



Test Report issued under the responsibility of:



TEST REPORT
IEC 60598-2-21
Part 2: Particular requirements
Section 21: Rope Lights

Report Number.: GZES180900052601

Date of issue: 2021-03-26

Total number of pages: 42

Name of Testing Laboratory: SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou
preparing the Report.....: Branch

Applicant's name.....: Blueview Elec-optic Tech Co., Ltd.

Address: 1000, Section 2, 2nd Konggang Road, Southwest Aviation
Industrial Development Zone, Chengdu, Sichuan, China

Test specification:

Standard.....: IEC 60598-2-21:2014 used in conjunction with IEC 60598-1:2014,
AMD1:2017

Test procedure: CB Scheme + CSTC / CE_LVD

Non-standard test method.....: N/A

Test Report Form No......: IEC60598_2_21B

Test Report Form(s) Originator.....: DEKRA Certification B.V.

Master TRF: 2020-01-31

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General disclaimer:

The test results presented in this report relate only to the object tested.

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Test item description	Sealed lighting chain (AC High Voltage Rigid Bar)	
Trade Mark	N/A	
Original Product/Equipment Manufacturer	Blueview Elec-optic Tech Co., Ltd. 1000, Section 2, 2nd Konggang Road, Southwest Aviation Industrial Development Zone, Chengdu, Sichuan, China	
Branding Manufacturer(s)	N/A	
Model/Type reference	A4 2.0-1212, A4 2.0-1010, A4 2.0-0606	
Ratings	230 V; 50 Hz; IP20; Class II; A4 2.0-1212: 24 W; A4 2.0-1010: 20 W; A4 2.0-0606: 12 W	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒	CB Testing Laboratory:	SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch
Testing location/ address		198 Kezhu Road, Science City, Economic & Technology Development Area, Guangzhou, Guangdong, China
Tested by (name, function, signature)		Ivan Zhang / Project engineer <i>Ivan Zhang</i>
Approved by (name, function, signature) ...:		Mon Liang / Reviewer <i>Mon Liang</i>
☐	Testing procedure: CTF Stage 1:	N/A
Testing location/ address		
Tested by (name, function, signature)		
Approved by (name, function, signature) ...:		
☐	Testing procedure: CTF Stage 2:	N/A
Testing location/ address		
Tested by (name + signature)		
Witnessed by (name, function, signature) ...:		
Approved by (name, function, signature) ...:		
☐	Testing procedure: CTF Stage 3:	N/A
☐	Testing procedure: CTF Stage 4:	N/A
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):

Attachment 1: EU deviation of IEC 60598-1 (Total: 2 pages)

Attachment 2: Additional requirement of IEC/EN 62031 (Total: 4 pages)

Attachment 3: Additional requirement of EN 62493: 2015 (Total: 1 page)

Attachment 4 Diagram circuit and PCB layout (Total: 2 page)

Attachment 5 Photo documentations (Total: 5 pages)

Summary of testing:

1. The submitted samples were found to be compliance with the standard IEC 60598-2-21: 2014, IEC 60598-1: 2014 + A1: 2017, EN 60598-2-21: 2015 and EN 60598-1: 2015 + A1: 2018.
2. The LED module has been tested according to the standard IEC 62031: 2018 and EN IEC 62031: 2020.
3. Photobiological hazard measurements have been tested according to Technical report IEC/TR 62778:2014 (Ed 2). According to the test results, Blue light hazard of the product belongs to RG1 and therefore no markings are required on the product or in the instructions.
4. The submitted samples were found to be compliance with the EN 62493: 2015 according to the clause 4.2.2.
5. The model A4 2.0-1212 was selected to performed full tests, as it has the maximum consumption power, other models are construction checked.

