	See Test Table 3.15 (13.3.2)	N/A
3.15 (13.4)	Proof tracking test (IEC 60112) ..... :	See Test Table 3.15 (13.4)	N/A

3.7 (11.2)	**TABLE I: Creepage distances and clearances**							**P**
	Minimum distances (mm) for a.c. up to 30 kHz sinusoidal voltages							
	Applicable part of IEC 60598-1 Table 11.1.A*, 11.1.B* and 11.2*							
	Insulation type **	**Measured clearance**	**Required**		**Measured creepage**	**Required**		
			clearance	***Table**		**creepage**	***Table**	
Distance 1:	B	>0.7	0.5	11.1.B	>1.7	1.3	11.1.A	
Working voltage (V) ..... :					250			—
PTI..... :					< 600 ☐ ≥ 600 ☒			—
Pulse voltage or U_P if applicable (kV) ..... :					N/A			—
Supplementary information: Primary circuit								
Distance 2:	B	>0.7	0.5	11.1.B	>1.7	1.3	11.1.A	
Working voltage (V) ..... :					250			—
PTI..... :					< 600 ☐ ≥ 600 ☒			—

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

Pulse voltage or U_P if applicable (kV) ..... :					N/A		—
Supplementary information: Secondary circuit							
Distance 3:	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Working voltage (V) ..... :					N/A		—
PTI..... :					< 600 ☐ ≥ 600 ☐		—
Pulse voltage or U_P if applicable (kV) ..... :					N/A		—
Supplementary information: N/A							

** Insulation type: B – Basic; S – Supplementary; R – Reinforced. See also IEC 60598-1 Annex M.

3.7 (11.2)	**TABLE II: Creepage distances and clearances**						**N/A**
Minimum distances (mm) for a.c. higher than 30 kHz sinusoidal voltages							
Applicable part of IEC 61347-1 Table 7 and 8* or IEC 60664-4 Table 1 and 2							
Distances	**Insulation type ****	**Measured clearance**	**Required**		**Measured creepage**	**Required**	
			clearance	***Table**		**creepage**	***Table**
Distance 1:							
Working voltage (V) ..... :					250		—
Frequency if applicable (kHz) ..... :							—
PTI..... :					< 600 ☐ ≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) ..... :							—
Supplementary information:							
Distance 2:							
Working voltage (V) ..... :							—
Frequency if applicable (kHz) ..... :							—
PTI..... :					< 600 ☐ ≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) ..... :							—
Supplementary information:							
Distance 3:							
Working voltage (V) ..... :							—
Frequency if applicable (kHz) ..... :							—
PTI..... :					< 600 ☐ ≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) ..... :							—
Supplementary information:							

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

** Insulation type: B – Basic; S – Supplementary; R – Reinforced.

3.15 (13.2.1)	TABLE: Ball Pressure Test of Thermoplastics			N/A
Allowed impression diameter (mm) .....:		2		—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)	
Supplementary information:				

3.15 (13.3.1)	TABLE: Needle-flame test (IEC 60695-11-5)				N/A
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Supplementary information:					

3.15 (13.3.2)	TABLE: Glow-wire test (IEC 60695-2-11)			N/A
Glow wire temperature .....:		650°C		—
Object/ Part No./ Material	Manufacturer/ trademark	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Supplementary information:				

3.15 (13.4)	TABLE: Proof tracking test (IEC 60112)	N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

Test voltage PTI .....:		175 V			—
Object/ Part No./ Material	Manufacturer/ trademark	Withstand 50 drops without failure on three places or on three specimens			Verdict
Supplementary information:					

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 1	TABLE: Critical components information					
Object / part No.	**Code**	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Drivers	B	Meanwell	APC-8E Series	8W 50-60Hz 0,25-0,7A 200-240V Tc=75°C	IEC 61347-2-13	CB
Drivers	B	Meanwell	PLM-12 Series	12W 50-60Hz 0,35-1,05A 110-240V Tc=75°C	IEC 61347 IEC 62384	TUV
Drivers	B	Meanwell	PLM-25 Series	25W 50-60Hz 0,35-1,05A 110-240V Tc=80°C	IEC 61347 IEC 62384	TUV
Drivers	B	Meanwell	PLM-25E series	25W 50-60Hz 0.35/0.7/1.05A 220-240Vac Tc=85°C	IEC 61347-2-13	CB
Drivers	B	Meanwell	PLM-40-x series	40W 50-60Hz 0.35/0.5/0.7/1.05/1.4/1.75A 220-240Vac Tc=90°C	IEC 61347-2-13	ENEC CB
Drivers	B	Meanwell	PLM-40E-x series	40W 50-60Hz 0.35/0.5/0.7/1.05/1.4/1.75A 220-240Vac Tc=90°C	IEC 61347-2-13	ENEC CB
Drivers	B	Meanwell	PLD-16-.B series	16W 50-60Hz 0.35/0.7/1.05/1.4A 200-240Vac Tc=70°C	IEC 61347-2-13	CB
Drivers	B	Meanwell	PLD-25-. series	25W 50-60Hz 0.35/0.7/1.05/1.4A 100-240Vac Tc=70°C	IEC 61347-2-13	CB
Drivers	B	Meanwell	P.D-40-.B series	40W 50-60Hz 0,35/0,5/0,7/1,05/1,4A 200-240Vac Tc=90°C	IEC 61347-2-13	CB
Drivers	B	Meanwell	P.D-60-.B series	60W 50-60Hz 0,5/0,7/1,05/1,4/1,75/2,0/2,4A 200-240Vac Tc=90°C	IEC 61347-2-13	CB
Driver	B	LG	PISE-A027M	27W 0,2-1A 120-277V 50-60Hz Tc=80°C	IEC 61347-2-13	CB / UL
Driver	B	LG	PISE-A027A	27W 1A 120-277V 50-60Hz Tc=80°C	IEC 61347-2-13	CB / UL
Drivers	B	Moons	PU025H Series	25W 50-60Hz 0,35-2,1A 100-240V Tc=90°C	IEC 61347-2-13	TUV
Drivers	B	TRIDONIC	LCI 27W	27W 50-60Hz 1A 220-240V Tc=70°C	IEC 61347-2-13	OVE
Drivers	B	LG Innotek	LLP 110W 1A (LG PISE A110A) 68-110V	V in 120-277V AC Max 110W Vout:68-110Vdc tc:80°C	IEC/ EN 613472-13	CB
Drivers	B	LG Innotek	LLP 55W 1A (LG PISE A55A) 44-55V	V in 120-277V AC Max 55W Vout:44-55-Vdc tc:80°C	IEC/ EN 613472-13	CB

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

Drivers	B	LG Innotek	LG PISE A027A	V in 120-277V AC Max 27W Vout:22-27-Vdc tc:80°C	IEC/ EN 613472-13	CB
Drivers	B	Tridonic	LCI 27W 1-10V	220-240V 50/60Hz tc 70°C	IEC/ EN 613472-13	CB
Driver	B	LG	PISE-A040D	40W 0.35-0.7A 120-277V 50-60Hz Tc=80°C	IEC 61347-2-13	CB / UL
Driver	B	LG	PISE-A040A	40W 0.35/0.5/0.7 120-277V 50-60Hz Tc=80°C	IEC 61347-2-13	CB / UL
Driver	B	LG	PISE-A075A	75W 0.35/0.5/0.7 120-277V 50-60Hz Tc=80°C	IEC 61347-2-13	CB / UL
Driver	B	LG	PISE-A075D	75W 0.35-0.7A 120-277V 50-60Hz Tc=80°C	IEC 61347-2-13	CB / UL
Drivers	B	LG	PISE-A150D	150W 50/60Hz 0.35-07A 120-277V Tc=80°C	IEC 61347-2-13	CB / UL
Drivers	B	LG	PISE-A150A	150W 50/60Hz 0.35/0.5/0.7 120-277V Tc=80°C	IEC 61347-2-13	CB / UL
Drivers	B	LG	PISE-A040X	40W 0.2-0.6A 220-240V 50-60Hz Tc=80°C Ta = -40 to 55°C	IEC 61347-2-13	CB
Drivers	B	LG	PISE-A040Y	40W 0,3-1,0A 220-240V 50-60Hz Tc=80°C Ta = -40 to 55°C	IEC 61347-2-13	CB
Drivers	B	LG	PISE-A075X	75W 0.2-0.6A 220-240V 50-60Hz Tc=80°C Ta = -40 to 55°C	IEC 61347-2-13	CB
Drivers	B	LG	PISE-A075Y	75W 0,3-1,0A 220-240V 50-60Hz Tc=80°C Ta = -40 to 55°C	IEC 61347-2-13	CB
Drivers	B	LG	PISE-A110X	110W 0,2-0,7A 220-240V 50-60Hz Tc=80°C Ta = -40 to 55°C	IEC 61347-2-13	CB
Drivers	B	LG	PISE-A110Y	110W 0,3-1,0A 220-240V 50-60Hz Tc=80°C Ta = -40 to 55°C	IEC 61347-2-13	CB
Dongle	B	LG	TWBU-C302D	Dongle for Bluetooth	EN 60950-1	CoC
Driver	B	OSRAM	OT 40/170-240/ 1A0 4DIMLT2 G2 CE	40 W – 0.2-1,05A 220-240 V 50/60 Hz, Tc80°C	IEC 61347-2-13	CB
Driver	B	OSRAM	OT 40/120-277/ 1A0 4DIMLT2 E	40 W – 0.2-1,05A 220-240 V 50/60 Hz, Tc80°C	IEC 61347-2-13	CB
Driver	B	OSRAM	OT 50/120-277/ 800 2DIMLT2 P	50 W – 0.35-0.8A 120-277 V 50-60 Hz, Tc85°C	IEC 61347-2-13	CB / UL / CCC
Driver	B	OSRAM	OT 50/120-277/ 1A2 2DIMLT2 P	50 W – 0.6-1.25A 120-277 V 50-60 Hz Tc80°C	IEC 61347-2-13	CB / UL / CCC
Drivers	B	PHILIPS/SIGNIFY	Xi FP 22W 0,3-1,0A SNLDAE 230V C123 sXt	22W 50-60Hz 0,3-1,05A 198-264V Tc=85°C	IEC 61347-2-13	CB

