LED Flux measurement

FORM-L-41 ED1 REV 0

Date : **6/01/2015**

Operator : **FC**

Filename : **2015_1.xml**

226 - TEST

NBN EN ISO/IEC 17025 : 2005

LEDs

Trademark : **LG Innotek**

Entry number : **34R336**

Type : **3535 Gen4**

Power (Catalogue) : **1.00** W

Flux : **160** lm/LED

BIN Description : **Unknown**

Part number : **Unknown**

Color or CCT (Theorical) : **NW**

Digitally signed by Galciuc Igor
Date: 2019.03.29 11:36:46 EET
Reason: MoldSign Signature
Location: Moldova

Number of LEDs : **16**

Lenses

Trademark : **None**

Type : **None**

Power & Print

Type : **DELTA SM400-AR-4**

Print description : **00-07-909 Rev.A**

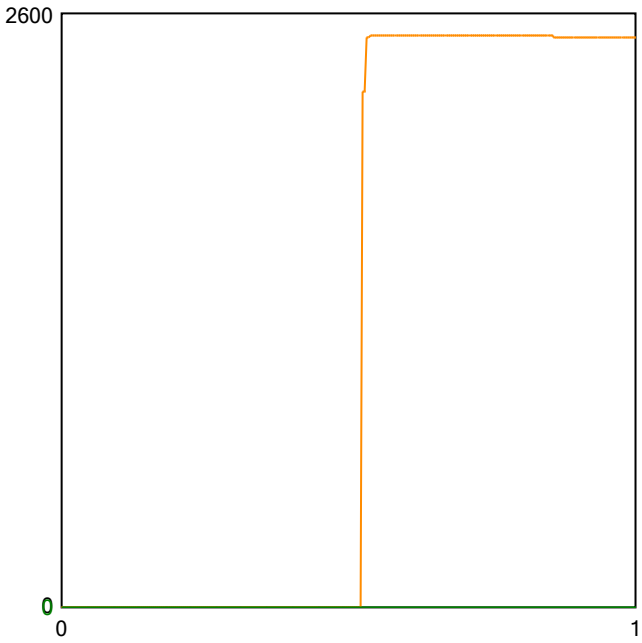
Active ☐

Picture

Sphere photometric measurement

Average flux : **1199** lumens

Maximum flux : **2508** lumens



Position in sphere : 

Electrical measurement

● Secondary electrical measurement

Voltage : **46.56** V

Current : **0.350** A

Power : **16.30** Watt

→ LEDs light efficiency at thermal stabilization :

73.5 lm/W

74.9 lm/Led

→ LEDs light efficiency at 25° :

153.9 lm/W

156.8 lm/Led

● Primary electrical measurement

Voltage : **N/A** V

Current : **N/A** A

Power : **N/A** Watt

Cos φ : **N/A**

→ Driver losses : **N/A** %

→ LEDS & Driver light efficiency :

N/A lm/W

Description :

Flux @25°/350mA 16 LG 3535 Gen4 - Voltana 2 - pcb N°1/12 CTR du 2014/1005

Comment :

FORM-L-41 ED1 REV 0

226 - TEST

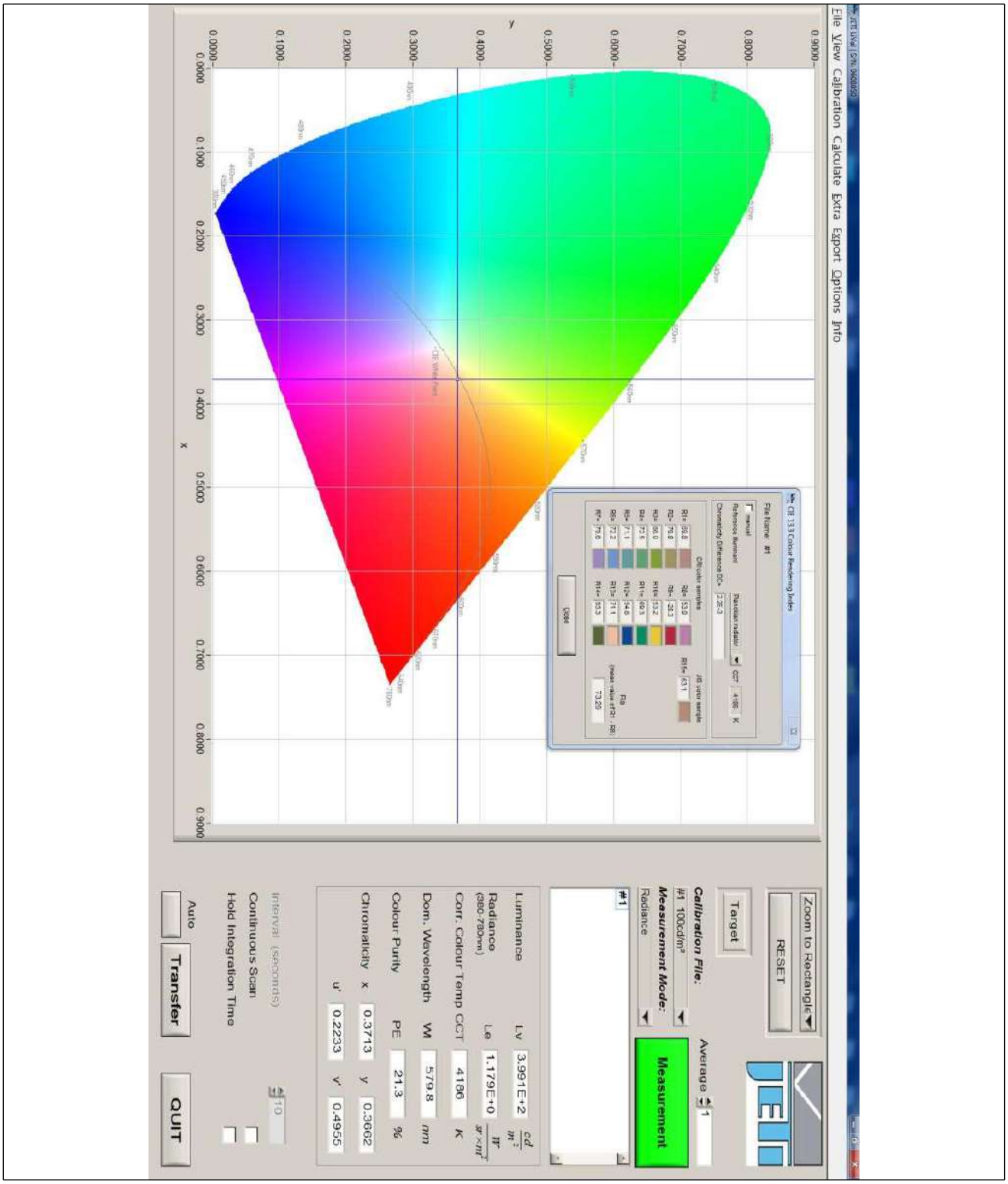
NBN EN ISO/IEC 17025 : 2005

Approved by :

Colorimetry

226 - TEST

NBN EN ISO/IEC 17025 : 2005



RTECH-PHOTOMETRY LABORATORY

Testreport : Measurement of luminous intensity distribution related to the standard NBN-EN 13032-1; CIE 121-1996; IES LM-79-08 and procedures PT-P-01 and PT-P-02

rue de Mons, 3 B-4000 LIEGE - Tel : 04/224.71.40 - Fax : 04/224.25.90

Measurement for Schréder group.

LED

Origin	Production	Luminaire	Request #
Tungsram-Schréder Plc. Hungary	Tungsram-Schréder Plc. Hungary	VOLTANA 2	FD35004

Source

Type	BIN	Trademark	Reference	# LEDs	Reflector
LED	Unknown	LG Innotek	3535 Gen4	16	5102

Master Reflector

Led assembly Gaggione Medium 0,0° No 5102

Protector Refractor Lens

Protector Glass Extra Clear Flat Smooth

Lens Gaggione 5102 PMMA

Laboratory observation

VOLTANA 2 (serie 0) equiped with 16 LG 3535 Gen4 .
Used flux for efficiency matrix calculation = 2508 lm - CCT= 4186K - CRI= 73,26 measured @ 350mA/25°C
(see sphere test report 2015/1 on appendix).

Purpose	Sample date	Sample #
DOC	13/06/2014	34R142

Observation

DOC VOLTANA 2 with lenses 5102

flux coefficient multiplicator (only for efficiency matrix):
From 350 to 500mA: 1,353
From 350 to 700mA: 1,777
From 350 to 1000mA: 2,333

Fixture powered @350/500/700mA by driver LG LLP 40W 0.7A 38/77Vdc model:PISE A040D
Fixture powered @1000mA by driver LG LLP 55W 1A 44/55Vdc model:PISE A055A

Asked by	Measured by	Approved by	Appendix		
LMA	CL	LMA	1	226-TEST NBN EN ISO/IEC 17025 :2005	35605

LUMINOUS INTENSITY DIAGRAM

Origin	Production	Luminaire	Request #
Tungsram-Schréder Plc. Hungary	Tungsram-Schréder Plc. Hungary	VOLTANA 2	FD35004

Source	Type	BIN	Trademark	Reference	# LEDs	Reflector
	LED	Unknown	LG Innotek	3535 Gen4	16	5102

Reflector	Led assembly Gaggione Medium 0,0°	No	5102
Matrices	**356051** Φ 0-90° = 2147lm - 90-99° = 0lm		Absolute measurement
Protector Refractor Lens	Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5102 PMMA		

Observation

Matrix in total flux @350mA

Light losses due to thermal stabilisation: 0,5 %

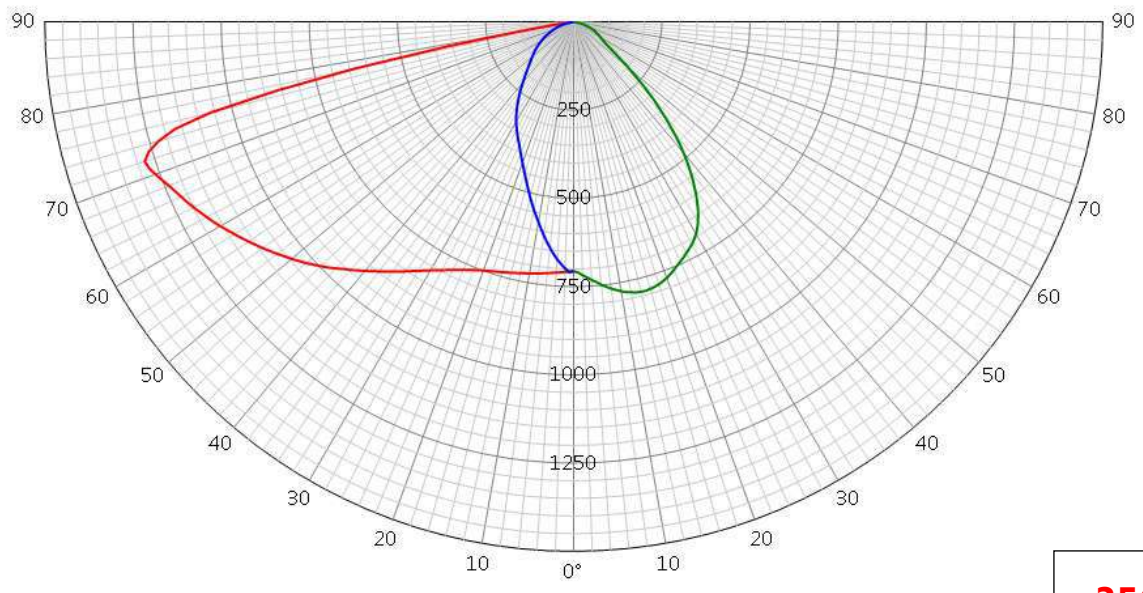
Electrical measurement on LED (#1) : Voltage = 46,11 V Current = 0,350 A Power = 16,15 W