Tests performed (name of test and test clause):

21.6 Marking

21.7 Construction

21.8 Creepage distances and clearances

21.11 External and internal wiring

21.12 Protection against electric shock

21.13 Endurance tests and thermal tests

21.14 Resistance to dust, solid objects and moisture

21.15 Insulation resistance and electric strength

21.16 Resistance to heat, fire and tracking

The standard IEC 62031: 2018 & IEC 60598-2-21: 2014 are equivalent to EN IEC 62031: 2020 & EN 60598-2-21: 2015 respectively.

Testing location:

198 Kezhu Road, Science City, Economic & Technology Development Area, Guangzhou, Guangdong, China

Summary of compliance with National Differences (List of countries addressed):

European group deviation was considered.

☒ The product fulfils the requirements of EN 60598-2-21: 2015, EN 62493 and EN 60598-1: 2015 + A1: 2018.

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Procedure number, issue date and title:

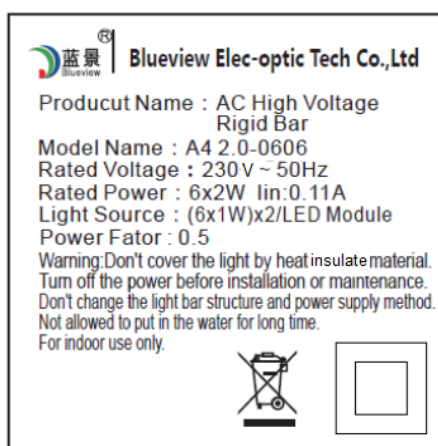
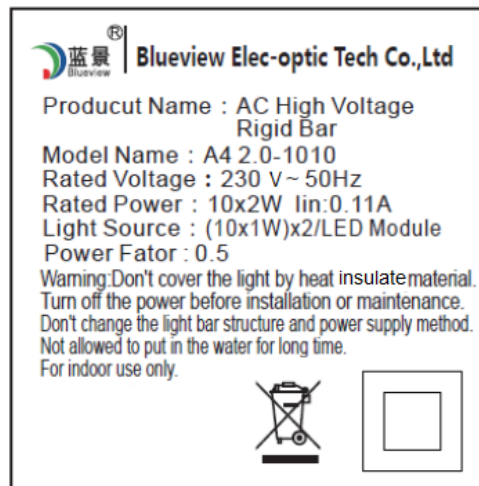
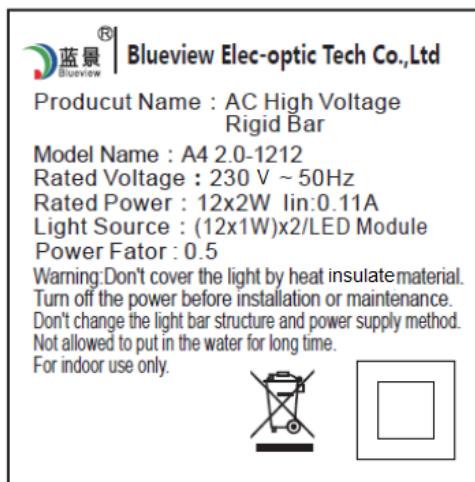
Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

☒ **Statement not required by the standard used for type testing**

(Note: When IEC or ISO standard requires a statement concerning the uncertainty of the measurement systems used for tests, this should be reported above. The informative text in parenthesis should be delete in both cases after selecting the applicable option)

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.



Attached on the power cord

Remark:

1. The height of graphical symbols and CE logo were not less than 5 mm;
2. The height of letters and numerals were not less than 2 mm;
3. The WEEE symbol shall not be less than 7 mm;
4. According to the standard, warning and text required by the standard should be written in the official language(s) of the country in which the appliance is to be sold. The applicant should ensure that the samples in future production fulfill the requirement.
5. As declared by the applicant, the importer (and manufacturer, if it is different)'s name, registered trade name or registered trade mark and the postal address will be marked on the products before being place on the market. The contact details shall be in a language easily understood by end-users and market surveillance authorities;
6. Marking on the packaging or in a document accompanying the electrical equipment is only acceptable if it is not possible to place such markings on the product.