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

Drivers	B	PHILIPS/SIGNIFY	Xi FP 22W 0,2-0,7A SNLDAE 230V C123 sXt	22W 50-60Hz 0,3-1,05A 198-264V Tc=85°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi LP 22W 0,3-1,0A S1 230V C123 sXt	22W 50-60Hz 0,3-1,05A Uoc 50Vdc Tc=85°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi LP 22W 0,2-0,7A S1 230V C123 sXt	22W 50-60Hz 0,3-1,05A Uoc 70Vdc Tc=85°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi FP 40W 0,3-1,0A SNLDAE 230V S175 sXt	40W 50-60Hz 0,3-1,05A 198-264V Tc=90°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi FP 40W 0,2-0,7A SNLDAE 230V S175 sXt	40W 50-60Hz 0,2-0,7A 198-264V Tc=90°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi LP 40W 0,3-1,0A S1 230V S175 sXt	40W 50-60Hz 0,3-1,05A 198-264V Tc=90°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi LP 40W 0,2-0,7A S1 230V S175 sXt	40W 50-60Hz 0,2-0,7A 198-264V Tc=90°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi FP 40W 0,2-0,7A SNLDAE 230V C123 sXt	40W 50-60Hz 0,2-0,7A 220-240V Tc=85°C Ta= -40 to 55°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi FP 40W 0,3-1,0A SNLDAE 230V C123 sXt	40W 50-60Hz 0,2-1,05A 220-240V Tc=85°C Ta= -40 to 55°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi LP 40W 0,2-0,7A S1 230V C123 sXt	40W 50-60Hz 0,2-0,7A 220-240V Tc=85°C Ta= -40 to 55°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi LP 40W 0,3-1,0A S1 230V C123 sXt	40W 50-60Hz 0,3-1,05A 220-240V Tc=85°C Ta= -40 to 55°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi LP/FP 70W 0,2-0,7A 230V C150 sXt	70W 50-60Hz 0,2-0,7A 198-264V Tc=85°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi FP 75W 0,2-0,7A SNLDAE 230V S240 sXt	75W 50-60Hz 0,2-0,7A 198-264V Tc=85°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi FP 75W 0,3-1,0A SNLDAE 230V S240 sXt	75W 50-60Hz 0,3-1,05A 198-264V Tc=85°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi LP 75W 0,3-1,0A S1 230V S240 sXt	75W 50-60Hz 0,3-1,05A 198-264V Tc=85°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi LP 75W 0,2-0,7A S1 230V S240 sXt	75W 50-60Hz 0,2-0,7A 198-264V Tc=85°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi FP 75W 0,3-1,0A SNLDAE 230V C133 sXt	75W 50-60Hz 0,3-1,0A 220-240V Tc=85°C	IEC 61347-2-13	Drivers
Drivers	B	PHILIPS/SIGNIFY	Xi FP 75W 0,2-0,7A SNLDAE 230V C133 sXt	75W 50-60Hz 0,2-0,7A 220-240V Tc=85°C	IEC 61347-2-13	Drivers
Drivers	B	PHILIPS/SIGNIFY	Xi LP 75W 0,3-1,0A S1 230V C133 sXt	75W 50-60Hz 0,3-1,0A 220-240V Tc=80°C	IEC 61347-2-13	Drivers
Drivers	B	PHILIPS/SIGNIFY	Xi LP 75W 0,2-0,7A S1 230V C133 sXt	75W 50-60Hz 0,2-0,7A 220-240V Tc=80°C	IEC 61347-2-13	Drivers

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

Drivers	B	PHILIPS/SIGNIFY	Xi FP 75W 0,5-1,5A SNLDAE 230V C133 sXt	75W 50-60Hz 0,5-1,5A 220-240V Tc=85°C	IEC 61347-2-13	Drivers
Drivers	B	PHILIPS/SIGNIFY	Xi LP 150W 0,3-1,0A SL 230V S240 sXt	150W 50-60Hz 0,3-1,05A 198-264V Tc=90°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi FP 150W 0,3-1,0A SNLDAE 230V S240 sXt	150W 50-60Hz 0,3-1,05A 198-264V Tc=90°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi LP 150W 0,2-0,7AA SL 230V S240 sXt	150W 50-60Hz 0,2-0,7A 198-264V Tc=90°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi FP 150W 0,2-0,7A SNLDAE 230V S240 sXt	150W 50-60Hz 0,2-0,7A 198-264V Tc=90°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi FP 22W 0,3-1,0A SNLDAE 230V S175 sXt	22W 50-60Hz 0,3-1,05A 198-264V Tc=85°C	IEC 61347-2-13	CB
Drivers	B	PHILIPS/SIGNIFY	Xi LP 22W 0,3-1,0A S1 230V S175 sXt	22W 50-60Hz 0,3-1,05A 198-264V Tc=85°C	IEC 61347-2-13	CB
EMI filter	B	TE connectivity	Corcom 2FB3	Imax 2A Vmax = 250Vac/d Tc 50°C	IEC 61000	VDE
Driver	B	INVENTRONICS	EBS-040SyBT2xxxx	40W 200-240V 50/60Hz tc 90°C y=045 :Iout 0,45A y=070 :Iout 0,7A y=105 :Iout 1,05A	IEC 61347-1 & 2-13	ENEC
Driver	B	INVENTRONICS	EBS-080SyBT2xxxx	80W 200-240V 50/60Hz tc 90°C y=070 :Iout 0,7A y=105 :Iout 1,05A y=150 :Iout 1,5A	IEC 61347-1 & 2-13	ENEC
Control Device	B	Owlet	LuCo ADP	110-277V 50/60 Hz Tmax = 80°C	IEC/EN 61347	CB / UL
Control Device	B	Owlet	LuCo NXP	110-277V 50/60 Hz Tmax = 80°C	IEC/EN 61347	CB / UL
Control Device	A	Owlet	LuCo P7	110-277V 50/60 Hz Tmax = 75°C	IEC/EN 61347	CB / UL
Control Device	A	TGV Limited	SCIP 66	Shorting Cap IP66	IEC/EN 61347	COC
Connection Device	B	TE	TE NEMA Socket 7-pin	Power contacts: 15A 480V Dimming contacts: 0.10A 10V	IEC 61347-1 IEC 61347-2-11	COC
Connection Device	B	SCHREDER	NEMA Socket M400	Power contacts: 110-277Vac 50/60 Hz Max 5A Dimming contacts: 0.10A 10V	IEC 60598-1 IEC 60598-2-3	COC
Connection Device	B	Shanghai Long-Join Electronics	JL-240	Power contacts: 0-480Vac 50/60 Hz Max 10A Dimming contacts: 0,25A 30Vdc	EN 61984	COC
Connection Device	B	TE Connectivity	Lumawise	30 $V_{AC/DC}$ 50/60 Hz 1,5A	IEC 61984	VDE