Electrical measurement on driver (#1) : Voltage = 230,00 V Current = 0,100 A Power = 20,27 W PF = 0,844

Total luminaire power = 20,27 W : Lm/Watt = 105,91 lm/W

Driver #1 : See observations for driver details 00-07-909 Rev.A

Plane	I Peak	Peak position	Index	I zero	Laboratory ambiant t°	Measurement date
10 - 170	1279	72	G	706	25,0°	12/01/2015
90	789	15	D			
270	709	1	G			



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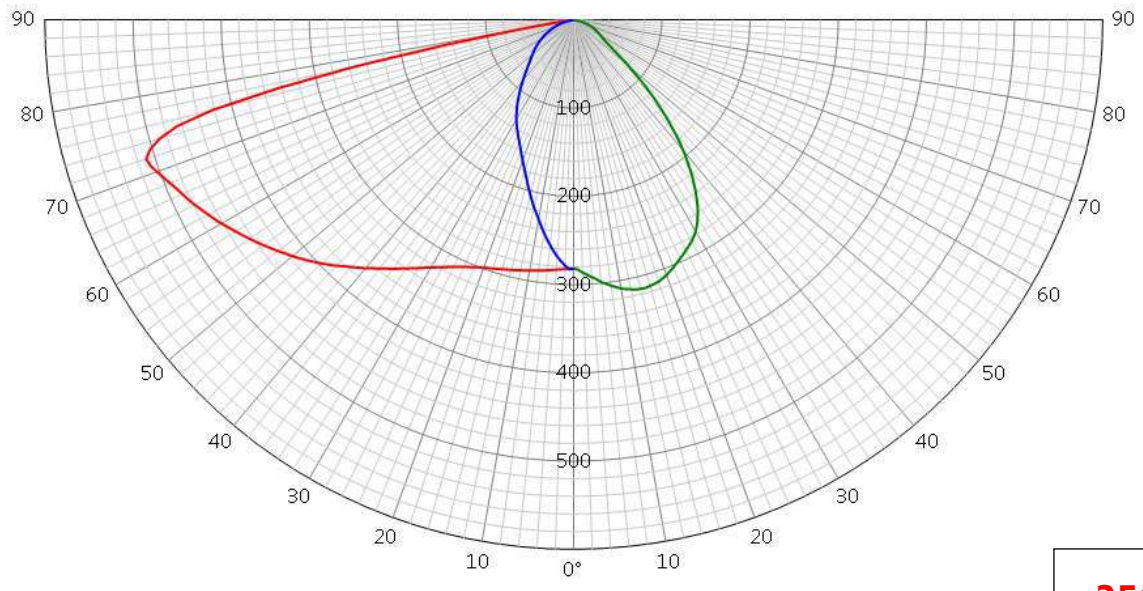
LUMINOUS INTENSITY DIAGRAM

Origin	Production	Luminaire	Request #
Tungsram-Schréder Plc. Hungary	Tungsram-Schréder Plc. Hungary	VOLTANA 2	FD35004

Source	Type	BIN	Trademark	Reference	# LEDs	Reflector
	LED	Unknown	LG Innotek	3535 Gen4	16	5102

Reflector	Led assembly Gaggione Medium 0,0°	No	5102
Matrices	**356052** η 0-90° = 85,6% - 90-99° = 0,0%		Relative measurement
Protector Refractor Lens	Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5102 PMMA		
Observation	Matrix in efficiency @350mA Light losses due to thermal stabilisation: 0,5 % Electrical measurement on LED (#1) : Voltage = 46,11 V Current = 0,350 A Power = 16,15 W Electrical measurement on driver (#1) : Voltage = 230,00 V Current = 0,100 A Power = 20,27 W PF = 0,884 **Total luminaire power = 20,27 W** Driver #1 : See observations for driver details 00-07-909 Rev.A		

Plane	I Peak	Peak position	Index	I zero	Laboratory ambiant t°	Measurement date
10 - 170	510	72	G	282	25,0°	12/01/2015
90	314	15	D			
270	283	1	G			



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LUMINOUS INTENSITY DIAGRAM

Origin	Production	Luminaire	Request #
Tungsram-Schréder Plc. Hungary	Tungsram-Schréder Plc. Hungary	VOLTANA 2	FD35004

Source	Type	BIN	Trademark	Reference	# LEDs	Reflector
	LED	Unknown	LG Innotek	3535 Gen4	16	5102

Reflector	Led assembly Gaggione Medium 0,0°	No	5102
Matrices	**356053** Φ 0-90° = 2905lm - 90-99° = 0lm		Absolute measurement
Protector Refractor Lens	Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5102 PMMA		

Observation

Matrix in total flux @500mA

Light losses due to thermal stabilisation: 0,75 %

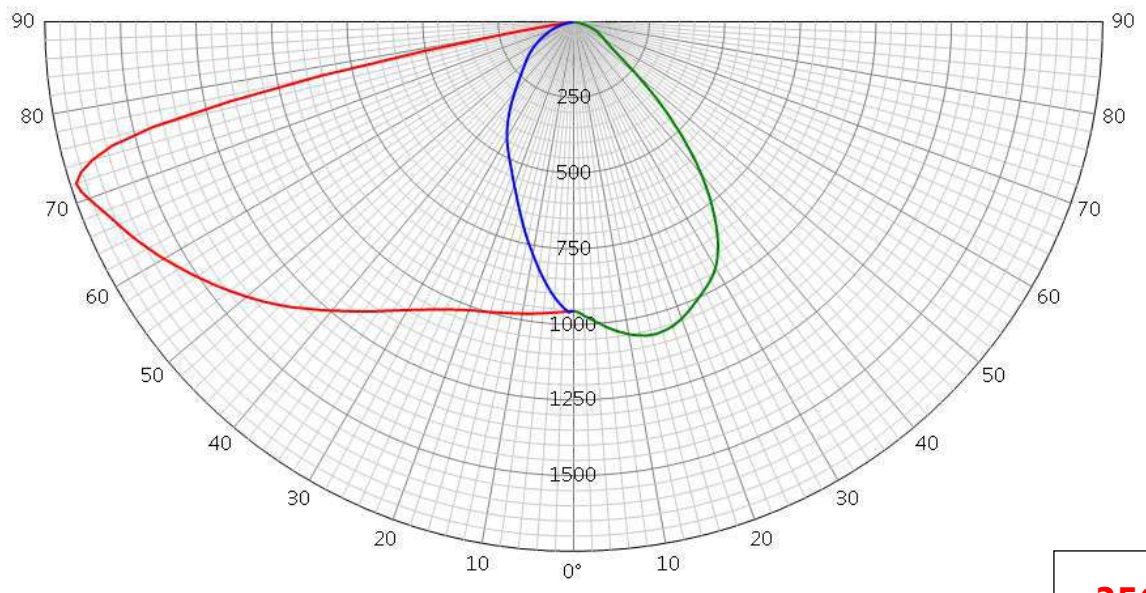
Electrical measurement on LED (#1) : Voltage = 47,14 V Current = 0,500 A Power = 23,56 W

Electrical measurement on driver (#1) : Voltage = 230,00 V Current = 0,131 A Power = 27,17 W PF = 0,935

Total luminaire power = 27,17 W : Lm/Watt = 106,90 lm/W

Driver #1 : See observations for driver details 00-07-909 Rev.A

Plane	I Peak	Peak position	Index	I zero	Laboratory ambiant t°	Measurement date
10 - 170	1731	72	G	955	25,0°	12/01/2015
90	1067	15	D			
270	960	1	G			



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LUMINOUS INTENSITY DIAGRAM

Origin	Production	Luminaire	Request #
Tungsram-Schréder Plc. Hungary	Tungsram-Schréder Plc. Hungary	VOLTANA 2	FD35004

Source	Type	BIN	Trademark	Reference	# LEDs	Reflector
	LED	Unknown	LG Innotek	3535 Gen4	16	5102

Reflector	Led assembly Gaggione Medium 0,0°	No	5102
Matrices	**356054** Φ 0-90° = 3815lm - 90-99° = 0lm		Absolute measurement
Protector Refractor Lens	Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5102 PMMA		

Observation

Matrix in total flux @700mA

Light losses due to thermal stabilisation: 1,5 %

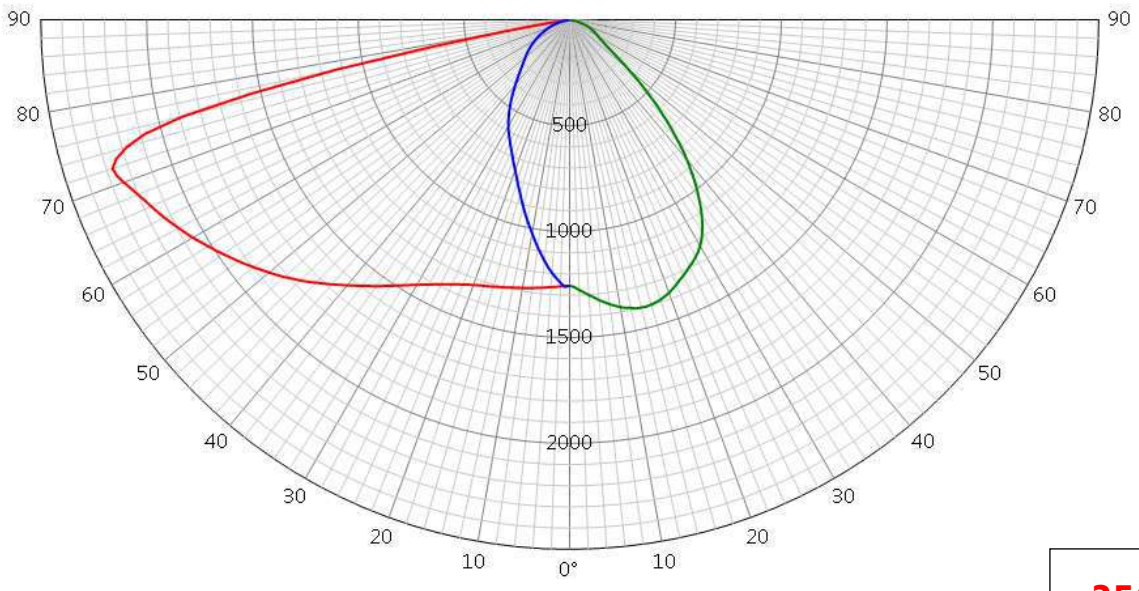
Electrical measurement on LED (#1) : Voltage = 48,38 V Current = 0,700 A Power = 33,85 W

Electrical measurement on driver (#1) : Voltage = 230,00 V Current = 0,177 A Power = 39,23 W PF = 0,965

Total luminaire power = 39,23 W : Lm/Watt = 97,24 lm/W

Driver #1 : See observations for driver details 00-07-909 Rev.A

Plane	I Peak	Peak position	Index	I zero	Laboratory ambiant t°	Measurement date
10 - 170	2273	72	G	1255	25,0°	12/01/2015
90	1401	15	D			
270	1261	1	G			



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LUMINOUS INTENSITY DIAGRAM

Origin	Production	Luminaire	Request #
Tungsram-Schréder Plc. Hungary	Tungsram-Schréder Plc. Hungary	VOLTANA 2	FD35004

Source	Type	BIN	Trademark	Reference	# LEDs	Reflector
	LED	Unknown	LG Innotek	3535 Gen4	16	5102

Reflector	Led assembly Gaggione Medium 0,0°	No	5102
Matrices	**356055** Φ 0-90° = 5008lm - 90-99° = 0lm		Absolute measurement
Protector Refractor Lens	Protector Glass Extra Clear Flat Smooth - VOLTANA 2 Lens 16 x Gaggione 5102 PMMA		

Observation

Matrix in total flux @1000mA

Light losses due to thermal stabilisation: 2,5 %

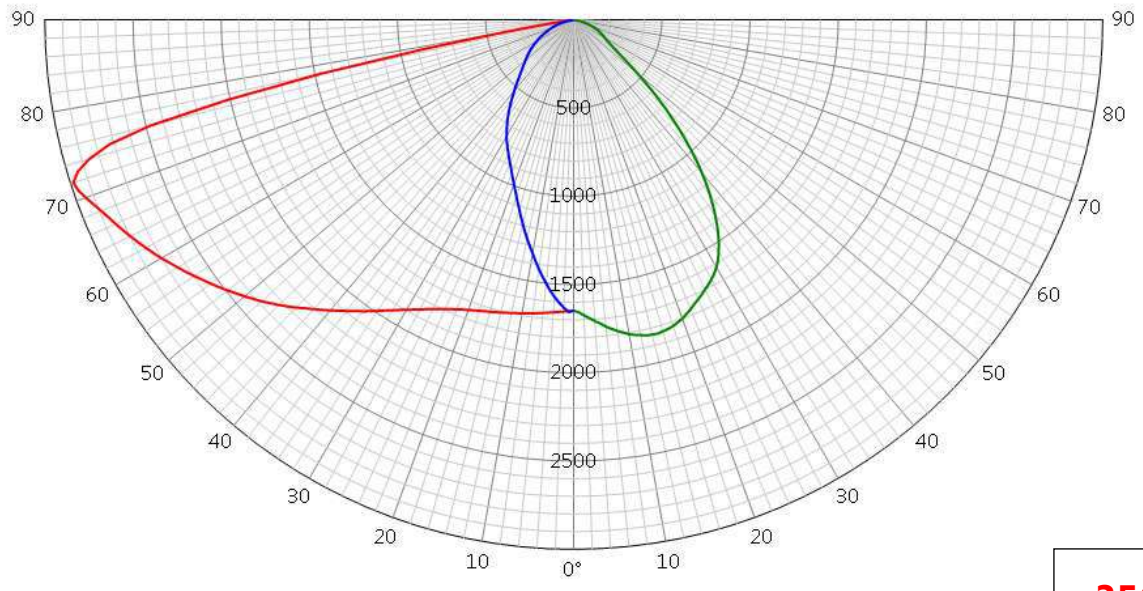
Electrical measurement on LED (#1) : Voltage = 50,13 V Current = 1,000 A Power = 50,11 W

Electrical measurement on driver (#1) : Voltage = 230,00 V Current = 0,259 A Power = 57,56 W PF = 0,963

Total luminaire power = 57,56 W : Lm/Watt = 87,01 lm/W

Driver #1 : See observations for driver details 00-07-909 Rev.A

Plane	I Peak	Peak position	Index	I zero	Laboratory ambiant t°	Measurement date
10 - 170	2984	72	G	1648	25,0°	12/01/2015
90	1840	15	D			
270	1655	1	G			



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Measurement fulfil Standards:

- NBN-EN 13032-1
- NBN-EN 17025:2005
- CIE 121-1996
- LM79-08

Measurement quantities measured:

- Light distribution in relative or absolute photometry
- Led alone cold lumen package
- Led CCT and CRI
- Power consumption of the fitting
- Lm/watt

Electrical measurment, If not specified:

- Primary values are AC with 50Htz frequency
- Secondary values on SSL are DC

CCT, CRI and chromaticity coordinates: are Measured on sphere.
if specified Main test report refer to sphere extra test report.

Light distribution : are measured on gonio.

Number of hours operated prior to measurement: If no other specified, 0 hours (no aging)

Stabilization time: If no other specified, a minimal stabilization time of 1 hour is applied.

Total operating time of the product including stabilization:
45 minutes have to be added by measurement.
Minimal operating time is 105 minutes

Luminous intensity distribution: available on electronic file with
.mat format (internal schreder format)
.ldt format (European standard)
.IES format (American standard)

Statement of uncertainties (K=2 95% of confidence level):

Intensity measurement: +/- 3%
Angle: +/- 0.5°
Flux: +/- 2.5%
Electrical DC
Power: +/- 0.25%
Voltage: +/- 0.1%
Current: +/- 0.2%
Electrical AC
Power: +/- 0.1%

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Voltage: +/- 0.1%
Current: +/- 0.4%
Temperature: +/- 1.5%
CCT: +/- 5%
CRI: +/- 2%
x/y: +/- 2%

Measuring instruments in use:

Gonio
Type C with Moving mirror
Manufacturer: LMT Lichtmesstechnik GmbH Berlin, Helmholtzstrasse 9 10587 Berlin, Germany
Type: GO-DS 2000
Calibration: traceable to PTB (Physikalisch-Technische Bundesanstalt D-Braunschweig)
Photometric test distance : By default 10 meter, on request 30 meter.

Sphere n°1
4p geometry
Manufacturer: LMT Lichtmesstechnik GmbH, Helmholtzstrasse 9 10587 Berlin, Germany
Type: UL2000 + U1000 V-Lambda photometer
Calibration: traceable to BIPM (Bureau International des Poids et Mesures F-Sèvres)

Sphere n°2
4p geometry
Manufacturer: Instrument Systems GmbH, Neumarkter Str. 83, 81673 Muenchen, Germany
Type ISP2000 + Spectroradiometer CAS120 and CAS140
Calibration: traceable to NIST

Colorimetric portable spectroradiometer
Manufacturer: JETI Technische Instrumente GmbH, Tatzendpromenade 2 07745 Jena
Type: SPECBOS 1201
Calibration: traceable to NIST

Multimeters
Manufacturer: Agilent
Type: 34401A
Calibration: traceable to BIPM (Bureau International des Poids et Mesures F-Sèvres)

Wattmeters
Manufacturer: Yokogawa
Type: WT210
Calibration: traceable to BIPM (Bureau International des Poids et Mesures F-Sèvres)

Thermometers
Voltcraft K101 (Sphere IS2000)
LMT U1000 (Sphere LMT)
Gossen digem f96x48 CK/EK (gonio)
Calibration: traceable to PTB (Physikalisch-Technische Bundesanstalt)

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LICENCE

No. 20497 replaces No.20458

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

Licensee:
Schreder S.A.
Rue de Lusambo, 67
1190 BRUXELLES
Belgium

Product	:	road, square, street, flood lighting
Trade name(s)	:	SCHREDER
Type(s)/model(s)	:	VOLTANA 1, VOLTANA 2, VOLTANA 3, VOLTANA 4, VOLTANA 5

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: 09/10/2017

Ir. C. Lana,
Certification Manager

SGS Belgium NV-Division SGS CEBEC
Business Riverside Park
Bld Internationalelaan 55 Build. D
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 1, VOLTANA 2, VOLTANA 3, VOLTANA 4, VOLTANA 5
description	:	Street lighting
rated voltage (Un)	:	120-240 V
rated frequency	:	50-60 Hz
rated secondary current (In SEC)	:	350, 500, 700, 1000 mA (LED)
class	:	class I
degree of protection	:	IP66
additional information	:	IK08

Product data - type VOLTANA 1

lamp(s)	:	8 LED's
rated ambient temperature (ta)	:	max. 55°C

Product data - type VOLTANA 2

lamp(s)	:	16 LED's
rated ambient temperature (ta)	:	max. 55°C

Product data - type VOLTANA 3

lamp(s)	:	24 LED's
rated ambient temperature (ta)	:	max.55°C

Product data - type VOLTANA 4

lamp(s)	:	32 LED's
rated ambient temperature (ta)	:	max. 55°C

Product data - type VOLTANA 5

lamp(s)	:	64 LED's
rated ambient temperature (ta)	:	max. 55°C

TESTS

Test requirements

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

Test results

The test results are laid down in certification file 618719/12.

Remarks

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

Conclusion

The examination proved that all test requirements were met.

Checked by, project leader : Christian Maes - 09/10/2017

Department Manager, Product Certification :

Certification Manager : 2017-10-09

FACTORY LOCATION(S)

Schréder do Brasil Iluminação Ltda.
Rua Iracema Lucas, 415
Distrito Industrial Vinhedo
13280-000 SAO PAULO
Brazil

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

Comatelec S.A.
Z.I.
18400 SAINT FLORENT S/CHER
France

Tungsram-Schréder Világitási Berendezések Zrt
Tópart 2
2084 PILISSZENTIVAN
Hungary

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-IIb**
Date of issue .....:	**2017-10-09**
Total number of pages.....	**49+2**
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 (Third Edition) + A1:2011 used in conjunction with IEC 60598-1:2014 (Eighth Edition)
Test procedure .....:	CB Scheme
Non-standard test method.....:	N/A
Test Report Form No.....:	IEC60598_2_3J
Test Report Form(s) Originator.....:	Intertek Semko AB
Master TRF.....:	2014-09

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 1, VOLTANA 2, VOLTANA 3, VOLTANA 4 & VOLTANA 5.
Ratings	120-240 V, 50-60 Hz, Cl. II , IP66, LED, IK08 Version with 64, 32, 24, 16, 8 led's Led: 350-500-700-1000 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: TMP/CTF Stage 1:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: WMT/CTF Stage 2:**		
Testing location/ address.....:		R-TECH, Rue de Mons, 3,B-4000 LIEGE	
Tested by (name + signature).....:		Marc Abry	
Witnessed by (name, function, signature) .:		Christian Maes	
Approved by (name, function, signature)...:		Laurent Maghe	
☒	**Testing procedure: SMT/CTF Stage 3 or 4:**	R-Tech	
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Witnessed by (name, function, signature) .:			
Approved by (name, function, signature)...:			
Supervised by (name, function, signature) :			

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

Summary of testing: full test

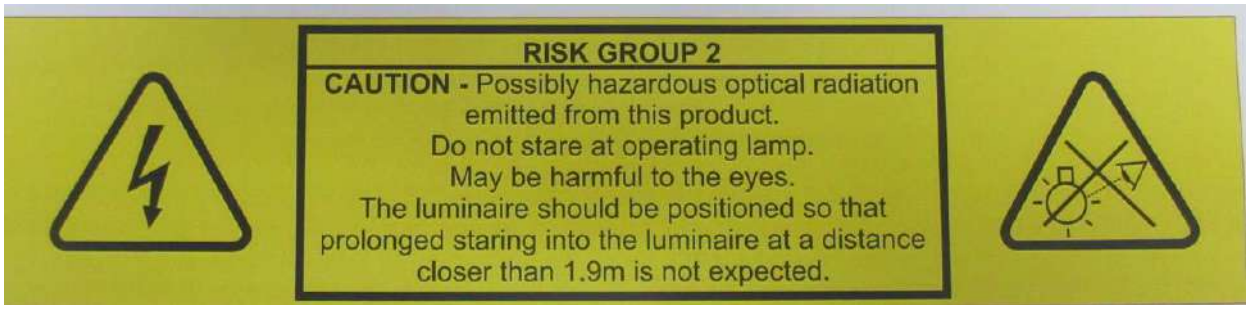
Tests performed (name of test and test clause):	**Testing location:**
IEC 60598-2-3:2002 (Third Edition) + A1:2011 used in conjunction with IEC 60598-1:2014 (Eighth Edition)	R-tech sa Rue de Mons, 3 B-4000 LIEGE Belgium.