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

Surge protection Device	A	Vossloh	SPC3/230/10K/i	100-277V 50/60Hz 10kA 20KV (DM) 120KV (CM) Tc=80°C	IEC 61643-11	DEKRA
Surge protection Device(alt)	A	Cirprotec	NSS-10-C12-P NSS-10/230-D-LCF-P	max 320V 50-60 Hz 5KA; max 10KA 20KV (DM) 120KV (CM) Tc = 80°C	IEC 61643-11	DEKRA
Surge protection Device	A	CITEL	MLPC1-230L-R	277 V, T85 10kA 20KV (DM) 120KV (CM)	IEC 61643-11	ENEC
Surge protection Device	A	Vossloh	SP3/230/10K/i	Uc 305Vac Uoc 10kV Up L-N < 1,5kV, L-PE < 1,8 kV, N-PE < 1,8 kV I_L 16A I_{SCCR} 1kA T 80°C	IEC 61643-11	DEKRA
FUSE HOLDER	B	Mersen	10x38mm CCR8-10 Series	20-32A 400V	IEC 60269-1 & -2	ENEC
FUSE HOLDER	B	CAMDENBOSS	CFTBN 5x20mm	13A 250V	IEC 60269-1 & -2	VDE / UL
FUSE	B	Mersen	FR10 10x38mm	0.5-32A 400-500V	IEC 60269-1 & -2	ENEC
FUSE	B	Littlefuse	5x20mm 213 Series	0.2-6.3A 250V	IEC 60269-1 & -2	VDE
VDR	A	Littlefuse	TM0V	275 Vac 10kA 20KV (DM)	IECQ-CECC E 1274/F	VDE
Terminal	A	WIELAND	ST18, GST18I	12-16A 250V 0,75-2,5mm²	EN 60998-1&2-2	VDE / UL
Terminal	A	ADELS	LK980-01	2.5mm², 450V 24A	EN 60998-1&2-2	VDE / UL
Terminal	A	ADELS	500 Series	0.5-4mm² 450V	EN 60998-1&2-2	VDE
Terminal	A	ADELS	503 Si series	16A t 85°C	IEC 60598-1	VDE
Terminal	A	ADELS	900-07/Q	0.5-4mm² 450V	EN 60998-1&2-2	VDE / UL
Terminal	A	ADELS	AC-166 ST(D)/3	0.5-2,5mm² 250-400V	EN 60998-1&2-2	VDE / UL
Terminal	A	ADELS	1000 K series	25A t 85°C	EN 60998-1 & -2-1	VDE
Terminal	A	WAGO	222 Series	0.08-2.5mm² 20A/400V	EN 60998-1&2-2	ENEC / UL
Terminal	A	WAGO	221 Series	0.2-4mm² 32A/450V	EN 60998-1&2-2	ENEC / UL
Terminal	A	WAGO	Connector 2 pole 294 model	24A/500V 0.5-2.5mm²	EN 60998-1&2-2	ENEC
Terminal	A	TEKOX	1104	Vmax 450 V Imax 32A 4mm² Tc 110°C	EN 60998-1&2-2	VDE / UL
Capacitor	A	Murata	KY	250Vac, X1 300Vac, Y2	EN 60384-14	VDE
Led Modules	A	Schréder	VOLTANA Led type: 3535 G4L 6, 8, 16, 24, 32 leds module I: 1400mA	ts = 150°C	IEC/EN 62031-60598	Tested in appliance

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

Led Modules	A	Schréder	VOLTANA Led type: XP-G3 6, 8, 16, 24, 32 leds module I: 1400mA	ts = 150°C	IEC/EN 62031-60598	Tested in appliance
Led Modules	A	Schréder	VOLTANA Led type: LH351C 6, 8, 16, 24, 32 leds module I: 1400mA	ts = 150°C	IEC/EN 62031-60598	Tested in appliance
Led Modules	A	Schréder	AXIA G3 Led type: OSLON 8, 16 leds module I: 1400mA	ts = 150°C	IEC/EN 62031-60598	Tested in appliance

Supplementary information:

[1)] Provided evidence ensures the agreed level of compliance. See OD-CB2039.

The codes above have the following meaning:

A - The component is replaceable with another one, also certified, with equivalent characteristics

B - The component is replaceable if authorised by the test house

C - Integrated component tested together with the appliance

D - Alternative component

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		
	Type reference ..... :	VOLTANA EVO 1	—
	Lamp used ..... :	16 leds @ 1050mA	—
	Lamp control gear used ..... :	PLD-60W 1050	—
	Mounting position of luminaire..... :	Horizontal	—
	Supply wattage (W) ..... :	55,8	—
	Supply current (A)..... :	0,249	—
	Calculated power factor ..... :	0,97	—
	Table: measured temperatures corrected for ta = 45 °C:		
	- abnormal operating mode ..... :		—
	- test 1: rated voltage ..... :	230V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage ..... :		—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :		—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage ..... :		—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :		—

Temperature measurements, (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Control Gear	45	97,8			90+10		
SPD	45	65,3			80		
Supply wiring	45	66,0			90		
Led Module ts	45	94,4			150		
Led Module optics	45	94,4			110		
Fuse	45	77,1			90		
Supplementary information: Temperature correction of 10°C as suitable for outdoor installation.							

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		
	Type reference ..... :	VOLTANA EVO 1	—
	Lamp used ..... :	16 leds @ 1000mA	—
	Lamp control gear used ..... :	OT50/120-277/1A2 2DIM LT2 P	—
	Mounting position of luminaire..... :	Horizontal	—
	Supply wattage (W) ..... :	53,0	—
	Supply current (A)..... :	0,236	—
	Calculated power factor ..... :	0,98	—
	Table: measured temperatures corrected for ta = 45 °C:		
	- abnormal operating mode ..... :		—
	- test 1: rated voltage ..... :	230V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage ..... :		—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :		—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage ..... :		—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :		—

Temperature measurements, (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Control Gear	45	89,4			80+10		
SPD	45	63,8			80		
Supply wiring	45	67,6			90		
Led Module ts	45	91,8			150		
Led Module optics	45	91,8			110		
Fuse	45	72,0			90		
Supplementary information: Temperature correction of 10°C as suitable for outdoor installation.							

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	**TABLE: Temperature measurements, thermal tests of Section 12**		
	Type reference ..... :	VOLTANA EVO 1	—
	Lamp used ..... :	16 leds @ 1200mA	—
	Lamp control gear used ..... :	Xi FP 75W 0.5-1.5A SNLDAE 230V C133 sXt	—
	Mounting position of luminaire..... :	Horizontal	—
	Supply wattage (W) ..... :	62,2	—
	Supply current (A)..... :	0,274	—
	Calculated power factor ..... :	0,99	—
	Table: measured temperatures corrected for ta = 40 °C:		
	- abnormal operating mode ..... :		—
	- test 1: rated voltage ..... :	230V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage ..... :		—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :		—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage ..... :		—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :		—

Temperature measurements, (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Control Gear	40	87,3			80+10		
SPD	40	62,7			80		
Supply wiring	40	67,5			90		
Led Module ts	40	99,8			150		
Led Module optics	40	99,8			110		
Supplementary information: Temperature correction of 10°C as suitable for outdoor installation.							

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		
	Type reference ..... :	VOLTANA EVO 1	—
	Lamp used ..... :	8 leds @ 1400mA	—
	Lamp control gear used ..... :	PLD-40W 1400	—
	Mounting position of luminaire..... :	Horizontal	—
	Supply wattage (W) ..... :	39,2	—
	Supply current (A)..... :	0,176	—
	Calculated power factor ..... :	0,97	—
	Table: measured temperatures corrected for ta = 55 °C:		
	- abnormal operating mode..... :		—
	- test 1: rated voltage..... :	230V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage ..... :		—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :		—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage ..... :		—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :		—

Temperature measurements, (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Control Gear	55	97,8			90+10		
Supply wiring	55	70,2			90		
Led Module ts	55	105,4			150		
Led Module optics	55	105,4			110		
Supplementary information: Temperature correction of 10°C as suitable for outdoor installation.							