Summary of compliance with National Differences: Europe
List of countries addressed

☒ **The product fulfils the requirements of**
IEC 60598-2-3: 2002 (third Edition) + A1:2011 used in conjunction with IEC 60598-1: 2014 (Eighth Edition).
EN 60598-2-3: 2003 + A1:2011 used in conjunction with EN 60598-1:2015

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 .....:	September 2017
Date (s) of performance of tests.....:	September 2017

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.

Drivers Meanwell PLM-12(E)-350 has been added based on report P1540-44-II.

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) ..... :

Comatelec S.A. Z.I. F-18400 SAINT FLORENT S/CHER France	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 do Brasil Iluminação Ltda. Rua Iracema Lucas, 415 Distrito Industrial Vinhedo 13280-000 SAO PAULO,Brazil
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
Tungsram-Schréder Világitási Berendezések Zrt Tópart 2 2084 PILISSZENTIVAN,Hungary	

General product information:

Ta following drivers in use :

	Current (mA)	Ta Philips (°C)	Ta LG (°C)
Vol1	350	/*	55
	500	/*	55
	700	/*	55
	1000	/*	45
Vol2	350	40	55
	500	40	55
	700	40	55
	1000	/*	50
Vol3	350	55	55
	500	55	55
	700	55	55
	1000	35	45
Vol4	350	55	55
	500	50	55
	700	50	55
	1000	40	35
Vol5	350	50	55
	500	50	55
	700	50	45
	1000	40	35

* no Philips drivers available

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

3.2 (0)	**GENERAL TEST REQUIREMENTS**		P
3.2 (0.1)	Information for luminaire design considered ..... :	Standard Yes ☒ No ☐	—
3.2 (0.3)	More sections applicable..... :	Yes ☐ No ☒	—

3.4 (2)	**CLASSIFICATION**		P
3.4 (2.2)	Type of protection ..... :	Class II	—
3.4 (2.3)	Degree of protection..... :	IP 66 (without external cable)	—
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
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	0.91	P

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

3.6 (4)	**CONSTRUCTION**		
3.6 (4.2)	Components replaceable without difficulty		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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
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

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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
	Interference suppression capacitors according to IEC 60384-14		N/A
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

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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**		
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		

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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
	- 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

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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
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

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Clause	Requirement + Test	Result - Remark	Verdict
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@400mm	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**		
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
	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		

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Clause	Requirement + Test	Result - Remark	Verdict
	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:		
	- 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

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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.....:	52	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	IK08	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 .....:	48	P
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

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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)	Creepage distances and clearances ..... :	See Table 3.7 (11.2)	P
	Working voltage (V) ..... :	250 V	—
	Rated pulse voltage (kV) ..... :	/	—
	Voltage form ..... :	Sinusoidal ☒ Non-sinusoidal ☐	—
	PTI ..... :	< 600 ☐ ≥ 600 ☒	—
	Impulse withstand category (Normal category II) (Category III Annex U)	Category II ☐ Category III ☐	—
3.8 (7)	**PROVISION FOR EARTHING**		
3.8 (7.2.1 + 7.2.3)	Accessible metal parts		N/A
	Metal parts in contact with supporting surface		N/A
	Resistance < 0,5 Ω ..... :		N/A
	Self-tapping screws used		N/A
	Thread-forming screws		N/A
	Thread-forming screw used in a grove		N/A
	Earth makes contact first		N/A
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
	Protective earthing of the luminaire not via built-in control gear		N/A
3.8 (7.2.2 + 7.2.3)	Earth continuity in joints, etc.		N/A
3.8 (7.2.4)	Locking of clamping means		N/A
	Compliance with 4.7.3		N/A
	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		N/A
3.8 (7.2.6)	Earth terminal adjacent to mains terminals		N/A
3.8 (7.2.7)	Electrolytic corrosion of the earth terminal		N/A
3.8 (7.2.8)	Material of earth terminal		N/A
	Contact surface bare metal		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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		N/A
	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
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

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Clause	Requirement + Test	Result - Remark	Verdict
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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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**		
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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
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

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Clause	Requirement + Test	Result - Remark	Verdict
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
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 $\geq$ 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 (12.3)	Endurance test:		P
	- mounting-position..... :	Acc. To mounting instruction	—
	- test temperature (°C) ..... :	35°C	—
	- total duration (h) ..... :	240 H	—
	- supply voltage: Un factor; calculated voltage (V)... :		—

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Clause	Requirement + Test	Result - Remark	Verdict
	- lamp used..... :		—
3.12 (12.3.2)	After endurance test:		
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N/A
	- marking legible		P
	- no cracks, deformation etc.		P
3.12 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
3.12 (12.5)	Thermal test (abnormal operation)	(see Annex 2)	P
3.12 (12.6)	Thermal test (failed lamp control gear condition):		
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		
	- 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:		
	- case of abnormal conditions ..... :		—

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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:		
	- 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 Table 3.15 (13.2.1)	N/A
3.12 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		
	- 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 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 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)		—

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Clause	Requirement + Test	Result - Remark	Verdict
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
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

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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 ..... :	>4 Mohm	P
	- between live parts and mounting surface ..... :	>4 Mohm	P
	- between live parts and metal parts ..... :	>4 Mohm	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..... :	>4 Mohm	P
	- 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 ..... :	1500V	P
	- between live parts and mounting surface ..... :	1500V	N/A
	- between live parts and metal parts ..... :	1500V	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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 (10.3)	Touch current or protective conductor current (mA) :	<<0,5	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

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Clause	Requirement + Test	Result - Remark	Verdict

3.7 (11.2)	**TABLES: Creepage distances and clearances**	p
Table 11.1	**Minimum distances (mm) for a.c. (50/60 Hz) sinusoidal voltages**	

RMS working voltage (V) not exceeding	50	150	250	500	750	1000
Creepage distances						
Required basic insulation, PTI ≥ 600	0,6	0,8	1,5	3	4	5,5
Measured			>2			
Required basic insulation, PTI < 600	1,2	1,6	2,5	5	8	10
Measured						
Required supplementary insulation PTI ≥ 600	-	0,8	1,5	3	4	5,5
Measured			>2			
Required supplementary insulation PTI < 600	-	1,6	2,5	5	8	10
Measured						
Required reinforced insulation	-	3,2	5	6	8	11
Measured			>7			
Clearances						
Required basic insulation	0,2	0,8	1,5	3	4	5,5
Measured			>2			
Required supplementary insulation	-	0,8	1,5	3	4	5,5
Measured						
Required reinforced insulation	-	1,6	3	6	8	11
Measured			>4			

Table 11.2	**Minimum distances (mm) for non-sinusoidal pulse voltages**						
Rated pulse voltage (peak kV)	2,0	2,5	3,0	4,0	5,0	6,0	8,0
Required clearances	1,0	1,5	2	3	4	5,5	8
Measured							
Rated pulse voltage (peak kV)	10	12	15	20	25	30	40
Required clearances	11	14	18	25	33	40	60
Measured							
Rated pulse voltage (peak kV)	50	60	80	100	-	-	-
Required clearances	75	90	130	170	-	-	-
Measured							

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Clause	Requirement + Test	Result - Remark	Verdict

3.15 (13.2.1)	**TABLE: Ball Pressure Test of Thermoplastics**				**N/A**
Allowed impression diameter (mm) ..... :					—
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	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict	
Any flame or glowing of the sample extinguished within 30 s of withdrawing the glow-wire, and any burning or molten drop did not ignite the underlying parts (Yes/No) ..... :						
Supplementary information:						

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

ANNEX 1	**TABLE: Critical components information**	

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

Object / part No.	Code	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
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
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	A	LG	PISE-A040D	40W 0.35-0.7A 120-277V 50-60Hz Tc=80°C	IEC 61347-2-13	CB / UL
Driver	A	LG	PISE-A040A	40W 0.35/0.5/0.7 120-277V 50-60Hz Tc=80°C	IEC 61347-2-13	CB / UL
Driver	A	LG	PISE-A075A	75W 0.35/0.5/0.7 120-277V 50-60Hz Tc=80°C	IEC 61347-2-13	CB / UL
Driver	A	LG	PISE-A075D	75W 0.35-0.7A 120-277V 50-60Hz Tc=80°C	IEC 61347-2-13	CB / UL
Drivers	A	LG	PISE-A150D	150W 50/60Hz 0.35-07A 120-277V Tc=80°C	IEC 61347-2-13	CB / UL
Drivers	A	LG	PISE-A150A	150W 50/60Hz 0.35/0.5/0.7 120-277V Tc=80°C	IEC 61347-2-13	CB / UL
Drivers	A	PHILIPS	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	A	PHILIPS	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	A	PHILIPS	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	A	PHILIPS	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	A	PHILIPS	Xi LP 70W 0,2-0,7A SL 230V C150 sXt	70W 50-60Hz 0,2-0,7A 198-264V Tc=85°C	IEC 61347-2-13	CB
Drivers	A	PHILIPS	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	A	PHILIPS	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	A	PHILIPS	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	A	PHILIPS	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	A	PHILIPS	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

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

Drivers	A	PHILIPS	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	A	PHILIPS	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	A	PHILIPS	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	A	PHILIPS	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	A	Meanwell	PLM-12-350 PLM-12E-350	12W 50-60Hz 0.35A 110-240Vac Tc=75°C Ta=50°C	IEC 61347-2-13	CB
Control Device	A	Owlet	LuCo ADP	110-277V 50/60 Hz Tmax = 80°C	IEC/EN 61347	CB / UL
Control Device	A	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	Owlet	Shorting Cap	Luco P7 Empty Body	IEC/EN 61347	Test report P-E16059
Connection Device	A	TE	TE NEMA Socket 7-pin	Power contacts: 15A 480V Dimming contacts: 0.10A 10V	IEC 61347-1 IEC 61347-2-11	CB
FUSE HOLDER	A	Mersen	10x38mm CCR8-10 Series	20-32A 400V	IEC 60269-1 & -2	ENEC
FUSE HOLDER	A	CAMDENBOSS	CFTBN 5x20mm	13A 250V	IEC 60269-1 & -2	VDE / UL
FUSE	A	Mersen	FR10 10x38mm	0.5-32A 400-500V	IEC 60269-1 & -2	ENEC
FUSE	A	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
ESD	A	Vishay	VR 37	0,5W 2MΩ	DIN EN 60085	VDE
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 10kA 20KV (DM) 120KV (CM) Tc=80°C	IEC 61643-11	DEKRA
Terminal	A	WIELAND	GST18i S B	16A/250V 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	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	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
Cable Gland	A	Hummel	HSK-K	IP68-10bar M20x1,5	DIN EN 62444	VDE / UL

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

Led Modules	A	LG	8 Leds G4TOP @1000 mA 16 Leds G4TOP @1000 mA 24 Leds G4TOP @1000 mA 32 Leds G4TOP @1000 mA	RG	IEC/EN 62031-62471	Tested in appliance
Led Modules	A	LG	8 Leds G4 @1000 mA 16 Leds G4 @1000 mA 24 Leds G4 @1000 mA 32 Leds G4 @1000 mA	RG	IEC/EN 62031-62471	Tested in appliance
Led Modules (Voltana)	A	LG	8 Leds G4L @1000 mA 16 Leds G4L @1000 mA 24 Leds G4L @1000 mA 32 Leds G4L @1000 mA	RG	IEC/EN 62031-62471	Tested in appliance
Led Modules	A	Schréder	2x12 Leds XP-G2 @700 mA 2x16 Leds XP-G2 @700 mA 24 Leds XP-G2 @700 mA 32 Leds XP-G2 @700 mA	RG0	IEC/EN 62031-62471	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-1	—
	Lamp used..... :	8 Led's LG3535	—
	Lamp control gear used..... :	Tridonic 27W @ 1000 mA	—
	Mounting position of luminaire ..... :	Horizontal	—
	Supply wattage (W) ..... :		—
	Supply current (A) ..... :		—
	Calculated power factor..... :		—
	Table: measured temperatures corrected for ta = 45 °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	68			70		
Supply wiring	45	57			90		
Led Module	45	73			85		
Terminal	45	57			110		
Internal wiring	45	57			90		

Supplementary information:
Corrected for Ta 45 °C

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 Led's XPL	—
	Lamp control gear used..... :	MeanWell PLD-40 @ 1400 mA	—
	Mounting position of luminaire ..... :	Horizontal	—
	Supply wattage (W) ..... :		—
	Supply current (A) ..... :		—
	Calculated power factor..... :		—
	Table: measured temperatures corrected for ta = 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	55	87			90		
Supply wiring	55	64			90		
Led Module	55	106			130		
Terminal	55	64			110		
Internal wiring	55	64			90		

Supplementary information:
Corrected for Ta 55 °C

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 Led's LG3535	—
	Lamp control gear used..... :	Philips 40W @ 700 mA	—
	Mounting position of luminaire ..... :	Horizontal	—
	Supply wattage (W) ..... :		—
	Supply current (A) ..... :		—
	Calculated power factor..... :		—
	Table: measured temperatures corrected for ta = 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	55	78			90		
Supply wiring	55	64			90		
Led Module	55	74			85		
Terminal	55	64			110		
Internal wiring	55	64			90		

Supplementary information:
Corrected for Ta 55 °C

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 Led's LG3535	—
	Lamp control gear used..... :	Xitanium 40W @ 700 mA	—
	Mounting position of luminaire ..... :	Horizontal	—
	Supply wattage (W) ..... :		—
	Supply current (A) ..... :		—
	Calculated power factor..... :		—
	Table: measured temperatures corrected for ta = 40 °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	40	86			90		
Supply wiring	40	50			90		
Led Module	40	65			85		
Terminal	40	50			110		
Internal wiring	40	50			90		

Supplementary information:
Corrected for Ta 40°C

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 Led's LG3535	—
	Lamp control gear used..... :	Xitanium 150W@1000 (700) mA	—
	Mounting position of luminaire ..... :	Horizontal	—
	Supply wattage (W) ..... :		—
	Supply current (A) ..... :		—
	Calculated power factor..... :		—
	Table: measured temperatures corrected for ta = 35 (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	35 (55)	61 (84)			90		
Supply wiring	35 (55)	46 (64)			90		
Led Module	35 (55)	80 (85)			85		
Terminal	35 (55)	46 (64)			110		
Internal wiring	35 (55)	46 (64)			90		

Supplementary information:
Corrected for Ta 35 (55) °C

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's LG3535	—
	Lamp control gear used..... :	Xitanium 150W @1000 (700) mA	—
	Mounting position of luminaire ..... :	Horizontal	—
	Supply wattage (W) ..... :		—
	Supply current (A) ..... :		—
	Calculated power factor..... :		—
	Table: measured temperatures corrected for ta = 40 (50) °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	40 (50)	88 (86)			90		
Supply wiring	40 (50)	55 (61)			90		
Led Module	40 (50)	81 (79)			85		
Terminal	40 (50)	55 (61)			110		
Internal wiring	40 (50)	55 (61)			90		

Supplementary information:
Corrected for Ta 40 (50) °C

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

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		
	Type reference ..... :	VOLTANA-5	—
	Lamp used..... :	64 Led's LG3535	—
	Lamp control gear used..... :	Xitanium 150W @1000 (700) mA	—
	Mounting position of luminaire ..... :	Horizontal	—
	Supply wattage (W) ..... :		—
	Supply current (A) ..... :		—
	Calculated power factor..... :		—
	Table: measured temperatures corrected for ta = 35 (50) °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	35 (50)	81 (85)			90		
Supply wiring	35 (50)	52 (61)			90		
Led Module	35 (50)	82 (80)			85		
Terminal	35 (50)	52 (61)			110		
Internal wiring	35 (50)	52 (61)			90		

Supplementary information:
Corrected for Ta 35 (50)°C

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
(15.3.3)	Stop		N/A
(15.3.4)	Unprepared conductors		N/A

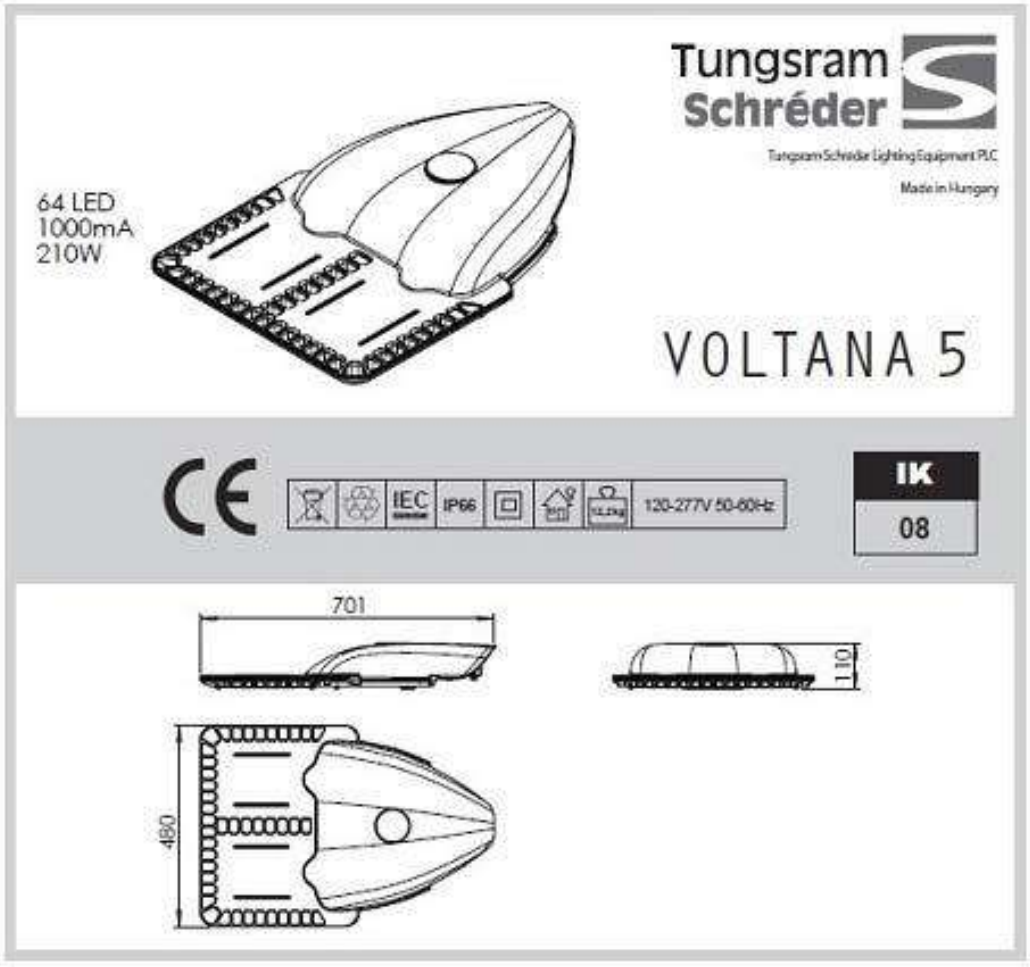
IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
(15.3.5)	Pressure on insulating material		N/A
(15.3.6)	Clear connection method		N/A
(15.3.7)	Clamping independently		N/A
(15.3.8)	Fixed in position		N/A
(15.3.10)	Conductor size		N/A
	Type of conductor		N/A
(15.5.1)	Terminals internal 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

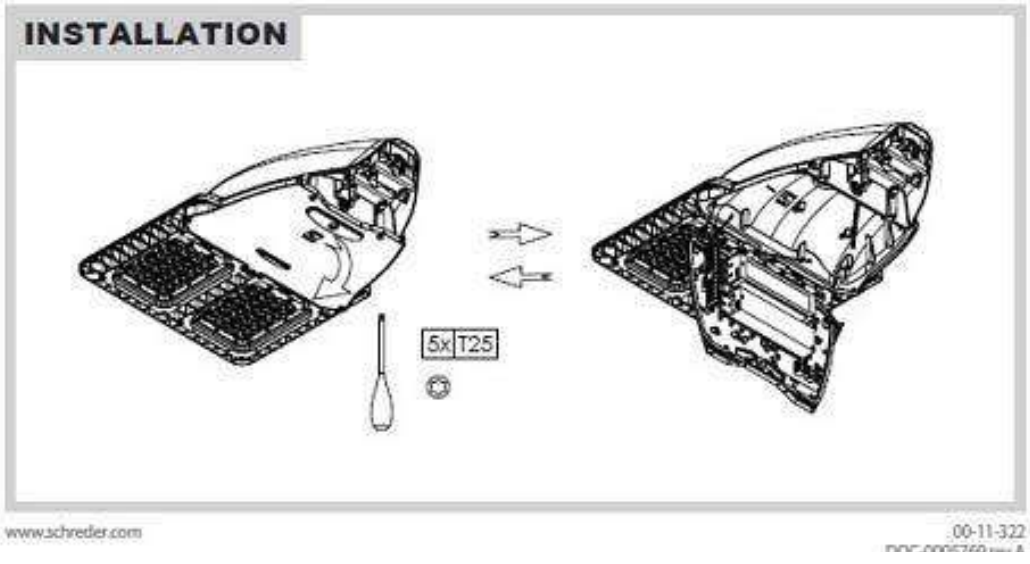
IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

(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:										