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		
	Type reference ..... :	VOLTANA 0	—
	Lamp used ..... :	8 leds @ 1400mA	—
	Lamp control gear used ..... :	PLD-40W 1400	—
	Mounting position of luminaire..... :	Horizontal	—
	Supply wattage (W) ..... :	40,1	—
	Supply current (A)..... :	0,180	—
	Calculated power factor ..... :	0,97	—
	Table: measured temperatures corrected for ta = 45 °C:		
	- abnormal operating mode..... :		—
	- test 1: rated voltage..... :	230V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage ..... :		—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :		—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage ..... :		—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :		—

Temperature measurements, (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Control Gear	45	97,8			90+10		
SPD	45	69,1			80		
Supply wiring	45	67,0			90		
Led Module ts	45	108,0			150		
Led Module optics	45	108,0			99+10		

Supplementary information: Temperature correction of 10°C as suitable for outdoor installation.

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		
	Type reference ..... :	VOLTANA 0	—
	Lamp used ..... :	8 leds @ 1250mA	—
	Lamp control gear used ..... :	OT50/120-277/1A2 2DIM LT2 P	—
	Mounting position of luminaire..... :	Horizontal	—
	Supply wattage (W) ..... :	37,6	—
	Supply current (A)..... :	0,170	—
	Calculated power factor ..... :	0,96	—
	Table: measured temperatures corrected for ta = 40 °C:		
	- abnormal operating mode..... :		—
	- test 1: rated voltage..... :	230V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage ..... :		—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :		—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage ..... :		—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :		—

Temperature measurements, (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Control Gear	40	85,7			80+10		
SPD	40	60,8			80		
Supply wiring	40	61,4			90		
Led Module ts	40	95,5			150		
Led Module optics	40	95,5			99		
Supplementary information: Temperature correction of 10°C as suitable for outdoor installation.							

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		
	Type reference ..... :	VOLTANA 0	—
	Lamp used ..... :	8 leds @ 1050mA	—
	Lamp control gear used ..... :	Xi FP 40W 0.3-1.05A SNLDAE 230V C123 sXt	—
	Mounting position of luminaire..... :	Horizontal	—
	Supply wattage (W) ..... :	30,3	—
	Supply current (A)..... :	0,135	—
	Calculated power factor ..... :	0,98	—
	Table: measured temperatures corrected for ta = 45 °C:		
	- abnormal operating mode ..... :		—
	- test 1: rated voltage ..... :	230V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage ..... :		—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :		—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage ..... :		—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :		—

Temperature measurements, (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Control Gear	45	92,0			85+10		
SPD	45	60,5			80		
Supply wiring	45	63,5			90		
Led Module ts	45	89,3			150		
Led Module optics	45	89,3			99		
Supplementary information: Temperature correction of 10°C as suitable for outdoor installation.							

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		
	Type reference ..... :	VOLTANA 0	—
	Lamp used ..... :	6 leds @ 1400mA	—
	Lamp control gear used ..... :	PLD-40W 1400	—
	Mounting position of luminaire..... :	Horizontal	—
	Supply wattage (W) ..... :	30,8	—
	Supply current (A)..... :	0,140	—
	Calculated power factor ..... :	0,96	—
	Table: measured temperatures corrected for ta = 55 °C:		
	- abnormal operating mode..... :		—
	- test 1: rated voltage..... :	230V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage ..... :		—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :		—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage ..... :		—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :		—

Temperature measurements, (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Control Gear	55	98,4			90+10		
SPD	55	73,1			80		
Supply wiring	55	71,6			90		
Led Module ts	55	103,1			150		
Led Module optics	55	103,1			110+10		
Supplementary information: Temperature correction of 10°C as suitable for outdoor installation.							

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		
	Type reference ..... :	VOLTANA 0	—
	Lamp used ..... :	6 leds @ 1050mA	—
	Lamp control gear used ..... :	Xi FP 22W 0.3-1.05A SNLDAE 230V C123 sXt	—
	Mounting position of luminaire..... :	Horizontal	—
	Supply wattage (W) ..... :	23,3	—
	Supply current (A)..... :	0,102	—
	Calculated power factor ..... :	0,99	—
	Table: measured temperatures corrected for ta = 50 °C:		
	- abnormal operating mode..... :		—
	- test 1: rated voltage..... :	230V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage ..... :		—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :		—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage ..... :		—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :		—

Temperature measurements, (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Control Gear	50	94,2			85+10		
SPD	50	60,9			80		
Supply wiring	50	62,8			90		
Led Module ts	50	89,7			150		
Led Module optics	50	89,7			110		
Supplementary information: Temperature correction of 10°C as suitable for outdoor installation.							

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		
	Type reference .....:	VOLTANA 0	—
	Lamp used.....:	8 leds	—
	Lamp control gear used .....:	OT50 (Meanwell 40W)	—
	Mounting position of luminaire.....:	Horizontal	—
	Supply wattage (W) .....:	37,9W (30,3W)	—
	Supply current (A).....:	1250mA (1050mA)	—
	Calculated power factor .....:	0,96 (0,95)	—
	Table: measured temperatures corrected for ta = 40 (45) °C:		
	- abnormal operating mode .....:		—
	- test 1: rated voltage .....:	230V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....:		—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage .....:		—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....:		—
	Through wiring or looping-in wiring loaded by a current of A during the test .....:		—

Temperature measurements, (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Convertor Tc	40 (45)	88 (80)			80+10 (90+10)		
SPD Tc	40 (45)	70 (70)			70+10		
Supply wiring	40 (45)	63 (63)			90+10		
Led Module	40 (45)	108 (94)			99+10		
Terminal	40 (45)	63 (63)			110+10		
Internal wiring	40 (45)	63 (63)			90+10		
Supplementary information: Temperature correction of 10°C as suitable for outdoor installation.							

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		
	Type reference .....:	VOLTANA 0	—
	Lamp used.....:	6 leds	—
	Lamp control gear used .....:	Meanwell 25W	—
	Mounting position of luminaire.....:	Horizontal	—
	Supply wattage (W) .....:	22,5W	—
	Supply current (A).....:	1050mA	—
	Calculated power factor .....:	0,99	—
	Table: measured temperatures corrected for ta = 45 °C:		
	- abnormal operating mode .....:		—
	- test 1: rated voltage .....:	230V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....:		—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage .....:		—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....:		—
	Through wiring or looping-in wiring loaded by a current of A during the test .....:		—

Temperature measurements, (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Convertor Tc	45	88			80+10		
SPD Tc	45	63			80+10		
Supply wiring	45	56			90+10		
Led Module	45	83			105+10		
Terminal	45	56			110+10		
Internal wiring	45	56			90+10		
Supplementary information: Temperature correction of 10°C as suitable for outdoor installation.							

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	**TABLE: Temperature measurements, thermal tests of Section 12**		
	Type reference .....:	VOLTANA 1	—
	Lamp used.....:	8 leds	—
	Lamp control gear used .....:	Meanwell 40W (Philips 40W) [OT50]	—
	Mounting position of luminaire.....:	Horizontal	—
	Supply wattage (W) .....:	41,2W (29,0W) [38,1W]	—
	Supply current (A).....:	1400mA (1000mA) [1250mA]	—
	Calculated power factor .....:	0,96	—
	Table: measured temperatures corrected for ta = 45 (55) [50] °C:		
	- abnormal operating mode .....:		—
	- test 1: rated voltage .....:	230V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....:		—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage .....:		—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....:		—
	Through wiring or looping-in wiring loaded by a current of A during the test .....:		—

Temperature measurements, (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Convertor Tc	45 (55) [50]	81 (95) [88]			90+10 (90+10) [80+10]		
SPD Tc	45 (55) [50]	70 (68) [68]			80+10		
Supply wiring	45 (55) [50]	59 (64) [66]			90+10		
Led Module (ts)	45 (55) [50]	87 (84) [87]			105+10		
Lenses	45 (55) [50]	105 (96) [102]			99+10		
Terminal	45 (55) [50]	59 (64) [66]			110+10		
Internal wiring	45 (55) [50]	59 (64) [66]			90+10		
Supplementary information: Temperature correction of 10°C as suitable for outdoor installation.							

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		
	Type reference .....:	VOLTANA 2	—
	Lamp used.....:	16 leds	—
	Lamp control gear used .....:	OT50	—
	Mounting position of luminaire.....:	Horizontal	—
	Supply wattage (W) .....:	56.1W	—
	Supply current (A).....:	1000mA	—
	Calculated power factor .....:	0,98	—
	Table: measured temperatures corrected for ta = 45 °C:		
	- abnormal operating mode .....:		—
	- test 1: rated voltage .....:	230V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....:		—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage .....:		—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....:		—
	Through wiring or looping-in wiring loaded by a current of A during the test .....:		—

Temperature measurements, (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Convertor Tc	45	86			80+10		
SPD Tc	45	63			80+10		
Supply wiring	45	61			90+10		
Led Module (ts)	45	85			105+10		
Lenses	45	103			99+10		
Terminal	45	61			110+10		
Internal wiring	45	61			90+10		
Supplementary information: Temperature correction of 10°C as suitable for outdoor installation.							

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		
	Type reference .....:	VOLTANA 3	—
	Lamp used.....:	24 leds	—
	Lamp control gear used .....:	LG 75W	—
	Mounting position of luminaire.....:	Horizontal	—
	Supply wattage (W) .....:	56.1W (54,6W)	—
	Supply current (A).....:	1000mA (700mA)	—
	Calculated power factor .....:	0,99	—
	Table: measured temperatures corrected for ta = 35 (50) °C:		
	- abnormal operating mode .....:		—
	- test 1: rated voltage .....:	230V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....:		—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage .....:		—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....:		—
	Through wiring or looping-in wiring loaded by a current of A during the test .....:		—

Temperature measurements, (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Convertor Tc	35 (50)	87 (90)			80+10		
SPD Tc	35 (50)	55 (65)			80+10		
Supply wiring	35 (50)	46 (57)			90+10		
Led Module (ts)	35 (50)	79 (80)			105+10		
Lenses	35 (50)	91 (88)			99+10		
Terminal	35 (50)	46 (57)			110+10		
Internal wiring	35 (50)	46 (57)			90+10		
Supplementary information: Temperature correction of 10°C as suitable for outdoor installation.							

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		
	Type reference .....:	VOLTANA 4	—
	Lamp used.....:	32 Led	—
	Lamp control gear used .....:	Philips 150W	—
	Mounting position of luminaire.....:	Horizontal	—
	Supply wattage (W) .....:	107,6W (73,3W)	—
	Supply current (A).....:	1000mA (700mA)	—
	Calculated power factor .....:	0,96	—
	Table: measured temperatures corrected for ta = 45 (55) °C:		
	- abnormal operating mode .....:		—
	- test 1: rated voltage .....:		—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....:		—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage .....:		—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....:		—
	Through wiring or looping-in wiring loaded by a current of A during the test .....:		—

Temperature measurements, (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Convertor Tc	45 (55)	93 (81)			90+10		
SPD Tc	45 (55)	65 (71)			80+10		
Supply wiring	45 (55)	59 (66)			90+10		
Led Module (ts)	45 (55)	86 (83)			105+10		
Lenses	45 (55)	105 (96)			99+10		
Terminal	45 (55)	59 (66)			110+10		
Internal wiring	45 (55)	59 (66)			90+10		
Supplementary information: Temperature correction of 10°C as suitable for outdoor installation.							

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 3	**Screw terminals (part of the luminaire)**		N/A
(14)	**SCREW TERMINALS**		N/A
(14.2)	Type of terminal.....:		—
	Rated current (A).....:		—
(14.3.2.1)	One or more conductors		N/A
(14.3.2.2)	Special preparation		N/A
(14.3.2.3)	Terminal size		N/A
	Cross-sectional area (mm²) .....:		—
(14.3.3)	Conductor space (mm) .....:		N/A
(14.4)	Mechanical tests		N/A
(14.4.1)	Minimum distance		N/A
(14.4.2)	Cannot slip out		N/A
(14.4.3)	Special preparation		N/A
(14.4.4)	Nominal diameter of thread (metric ISO thread) .....:		N/A
	External wiring		N/A
	No soft metal		N/A
(14.4.5)	Corrosion		N/A
(14.4.6)	Nominal diameter of thread (mm).....:		N/A
	Torque (Nm).....:		N/A
(14.4.7)	Between metal surfaces		N/A
	Lug terminal		N/A
	Mantle terminal		N/A
	Pull test; pull (N) .....:		N/A
(14.4.8)	Without undue damage		N/A

ANNEX 4	**Screwless terminals (part of the luminaire)**		N/A
(15)	**SCREWLESS TERMINALS**		N/A
(15.2)	Type of terminal.....:		—
	Rated current (A).....:		—
(15.3.1)	Material		N/A
(15.3.2)	Clamping		N/A

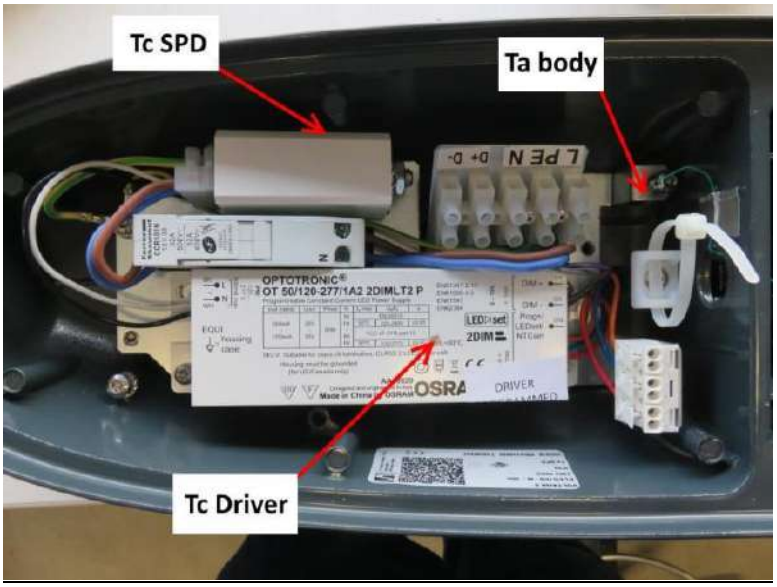
IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
(15.3.3)	Stop		N/A
(15.3.4)	Unprepared conductors		N/A
(15.3.5)	Pressure on insulating material		N/A
(15.3.6)	Clear connection method		N/A
(15.3.7)	Clamping independently		N/A
(15.3.8)	Fixed in position		N/A
(15.3.10)	Conductor size		N/A
	Type of conductor		N/A
(15.5.1)	Terminals internal wiring		N/A
(15.5.1.1)	Pull test spring-type terminals (4 N, 4 samples).....:		N/A
(15.5.1.2)	Pull test pin or tab terminals (4 N, 4 samples) .....:		N/A
	Insertion force not exceeding 50 N		N/A
(15.5.1.2)	Permanent connections: pull-off test (20 N)		N/A
(15.5.2)	Electrical tests		N/A
	Voltage drop (mV) after 1 h (4 samples).....:		N/A
	Voltage drop of two inseparable joints		N/A
	Number of cycles:		—
	Voltage drop (mV) after 10th alt. 25th cycle (4 samples) .....:		N/A
	Voltage drop (mV) after 50th alt. 100th cycle (4 samples) .....:		N/A
	After ageing, voltage drop (mV) after 10th alt. 25th cycle (4 samples).....:		N/A
	After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples).....:		N/A
(15.6)	Terminals external wiring		N/A
	Terminal size and rating		N/A
(15.6.2.1)	Pull test spring-type terminals or welded connections (4 samples); pull (N) .....:		N/A
	Pull test pin or tab terminals (4 samples); pull (N) .....:		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

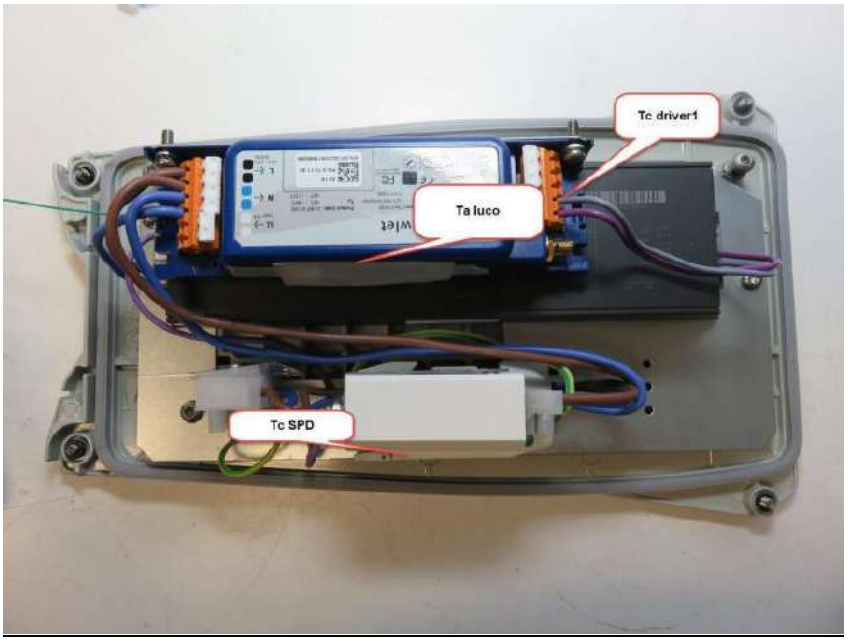
(15.6.3.1)	**TABLE: Contact resistance test**									N/A
	Voltage drop (mV) after 1 h									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Voltage drop of two inseparable joints									N/A
	Voltage drop after 10th alt. 25th cycle									N/A
	Max. allowed voltage drop (mV)..... :									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Voltage drop after 50th alt. 100th cycle									N/A
	Max. allowed voltage drop (mV)..... :									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Continued ageing: voltage drop after 10th alt. 25th cycle									N/A
	Max. allowed voltage drop (mV)..... :									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Continued ageing: voltage drop after 50th alt. 100th cycle									N/A
	Max. allowed voltage drop (mV)..... :									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
Supplementary information:										