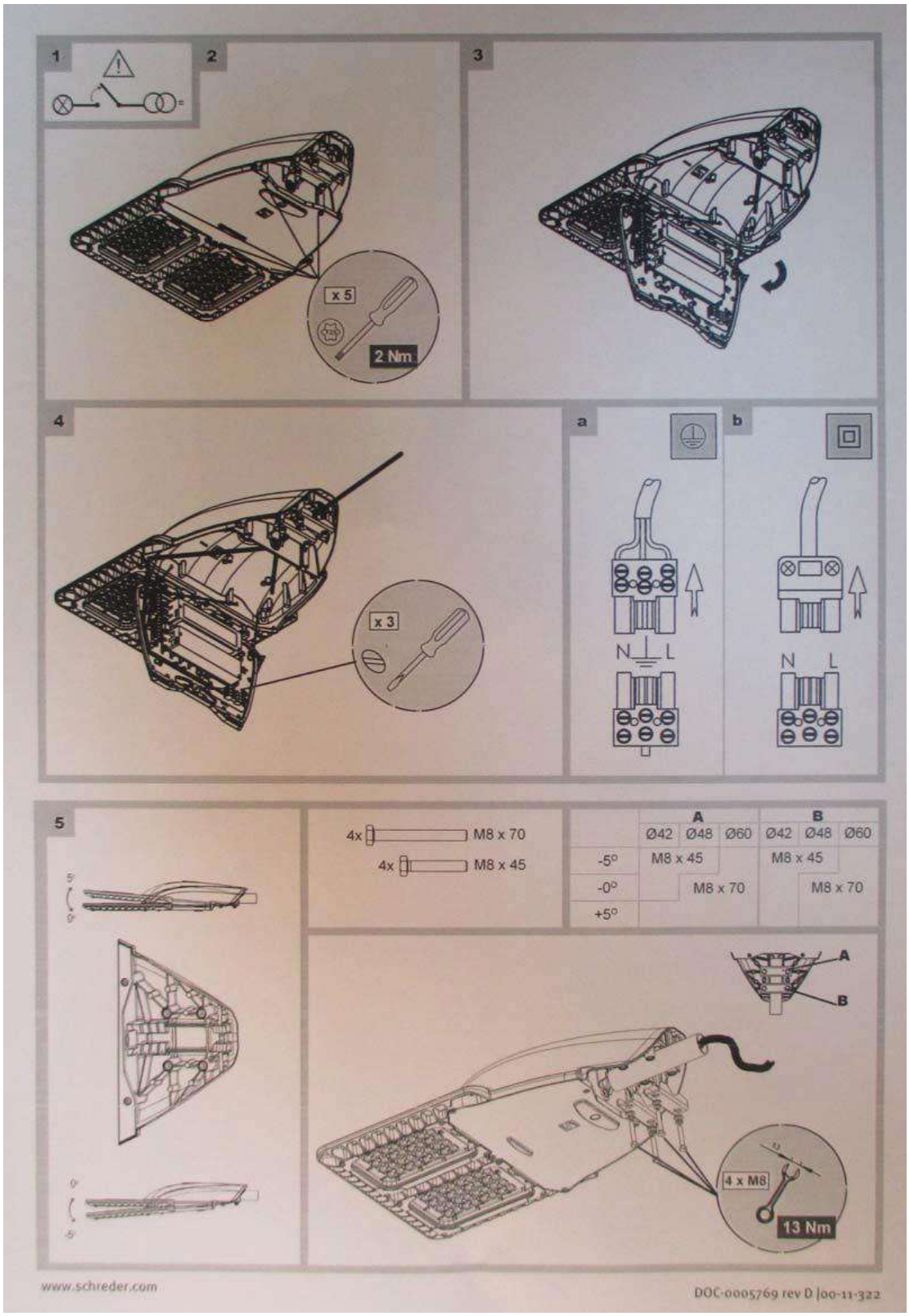
IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

Installation Notice and pictures





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



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

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

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

IEC60598_2_3K - 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 + A1:2011 used in conjunction with EN 60598-1:2015
Annex Form No. ..... :	EU_GD_IEC60598_2_3K
Annex Form Originator ..... :	IMQ S.p.A.
Master Annex Form..... :	2016-12

	CENELEC COMMON MODIFICATIONS (EN)		**P**

3.5 (3)	**MARKING**		
3.5 (3.3.101)	For luminaires not supplied with terminal block: Adequate warning on the package		N/A

3.6 (4)	**CONSTRUCTION**		
3.6 (4.11.6)	Electro-mechanical contact systems		N/A

3.10 (5)	**EXTERNAL AND INTERNAL WIRING**		
3.10 (5.2.1)	Connecting leads		N/A
	- without a means for connection to the supply		N/A
	- terminal block specified		N/A
	- relevant information provided		N/A
	- compliance with 4.6, 4.7.1, 4.7.2, 4.10.1, 11.2, 12 and 13.2 of Part 1		N/A
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**		
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

IEC60598_2_3K - ATTACHMENT			
Clause	Requirement – Test	Result - Remark	Verdict
(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 (Arrêté du 30 décembre 2011 portant règlement de sécurité pour la construction des immeubles de grande hauteur et leur protection contre les risques d'incendie et de panique; Section VIII; Article GH 48, Eclairage) Glow-wire test for outer parts of luminaires:		
	- 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

Laboratory Service PHYSICAL 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

Subject: **VOLTANA-2 16 Led's**
Sample n°: P-E14361

Test purpose: **Electrical measurements @ 1A**

Remarks:
Test request n°: P-D14674
Folder n°: P-F14058

TEST CONDITIONS:

Operator: CLOSSET Frédérick

Driver: LG Innotek PISE-A055A, 1A driver

Load: 16 led's (Typical Vf: 3,18 V)

Power Supply:
Elgar Tw 3500-4
Supply voltage: 230 V 50 Hz

Measurement device:
Fluke Norma 4000 (HF Powermeter, User 10, filter OFF)

CONCLUSIONS:

- Efficiency: 87,0 %
- PF: 0,97
- THD: 8,6 %
- Harmonics distribution complies with the IEC/EN 61000-3-2 Standard.

Duplicate to: Mr M. Thijs
LAB 16/09/2014
J.P. Harchies

//P-14E674

Laboratory Service PHYSICAL 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

Subject: **VOLTANA-2 16 led's @ 1A class I**
Sample n°:

Test purpose: **EMC tests according to EN 55015 & EN 61547 Standards**

Remarks:
Test request n°: P-D14700
Folder n°: P-F14058

TEST CONDITIONS:

Operator: ULg - EMC

Test Summary
EN 55015 & EN 61547 Standards

Emission

Standard	Limit / Level	Result	
		PASS	FAIL
EN 55015 Conducted Emission 9kHz- 30 MHz		X	
EN 55015 Annex B 30 MHz – 300 MHz		X	

Immunity

Standard	Limit / Level	Result	
		PASS	FAIL
EN 61000-4-5	0.5 , 1 , 2 & 4 kV M.D. Impulse + @ 90° Impulse - @ 270° 20' between impulse Criteria B required	X	

Driver: LG Innotek PISE-A 055A – 55W 1A (Rev-04)

EMC Auxiliaries: Ferrite W-E 742 700 55

CONCLUSIONS:

VOLTANA-2 16 led's driven @ 1A by LG Innotek 55 W driver complies with the CISPR/EN 55015 and EN 61547 Standards.

Remark: Surge protection tested OK up to 4 KV for both Differential & Common modes (Max ULg facilities).

Duplicate to: Mr M. Thijs
LAB 23/09/2014
J.P. Harchies

//P-14E700

Laboratory Service PHYSICAL 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

Subject: **VOLTANA-2 Extra Clear glass protectors**
Sample n°: P-E15378

Test purpose: **Fragmentation test following IEC/EN 60598-2-3 Standard**

Remarks:
Test request n°: P-D15559
Folder n°: P-F14058

TEST CONDITIONS:

Operator: BOMBIL Patrick

3 samples under test
Glass thickness: 5 mm

Fragmentation test

- An adhesive sheet is scotched on the protector internal side to hold the particles after breakage.
- Impact with spring punch hammer
- Impact on the external side of protector
- Impact at 3 cm from the mid-point of the longest edge.
- Counting of the particles in the coarsest area in a 5 cm side square within 5 minutes after breakage.

Results:
Sample 1: 117 pieces
Sample 2: 116 pieces
Sample 3: 118 pieces

CONCLUSIONS:

VOLTANA-2 Extra Clear Glass protector complies with fragmentation test following IEC/EN 60598-2-3 Standard.

Duplicate to: Mr M. Thijs
LAB 21/08/2015
L. Maghe

//P-15CR559

Laboratory Service PHYSICAL 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

Subject: **VOLTANA-2**
Sample n°: P-E14362

Test purpose: **Mechanical impact resistance test following IEC/EN 62262 Standard**

Remarks:
Test request n°: P-D14698
Folder n°: P-F14058

TEST CONDITIONS:

Operator: BOMBIL Patrick

Smooth extra clear glass
Glass thickness: 5 mm

At pendulum hammer
5 impact points distributed on protector surface
One impact on each point

Test on 5 samples

Test	**Result**
IK08 : Impact energy: 5 joules Hammer weight: 1,7 kg Height of fall: 29,4 cm	OK for the 5 samples for all tested points

CONCLUSIONS:

VOLTANA-2 satisfies the IK08 test following IEC/EN 62262 Standard.

Duplicate to: Mr M. Thijs
LAB 23/09/2014
J.P. Harchies

//P-14E698

Laboratory Service PHYSICAL TEST REPORT

R-Tech
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Tel.: +32 4 224 71 40 – Fax: +32 4 224 25 90
Member of Schréder Group

Subject: **VOLTANA-2 16 led's @ 1A**
Sample n°:

Test purpose: **Tightness test IP66 following IEC/EN 60598-1 Standard**

Remarks:
Test request n°: P-D14696
Folder n°: P-F14058

TEST CONDITIONS:

Operator: BOMBIL Patrick

Preconditioning: endurance test

Test	Result
IP6X : -Luminaire switched ON until stable T° -Talcum in suspension (blowing ON) -After 1', luminaire OFF -Talcum for 3 hours	OK.
IPX6 : - Luminaire switched ON until stable T° - Luminaire switched OFF and immediately sprayed with water jet - Hose Φ 12,5 mm - Water pressure: 1 kg/cm2 - Spraying distance: 3 m - Duration of test: 3 minutes	OK.

CONCLUSIONS:

VOLTANA-2 16 led's @ 1A satisfies the IP66 test following IEC/EN 60598-1 Standard.