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

Pictures



Example of Geartray Voltana 0



Example of Geartray Voltana 3

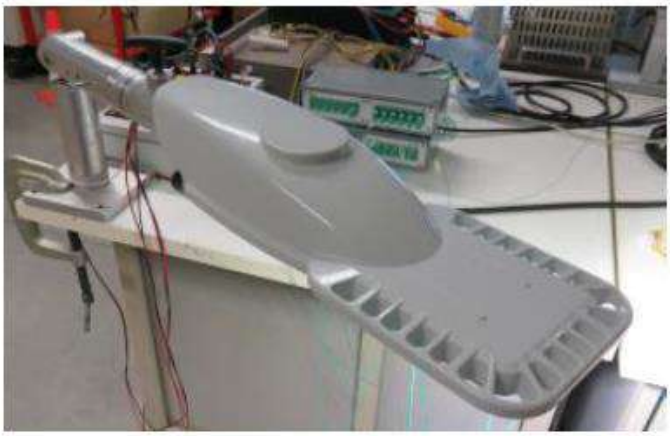
IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

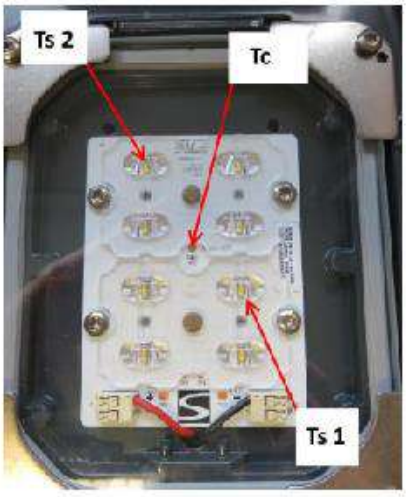
Voltana EVO 1 (8 or 16 leds)

Voltana 0 (6 leds)

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

Voltana 0 (8 leds)





Voltana 1 (8 leds)
Voltana 2 (16 leds)
Voltana 3 (24 leds)
Voltana 4 (32 leds)

IEC60598_2_3L ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT
IEC 60598-2-3
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES
Luminaires
Part 2: Particular requirements
Section 3: Luminaires for road and street lighting

Differences according to..... EN 60598-2-3:2003, AMD1:2011 used in conjunction with EN 60598-1:2015, AMD1:2018

Annex Form No. ..... EU_GD_IEC60598_2_3L

Annex Form Originator ..... Intertek Semko AB

Master Annex Form..... 2018-12-07

	CENELEC COMMON MODIFICATIONS (EN)		P
3.6 (4)	**CONSTRUCTION**		**P**
3.6 (4.11.6)	Electro-mechanical contact systems		N/A
3.10 (5)	**EXTERNAL AND INTERNAL WIRING**		**P**
3.10 (5.2.2)	Cables equal to EN 50525		N/A
	Replace table 5.1 – Supply cord		N/A
3.12 (12)	**ENDURANCE TESTS AND THERMAL TESTS**		**N/A**
3.12 (12.4.2c)	Thermal test (normal operation) see footnote c to table 12.2 relating to unsleeved fixed wiring		N/A
ZB	**ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)**		
(3.3)	DK: power supply cords of class I luminaires with label		N/A
(4.5.1)	DK: socket-outlets		N/A
(5.2.1)	CY, DK, FI, GB: type of plug		N/A
ZC	**ANNEX ZC, NATIONAL DEVIATIONS (EN)**		
(4 & 5)	FR: Shuttered socket-outlets 10/16A		N/A
	FR: Safety requirements for high buildings *(Decree of 30 December 2011 on safety regulations for the construction of high-rise buildings and their protection against fire and panic risks; Section VIII; Article GH 48, Lighting)* Glow-wire test for outer parts of luminaires:		N/A
	- 850°C for luminaires in stairways and horizontal travel paths		N/A
	- 650°C for indoor luminaires		N/A
	GB: Requirements according to United Kingdom Building Regulation		N/A

Schréder
Experts in lightability™

ROAD

VOLTANA EVO

IP 66 IK 10

PRO FLEX™

The compact, cost-effective LED solution for your urban spaces

Create a lighting set that efficiently fits into your urban landscapes and reduces energy consumption without compromising on lighting levels with the VOLTANA EVO. This new generation of the well-known VOLTANA range is the ultimate compact solution delivering the right lumen package for your urban spaces while considerably reducing energy costs for the fastest return on investment.

VOLTANA EVO is a low-weight lighting solution designed for side-entry mounting. As an option, an adapter piece for both post-top and side-entry mountings is available, allowing VOLTANA EVO to be fitted in all kinds of poles and easing the installation.

It can be adapted on-site thanks to a stepped inclination system allowing the photometry to be optimised.

With its compact design and lighting technology, the VOLTANA EVO luminaire is a sustainable, cost-effective LED solution that guarantees basic urban lighting needs, generates energy savings, and reduces the ecological footprint.

URBAN & RESIDENTIAL STREETS

SQUARES & PEDESTRIAN AREAS

ROADS & MOTORWAYS

Concept

The VOLTANA EVO luminaire is composed of a high-pressure die-cast aluminium body and a mounting clamp made of corrosion-resistant steel.

VOLTANA EVO is equipped with ProFlex™ photometric engines, offering optimised photometrical performance with a minimum total cost of ownership. The polycarbonate lens protector ensures high impact resistance to provide an efficient and reliable solution.

This luminaire can be mounted using a standard side-entry clamp fixation for Ø42-60mm spigots. Thanks to an incorporated inclination system, the angle can be adjusted on-site. As an option, an adapter piece is available for spigots from Ø42 to Ø76mm for both post-top and side-entry mounting.

VOLTANA EVO is designed to ease installation and on-site maintenance.

Precise on-site adjustment. The inclination angle can be set from -15° to +5° for side-entry mounting, and from -10° to +10° with the post-top adaptor.

TYPES OF APPLICATION

- URBAN & RESIDENTIAL STREETS
- SQUARES & PEDESTRIAN AREAS
- ROADS & MOTORWAYS

KEY ADVANTAGES

- Cost-effective and efficient lighting solution for a fast return on investment
- Compact design
- ProFlex™ photometric engines offering high efficiency lighting, comfort and safety
- Adjustable inclination on-site
- Side-entry and post-top (with accessory) mounting

VOLTANA EVO is a low weight luminaire that provides a cost-effective and sustainable lighting solution.

The polycarbonate ProFlex™ lens protector ensures a high impact resistance.

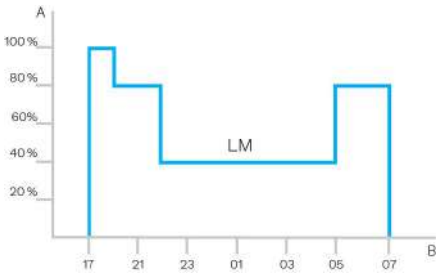
ProFlex™

The ProFlex™ photometric engine integrates the lenses into a polycarbonate protector. This integration increases the output and reduces the reflection inside the optical unit. The polycarbonate used for the ProFlex™ photometric engine offers essential characteristics such as high optical clarity for a superior light transmission, better impact resistance compared to glass and a long life span with UV-stabilisation treatment. The ProFlex™ concept enables a compact design with a thin optical compartment. It provides extensive light distributions so that the spacing between the luminaires can be increased.

Custom dimming profile

Intelligent luminaire drivers can be programmed with complex dimming profiles. Up to five combinations of time intervals and light levels are possible. This feature does not require any extra wiring.

The period between switching on and switching off is used to activate the preset dimming profile. The customised dimming system generates maximum energy savings while respecting the required lighting levels and uniformity throughout the night.



A. Dimming level | B. Time

VOLTANA EVO | CHARACTERISTICS

Schréder

GENERAL INFORMATION

Recommended installation height	4m to 15m | 13' to 49'
Circle Light label	Score ≥90 - The product fully meets circular economy requirements
Driver included	Yes
CE mark	Yes
ENEC certified	Yes
ENEC+ certified	Yes
Testing standard	LM 80 (all measurements in ISO17025 accredited laboratory)

HOUSING AND FINISH

Housing	Aluminium
Optic	Polycarbonate
Protector	Polycarbonate (with integrated lenses)
Housing finish	Polyester powder coating
Standard colour(s)	RAL 7035 light grey
Tightness level	IP 66
Impact resistance	IK 10
Vibration test	Compliant with modified IEC 68-2-6 (0.5G)
Access for maintenance	By loosening screws on the bottom cover

OPERATING CONDITIONS

Operating temperature range (Ta)	-30°C up to +55°C / -22° F up to 131°F

· Depending on the luminaire configuration. For more details, please contact us.

ELECTRICAL INFORMATION

Electrical class	Class I EU, Class II EU
Nominal voltage	220-240V – 50-60Hz
Surge protection options (kV)	10
Electromagnetic compatibility (EMC)	EN 55015 / EN 61000-3-2 / EN 61000-3-3 / EN 61547
Control protocol(s)	1-10V, DALI
Control options	Custom dimming profile

OPTICAL INFORMATION

LED colour temperature	3000K (Warm White 730) 4000K (Neutral White 740)
Colour rendering index (CRI)	>70 (Warm White 730) >70 (Neutral White 740)

LIFETIME OF THE LEDS @ TQ 25°C

All configurations	100,000h - L95 (high-power LEDs)

· Lifetime may be different according to the size/configurations. Please consult us.

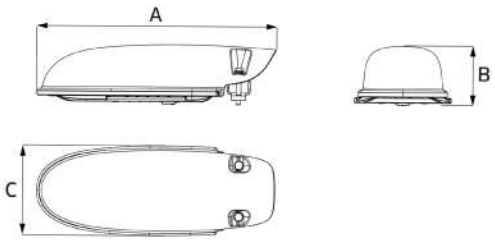
VOLTANA EVO | CHARACTERISTICS

Schréder

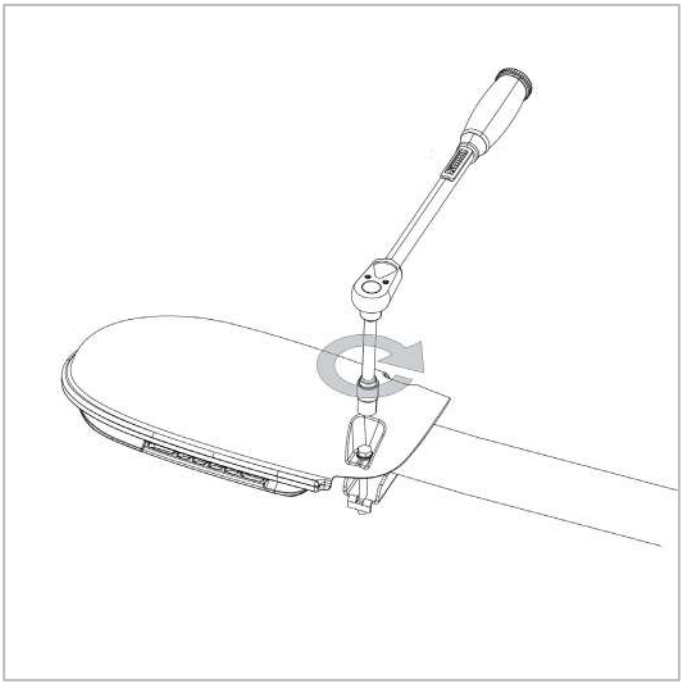
DIMENSIONS AND MOUNTING

AxBxC (mm | inch)	416x104x170 | 16.4x4.1x6.7
Weight (kg | lbs)	2.8 | 6.2
Aerodynamic resistance (CxS)	0.01
Mounting possibilities	Side-entry slip-over – Ø42mm Side-entry slip-over – Ø60mm Side-entry slip-over – Ø76mm

· For more information about mounting possibilities, please consult the installation sheet.



VOLTANA EVO | Side-entry (standard) and post-top (with adapter piece) mounting – 2xM8 screws

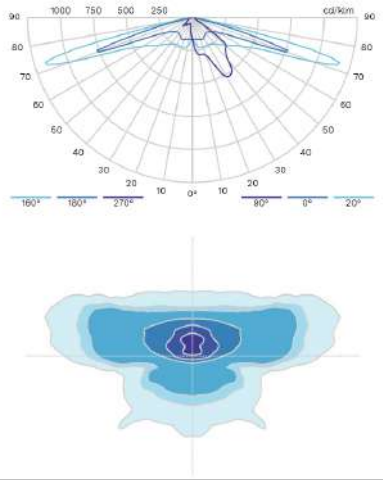


			Luminaire output flux (lm) Warm White 730		Luminaire output flux (lm) Neutral White 740		Power consumption (W)	Luminaire efficacy (lm/W)	
Luminaire	Number of LEDs	Current (mA)	Min	Max	Min	Max		Up to	Photometry
VOLTANA EVO 1	8	200	700	700	700	800	6	133	PRO FLEX
	8	350	1100	1200	1200	1300	9.7	134	PRO FLEX
	8	500	1600	1700	1700	1800	13.1	137	PRO FLEX
	8	700	2100	2200	2300	2400	18.4	130	PRO FLEX
	8	1050	2900	3000	3200	3300	28.4	116	PRO FLEX
	8	1250	3300	3400	3600	3700	36.1	102	PRO FLEX
	8	1400	3500	3700	3800	4000	39.5	101	PRO FLEX
	16	200	1400	1400	1500	1600	10.8	148	PRO FLEX
	16	350	2300	2400	2500	2600	18	144	PRO FLEX
	16	500	3200	3400	3500	3600	25.5	141	PRO FLEX
	16	700	4300	4500	4700	4900	38.1	129	PRO FLEX
	16	1050	5900	6100	6400	6700	56	120	PRO FLEX
	16	1200	6500	6700	7000	7300	62	118	PRO FLEX