Duplicate to: Mr M. Thijs
LAB 23/09/2014
J.P. Harchies

//P-14E696

Laboratory Service PHYSICAL 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

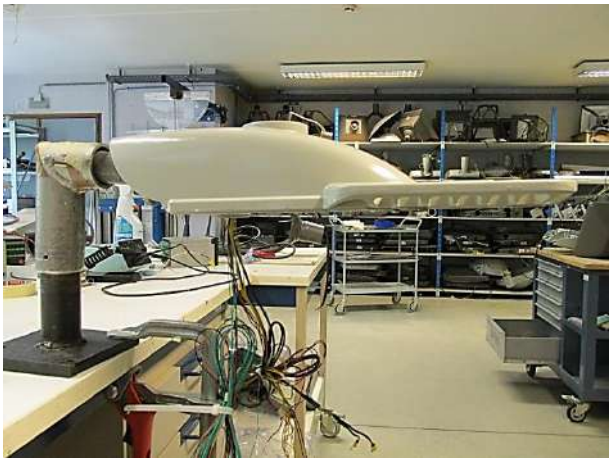
Subject: **VOLTANA-2 16 Led's**
Sample n°: P-E14361

Test purpose: **Thermal test evaluation @ 1A**

Remarks:
Test request n°: P-D14697
Folder n°: P-F14058

TEST CONDITIONS:

Operator: CLOSSET Frédérick



Load: 16 led's

Driver: LG Innotek LLP 55 W 1,0 A
PISE-A055A
Tc 80 °C

Measurement device:
Yokogawa TX10: thermal measurement
Yokogawa WT 210: primary EM
Fluke 87: secondary and led's EM

Junction Temperature measurement method
Junction temperature measurement by base temperature measurement and electrical measurement.
$T°_j = T°_b + R_{jb} \times P_{led}$

CONCLUSIONS:
According to "Led's Lumen Maintenance Criterion" LM80 extrapolation 6.000 hrs, we can state VOLTANA-2 16 led's driven @ 1A by LG Innotek driver LLP 55 W PISE-A055A driver satisfies:
Tq (CEI): 35 °C for led's with L80 – 100 Khrs target
Tq (CEI): 35 °C for lenses in Diakon material
Tq (CEI): 35 °C for driver PISE-A055A
Ta (CEI): 55 °C

Duplicate to: Mr M. Thijs
LAB 23/09/2014
J.P. Harchies

//P-14E697

Laboratory Service PHYSICAL 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

Subject: **VOLTANA-2 – Side entry Configuration**
Sample n°: P-E14365

Test purpose: **Vibrations test: "Street Lighting Luminaires" testing protocol**

Remarks:
Test request n°: P-D14801
Folder n°: P-F14058

TEST CONDITIONS:

Operator: V2i

Testing protocol

	"Street Lighting Luminaires" testing protocol
Test Item	Post-top and Side-entry Luminaire
Excitation Direction	3 directions
Search for frequencies and quality factor Q	Excitation: sine sweep Frequency band: 5 - 55 Hz Sweep speed: 1 octave/min. Acceleration: 0.5g
Test	Q < 2 (no natural frequency)
	Excitation: **RANDOM (*)** Frequency band: 5 - 55 Hz Acceleration: 0.84g_{RMS} Duration: 1h
	Q > 2
	Excitation : sine dwell Frequency : f0 (Qmax) Acceleration : 0.5g Duration : 30 minutes
Search for frequencies and quality factor Q	Excitation: sine sweep Frequency band: 5 - 55 Hz Sweep speed: 1 octave/min. Acceleration: 0.5g

(*) The RANDOM equivalent test consist in an accelerated ageing process of one hour which presents, on a reference one-degree-of-freedom system, an equivalent fatigue damage spectrum than 20 years of mean wind and 90 hours of storms.

CONCLUSIONS:

VOLTANA-2 side entry configuration satisfies the Vibration tests following "Street Lighting Luminaires" testing protocol.

Duplicate to: Mr M. Thijs
LAB 21/10/2014
J.P. Harchies

//P-14E801

Laboratory Service PHYSICAL 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

Subject: **VOLTANA-2**
Sample n°: P-E14363

Test purpose: **Aerodynamic wind test**

Remarks:
Test request n°: P-D14699
Folder n°: P-F14058

TEST CONDITIONS: Operator: ULg – CAT Soufflerie

2 tests realized:

1) Aerodynamic Coefficient determination
2) Endurance test

1) Aerodynamic coefficient determination

	Value (m²)		
Wind Direction	**Cd.S (drag)**	**Cs.S (Side)**	**Cl.S (Lift)**
Front	0,004	-0,004	0,002
Side	0,019	0,019	0,019

2) Endurance test: wind qualification test

Wind direction: Side

Wind resistance: 10' at 180 km/h

Result: OK

CONCLUSIONS:

VOLTANA-2 satisfies the wind speed test 180 Km/h for 10 minutes.
See Aerodynamic coefficients here above.

Duplicate to: Mr M. Thijs
LAB 23/09/2014
J.P. Harchies

//P-14E699

VOLTANA

ILUMINAT CU LEDURI, POTRIVIT ORICUI

EFICIENTIZAREA COSTURILOR

PERFORMANȚĂ RIDICATĂ

BENEFICII REMARCABILE

NU NECESITĂ ÎNTREȚINERE

Schréder

VOLTANA

CEA MAI NOUĂ, RENTABILĂ ŞI PERFORMANTĂ GAMĂ DE APARATE DE ILUMINAT, CARE ÎŞI ACOPERĂ INVESTIȚIA ÎN TIMP

POSIBILITATEA DE A RECUPERA INVESTIȚIA RAPID, PENTRU ILUMINAREA ORICĂRUI TIP DE PEISAJ URBAN SAU RURAL, A STAT LA BAZA DEZVOLTĂRII GAMEI VOLTANA. **DEVIZA NOASTRĂ ESTE: „ILUMINATUL CU LED ESTE PENTRU ORICINE".**

CALITATE FĂRĂ COMPROMISURI

Bazate pe modulul LED LensoFlex®2, aparatele de iluminat Voltana furnizează soluții de iluminat durabile, care scad semnificativ consumul de energie şi îmbunătățesc nivelul de iluminat.

INVESTIȚII MINIME

Disponibil în 5 dimensiuni, cu flux luminos cuprins între 900 de lumeni şi 23.900 lumeni, având numeroase distribuții luminoase de înaltă eficiență şi diverse opțiuni pentru control, gama Voltana întâmpină toate nevoile de iluminat urban şi rutier, cu investiții minime.

RECUPERARE RAPIDĂ, ECONOMII DE DURATĂ

Cu o durată de viață de 100.000 de ore, Voltana permite evitarea a 4, până la 6 schimbări ale lămpilor, comparativ cu sursele de iluminat convenționale. În perioada în care, pentru aparatele cu lămpi, ar fi necesară înlocuirea aparatului de iluminat, Voltana câştigă deja bătălia pentru scăderea costurilor totale, față de soluțiile HID. În primul rând, Voltana recuperează investiția, apoi continuă să ofere beneficii substanțiale, pentru o lungă perioadă de timp.

VOLTANA **0** VOLTANA **1** VOLTANA **2** VOLTANA **3** VOLTANA **4** VOLTANA **5**

ZONE PIETONALE

Străzi, alei şi piste \de biciclete

STRADAL

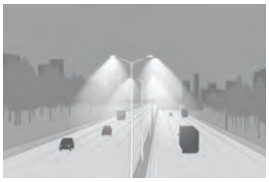
Străzi rezidențiale

Spații comune, zone comerciale din mediul urban

CĂI DE CIRCULAȚIE

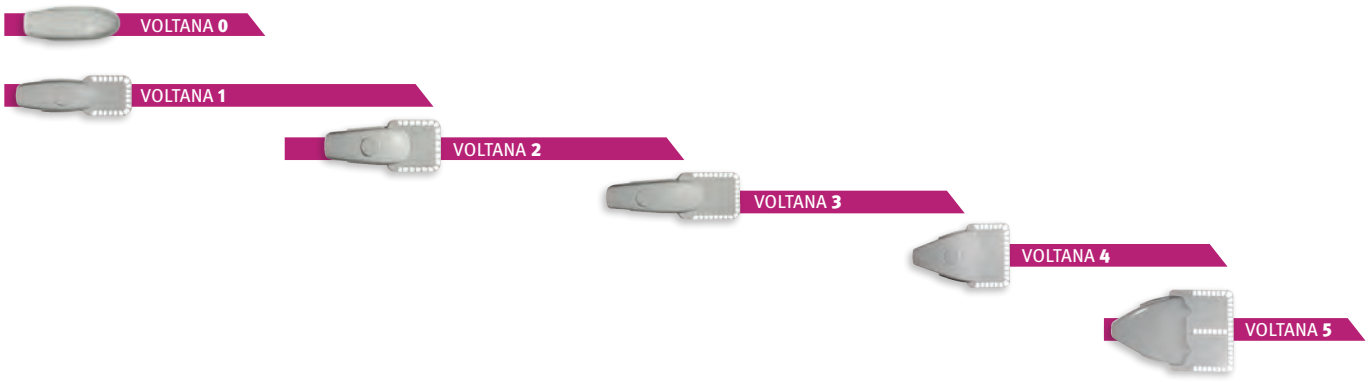
Căi de circulație din mediul rural

Căi de circulație din mediul urban



substitut HID

20/50W	70W	100W	150W	250W



ALTE MEDII ÎN CARE VOLTANA OFERĂ BENEFICII-CHEIE PENTRU CLIENT


FACILITĂȚI DE TRANSPORT


ZONE INDUSTRIALE


ZONE COMERCIALE


FACILITĂȚI SPORTIVE

PERFORMANT

UTILIZÂND **TEHNOLOGIE DE ULTIMĂ ORĂ,** VOLTANA SURCLASEAZĂ ORICE TIP DE APARAT DE ILUMINAT HID:

› Sistem cu **eficienţă ridicată**: până la 130 lm/ W
› **Index ridicat de redare a culorilor** (CRI) › 70
› Distribuție luminoasă avansată, care permite ca spațiul dintre stâlpi să crească, oferind un iluminat uniform

VERSATIL

GAMA VOLTANA ESTE **ULTRA-FLEXIBILĂ**, ASTFEL CĂ OFERĂ SOLUȚIA IDEALĂ PENTRU NEVOILE SPECIFICE DE ILUMINAT:

› **Distribuţii luminoase adaptate** atât pentru zonele şi căile de circulație foarte înguste, cât şi pentru cele foarte largi
› Numeroase **variante de intensitate luminoasă,** mulțumită celor 6 dimensiuni disponibile şi numeroşilor curenți conductori
› Numeroase **opțiuni de control**
› Proiectat atât pentru montaj lateral, cât şi pentru fixarea în vârf de stâlp (opțional)
› Rezistență la temperaturi ambiante extreme, de până la 55°C

CONSTRUIT SĂ REZISTE

VOLTANA A FOST PROIECTAT SĂ OFERE **PERFORMANȚĂ PE TERMEN LUNG**

› **Optimizează disiparea căldurii,** pentru a creşte durata de viață a componentelor
› **Protecție termică integrată,** cu facilități de reducere a fluxului, în caz de supraîncălzire
› **Protecţie la supratensiuni** (4kV standard, 10 kV opțional) pentru a proteja aparatul de iluminat de vârfurile de tensiune
› **Nivelul ridicat de etanşeitate** (IP 66) previne distrugerea componentelor & pierderea performanței
› **Materiale robuste** - aluminiu, oțel galvanizat şi sticlă securizată, pentru un nivel ridicat de rezistență la impact (IK 08)
› **Certificat pentru vibraţii 3G** (cu montaj)
› **Rezistență la vânt** de până la 180 km/h
› **Nu necesită întreținere**

CONFORM

GAMA VOLTANA A FOST **CERTIFICATĂ** DE CELE MAI PRETENȚIOASE ORGANISME EUROPENE ŞI AMERICANE:

› ENEC
› ETL / UL
› date despre iluminatul cu LEDuri

DEZVOLTARE DURABILĂ

DE LA ÎNCEPUT, APARATUL VOLTANA A FOST DEZVOLTAT PENTRU **A PROTEJA MEDIUL**

› **Materiale reciclabile** (aluminiu, oțel şi sticlă)
› **Profil destinat protejării mediului** (PEP) pentru scăderea amprentei ecologice
› **Emisii de CO_2 reduse** (economie şi întreținere)
› Fără poluare luminoasă (**ULOR 0%**), mulțumită distribuției luminoase precise