Tolerance on LED flux is ± 7% and on total luminaire power ± 5 %

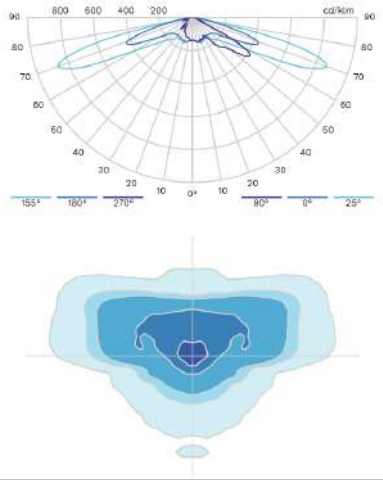
PRO FLEX™

5266



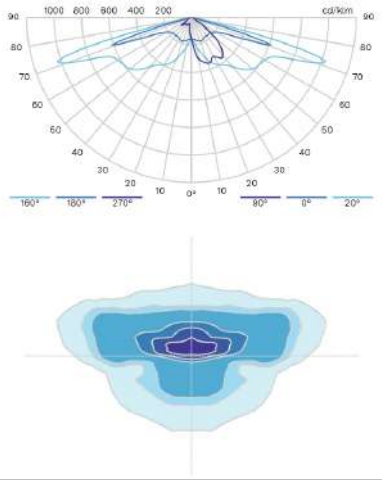
PRO FLEX™

5267



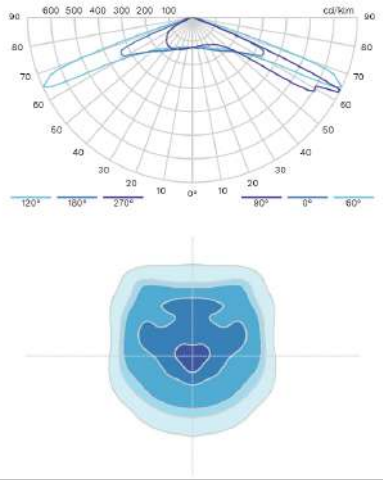
PRO FLEX™

5270



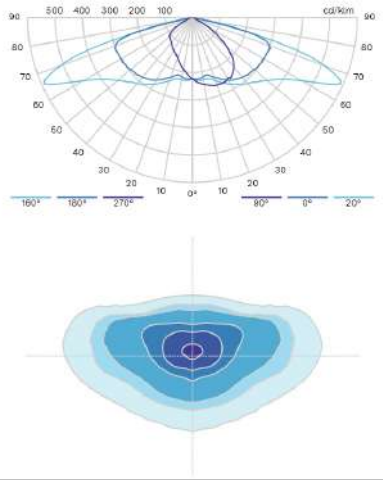
PRO FLEX™

5293



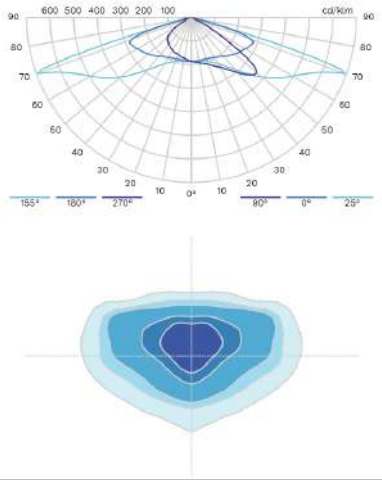
PRO FLEX™

5294



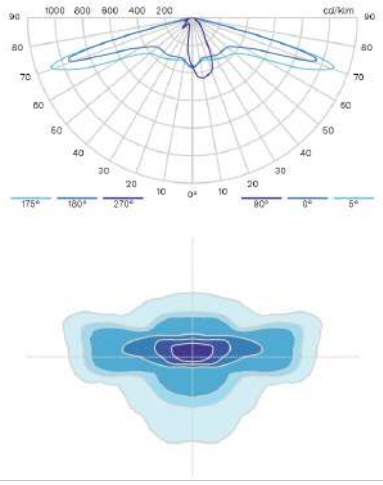
PRO FLEX™

5295



PRO FLEX™

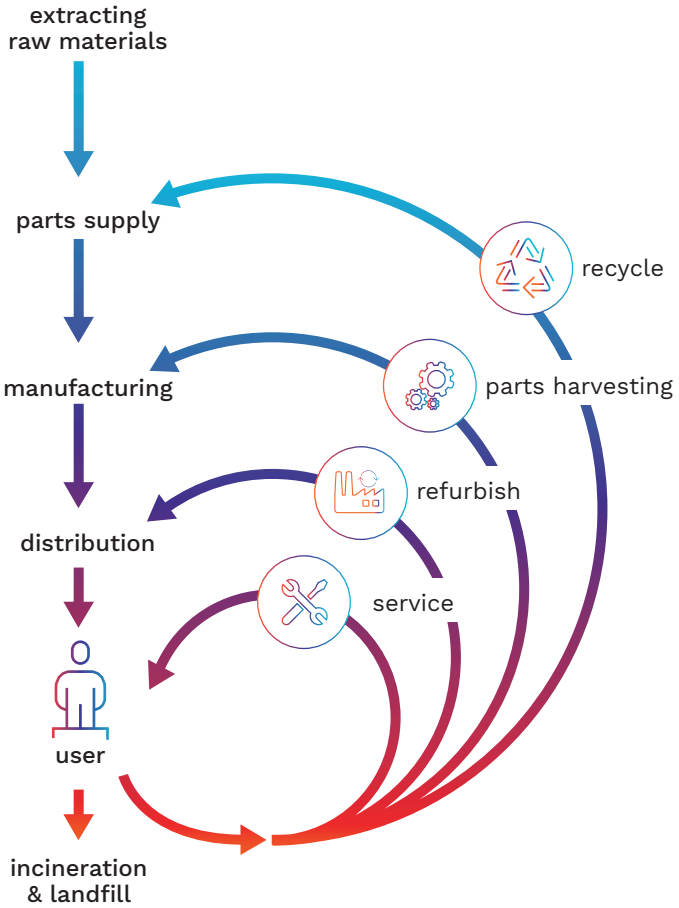
5296



Schréder
Experts in lightability™

CIRCLELIGHT

PASSPORT



VOLTANA EVO 1

Circularity focuses on reducing the environmental burden by valorising the flow of all materials.
It is mainly defined in opposition to the traditional linear economy: take, make and dispose. In a circular economy, products are part of a value network where they will be used for as long as possible.
Then, depending on their characteristics, they can be reused, refurbished, upgraded or recycled.
Schréder takes circular economy into account, right from the offset. Before we start to design our products, we incorporate it into their DNA.
After a careful analysis of the potential circularity of our luminaires, we decided to introduce a “circular lighting” product label. This label acts as a circular indicator for our customers.
It clearly designates products that are optimised for circular economy through 12 objective criteria.

Circular highlights:

- All product information is available on a smart label to facilitate maintenance
- Less than 7 steps to completely disassemble the luminaire
- Materials with a high rate of recyclability

Schréder
Experts in lightability™

VOLTANA EVO 1
Circle light

LONG-LASTING, LONG USE		POINTS	0	5	10	TOTAL
PERFORMANCE		Luminary efficacy[1]	F/P < 110 lm/w	110 lm/w =< F/P < 140 lm/w	140 lm/w =< F/P	10
		Rated life of the LEDs	x < L90/100.000	L90/100.000 =< x < L95/100.000	L95/100.000 =< x	10
		Mechanical[2]	Level 1	Level 2	Level 3	10
		Energy control	No control solution	Dimmable	Dynamic	5
		Smart ready[3]	Not available	Proprietary smart solution ready	Open smart solution ready	0
MAINTENANCE	PARTS WITHDRAWAL[4]	Opening	Specific tools/ Impossible	Basic tools	Tool free	5
		Optical unit	Specific tools/ Impossible	Basic tools	Tool free	
		Gear plate (driver, SPD, smart, ...)	Specific tools/ Impossible	Basic tools	Tool free	
	INFO AVAILABILITY	Product sheet	In the box	On the website	On Smart Label	10
		Installation sheet	In the box	On the website	On Smart Label	
		Asset data sheet	In the box	On the website	On Smart Label	
REFURBISH	SPARE PARTS	Availability[5]	Product warranty	Announced end of life	10 years after the announced end of life	5
	UPGRADE	Mechanical fixation method	Directly to the mold (only one mechanical fixation method allowed)	Use of a gear plate for some functional parts (allow different fixation method)	Use of a module for all the functional parts (allow different fixation method)	5
NONDESTRUCTIVE DISASSEMBLY		Dissasembly depth[6]	> 9	9 ≤ x < 7	≤ 7	10
END OF LIFE						
RECYCLE		Material separability	Not separable	/	All materials	10
		Material compatibility with recycling[7]	No	/	Yes	10
						90

Remarks:

(1) The luminaire's efficacy is the ratio between the output flux (F) and the consumed power (P). This measurement is carried out at 500mA with the maximum number of LEDs. When this configuration is not available, the variant with the maximum number of LEDs and highest current will be measured.
(2) The mechanical criteria takes into account the IP and IK level of the luminaire. Our criteria is as follows:

LEVEL 1	LEVEL 2	LEVEL 3
Any luminaire with an IP level equal or below IP 54	Any luminaire with an IK level equal or below IK 07. Or any luminaire with an IP level between IP 54 and IP 66	Any luminaire with an IP level equal or over IP 66 and an IK level equal or above IK 08

(3) A luminaire is considered smart ready if it can integrate an IoT solution. An open smart solution is a Nema or Zagha-D4I socket.
(4) This factor ensures that it is feasible and practical for a professional to access components after the luminaire has been put into service.
(5) The replacement parts should be the same as the originals, but if this is not possible, equivalent spare parts that perform the same function to the same or higher performance level may be used.
(6) The disassembly depth is the minimum number of steps required to remove a component from a product.
(7) The criteria focuses on the luminaire's main parts (body and reflector) with materials recognised by Schréder Group staff and R-Tech.

The product obtained a score between 0 and 30

It was designed to be cost-efficient

The product obtained a score between 30 and 60

It was built to last but not with circular economy requirements

The product obtained a score between 60 and 90

It was developed to meet most of circular economy requirements

The product obtained a score between 90 and 120

It was developed to fully meet circular economy requirements