SOCIAL

VOLTANA ADUCE NUMEROASE **BENEFICII COLECTIVE**

› Vizibilitate îmbunătățită, cu lumină albă, care oferă **contrast ridicat**
› **Siguranță ridicată,** pentru pietoni şi pentru conducătorii auto
› Opțional, iluminat la cerere, pentru a oferi lumină atunci când şi acolo unde este cu adevărat necesară
› **Mai puține interferențe în trafic**, datorită faptului că nu este necesară întreținerea şi datorită posibilității de monitorizare
› Contribuie la **administrarea eficientă a finanțelor** şi la consumul responsabil de energie

PRECIS

CU 6 DIMENSIUNI DISPONIBILE, VOLTANA RĂSPUNDE EXACT **NEVOILOR SPECIFICE**

› **Investiție optimizată,** cu minimum de resurse
› **Adaptare precisă** la nevoile reale
› **Design uniform** pentru întregul proiect
› **Uşor de utilizat** pentru instalator (opțional, poate fi furnizat pre-cablat)

INTELIGENT

CU NUMEROASE **OPȚIUNI DE CONTROL**, VOLTANA OFERĂ OPORTUNITĂȚI PENTRU CREAREA DE SCENARII DE ILUMINAT NELIMITATE ŞI PENTRU **ÎMBUNĂTĂȚIREA MANAGEMENTULUI OPERAȚIONAL**

› Disponibil cu profil **DALI** 1-10 V sau **profil de reducere** personalizat
› **Flux Luminos Constant** (CLO), pentru compensarea automată a deprecierii fluxului
› Poate funcționa într-o **rețea independentă** limitată sau în **rețeaua unui oraş**, prin comunicație fără fir. Scenariile pot fi îmbunătățite prin **senzori externi.***

› Disponibil cu **fotocelulă** sau **priză NEMA P7**, pentru a opera în noua platformă Owlet IoT

* indisponibil pentru Voltana 0

CARACTERISTICI - CHEIE

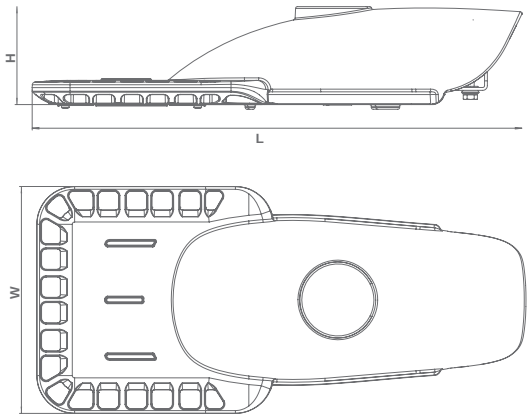
	Voltana 0	Voltana 1	Voltana 2	Voltana 3	Voltana 4	Voltana 5
Flux luminos standard (gamă) (*)	700 - 2,500lm	800 - 3,000lm	1,800 - 6,100lm	2,700 - 9,200lm	3,700 - 12,700lm	7,500 - 25,200lm
Consum de energie (W) (*)	8 - 30W	10 - 31W	20 - 56W	28 - 82W	36 - 110W	70 - 215W
Flux rezidual pe durata de viață @ tq 25°C	@100,000h Curent până la 700mA: up to 95% | Curent de la 701mA până la 1A: până la 90%					
Temperatură de culoare	alb cald sau neutru					
Etanș. compartiment optic	IP 66 (**)					
Etanș. placă echip. control	IP 66 (**)					
Rezistență la impact (sticlă)	IK 08 (***)					
Putere nominală	120 - 277V - 50 - 60Hz					
Clasă electrică	EU I sau II (**)					
Înălțimea de instalare	4 - 12m					
Materiale						
Corp	Aluminiu turnat sub presiune					
Difuzor	Sticlă (policarbonat pentru unele variante ale Voltana o)					
Culoare	RAL 7038 Orice altă culoare din paletarul RAL, la cerere					

(*) Fluxul inițial și consumul de curent al aparatului sunt valori orientative, pentru temperatură ambientală de 25°C. Fluxul real depinde de condițiile de mediu (de exemplu, temperatură) și poate varia, în anumite configurații. Valorile comunicate sunt supuse modificărilor, conform evoluției tehnologice. Pentru a verifica dacă acest document cuprinde ultimele informații disponibile, vă rugăm să vizitați www.schreder.com

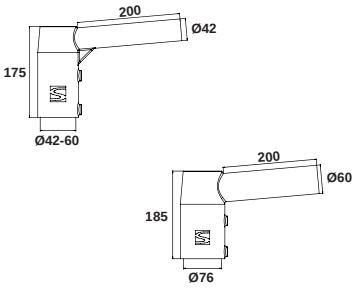
(**) conform standardului IEC - EN 60598 (doar Voltana o este disponibil cu Clasa I) – (***) conform standardului IEC - EN 62262

DIMENSIUNI | GREUTATE

	Voltana 0	Voltana 1	Voltana 2	Voltana 3	Voltana 4	Voltana 5
L	416mm	501mm	518mm	641mm	555mm	705mm
W	156mm	181mm	240mm	240mm	380mm	480mm
H	91mm	87mm	108mm	111mm	112mm	109mm
KG	2.6kg	4kg	5kg	6kg	8kg	12kg

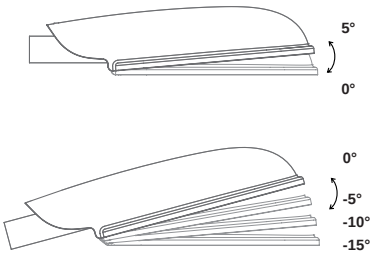


ADAPTOR VÂRF DE STÂLP

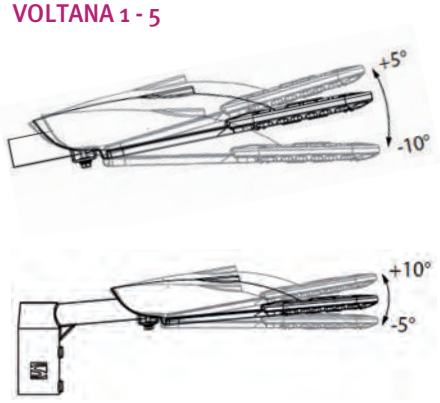


REGLAJE UNGHI ÎNCLINARE

VOLTANA o

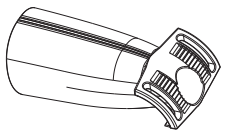


VOLTANA 1 - 5



MONTAJ UNIVERSAL

(OPȚIONAL PENTRU VOLTANA 0-1-2-3-4)



Ø 32 - 48mm

Ø 42 - 60mm

Ø 76mm

ÎNLOCUIȚI-VĂ ACTUALUL SISTEM DE ILUMINAT ŞI FACEȚI ECONOMII IMEDIAT, CU VOLTANA!

Prin simpla înlocuire a aparatelor de iluminat cu lămpi pe bază de sodiu cu aparatele Voltana, economiile de energie devin impresionante. În varianta plug-and-play, opțiunile de control - care nu sunt disponibile sau sunt foarte limitate în cazul aparatelor HPS - nu sunt incluse. În funcție de diferite scenarii, aceste opțiuni pot creşte semnificativ economiile de energie, oferind, în acelaşi timp, siguranță şi confort pentru toți utilizatorii şi îmbunătățind managementul operațional al întregului sistem.

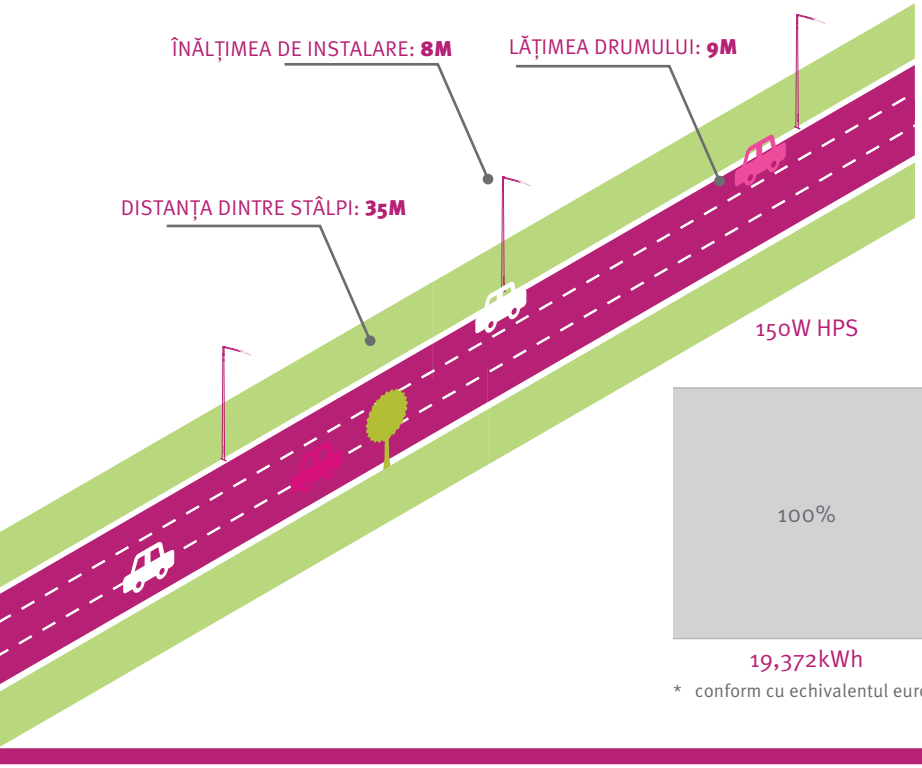
zone pietonale P5-P2		zone pietonale P1		căi de circulație clasificate M6-M5		căi de circulație clasificate M4		căi de circulație clasificate M3		căi de circulație clasificate M2	
aparat HPS 70W	Voltana 1	aparat HPS 100W	Voltana 2	aparat HPS 100W	Voltana 2	aparat HPS 150W	Voltana 3	aparat HPS 150W	Voltana 4	aparat HPS 250W	Voltana 5
78W(*)	economii de 67% / 26W(*)	110W(*)	economii de 56% / 48W(*)	110W(*)	economii de 56% / 48W(*)	167W(*)	economii de 58% / 70W(*)	167W(*)	economii de 45% / 92W(*)	280W(*)	economii de 35% / 180W(*)

(*) Consum de energie total al sistemului

STUDIU DE CAZ

FLEXIBILITATEA DE CARE AVEȚI NEVOIE, PENTRU SCĂDEREA CHELTUIELILOR DE 5 ORI

Cu o investiție minimă (24 de LEDuri, versiunea 1A), Voltana 3 oferă o soluție extrem de competitivă - comparativ cu aparatele de iluminat de 150W, cu lămpi pe bază de sodiu- pentru a ilumina o cale de circulație clasificată M3 (conform standardului CIE 115), cu o recuperare a investiției în mai puțin de 4 ani şi economii de energie de pană la 79%.



ONSUM ANUAL DE CURENT PENTRU UN KILOMETRU (4.000 ORE/AN)

150W HPS	Voltana 3 24 LEDuri 1A	Voltana 3 24 LEDS 1A + dimming
100%	economii la energie de 58% (sau poluare cu 5.17t eq CO2 mai puțin pe an*) / 42%	economii la energie de 79% (sau poluare cu 7.02t eq CO2 mai puțin pe an*) / 21%
19,372kWh	8,120kWh	4,100kWh

* conform cu echivalentul european de 0.46kg eq Co2/kWh

SIGURANȚĂ

STARE DE BINE

DEZVOLTARE DURABILĂ

ECONOMII

SOLUȚII

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