Test item particulars	
Classification of installation and use Fixed	
Supply Connection Supply cord	
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 2018-09-29	
Date (s) of performance of tests 2018-09-29 to 2019-03-20	
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. Clause numbers between brackets refer to clauses in IEC 60598-1. This document is issued by the Company subject to its General Conditions of Service, available on request or accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.	
Manufacturer's Declaration per sub-clause 4.2.5 of IECCE 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): Same as manufacturer

General product information:

The seal light chain, connected to the supply via supply cord, non-replaceable LED used, IP20, Class II, only for indoor use.

All the models are same electrical connecting, diagram circuit, PCB layout and mechanical construction, except the consumption power and length.

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict

21.4 (0)	GENERAL TEST REQUIREMENTS		
21.4 (0.3)	More sections applicable.....:	Yes ☐ No ☒ Section/s:	—
21.4 (0.5)	Components	(see Annex 1)	—
21.4 (0.7)	Information for luminaire design in light sources standards		—
21.4 (0.7.2)	Light source safety standard	IEC/EN 62031	—
	Luminaire design in the light source safety standard		P

21.5 (2)	CLASSIFICATION		
21.5 (2.2)	Type of protection	Class II	P
21.5 (2.3)	Degree of protection	IP20	P
21.5 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces	Yes ☒ No ☐	—
21.5 (2.5)	Luminaire for normal use	Yes ☒ No ☐	—
	Luminaire for rough service	Yes ☐ No ☒	—
21.5.2 (-)	Class II or Class III		P
21.5.3 (-)	Rope lights for outdoor use shall be IP44 or higher		P

21.6 (3)	MARKING		
21.6 (3.2)	Mandatory markings		P
	Position of the marking		P
	Format of symbols/text		P
21.6 (3.3)	Additional information		P
	Language of instructions		P
21.6 (3.3.1)	Combination luminaires		N/A
21.6 (3.3.2)	Nominal frequency in Hz		P
21.6 (3.3.3)	Operating temperature		N/A
21.6 (3.3.4)	Symbol or warning notice		N/A
21.6 (3.3.5)	Wiring diagram		N/A
21.6 (3.3.6)	Special conditions		N/A
21.6 (3.3.7)	Metal halide lamp luminaire – warning		N/A
21.6 (3.3.8)	Limitation for semi-luminaires		N/A
21.6 (3.3.9)	Power factor and supply current		P

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
21.6 (3.3.10)	Suitability for use indoors		P
21.6 (3.3.11)	Luminaires with remote control		N/A
21.6 (3.3.12)	Clip-mounted luminaire – warning		N/A
21.6 (3.3.13)	Specifications of protective shields		N/A
21.6 (3.3.14)	Symbol for nature of supply		P
21.6 (3.3.15)	Rated current of socket outlet		N/A
21.6 (3.3.16)	Rough service luminaire		N/A
21.6 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments	Type Z	P
21.6 (3.3.18)	Non-ordinary luminaires with PVC cable		N/A
21.6 (3.3.19)	Protective conductor current in instruction if applicable		N/A
21.6 (3.3.20)	Provided with information if not intended to be mounted within arm's reach		N/A
21.6 (3.3.21)	Non replaceable and non-user replaceable light sources information provided	Non replaceable LEDs	P
	Cautionary symbol		N/A
21.6 (3.3.22)	Controllable luminaires, classification of insulation provided		N/A
21.6 (3.4)	Test with water		P
	Test with hexane		P
	Legible after test		P
	Label attached		P
21.6.2 (-)	Rope light marking		P
	Rated voltage and wattage marked on the rope light		P
	Durable non-removable label if information on the cable		P
21.6.3 (-)	Rope light and packing marking		P
	Marking if only for indoor use		P
21.6.4 (-)	Marking on the packing or instructions		P
	Marking a) – e)		P

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
21.7 (4)	CONSTRUCTION		
21.7 (4.2)	Components replaceable without difficulty		P
21.7 (4.3)	Wireways smooth and free from sharp edges		P
21.7 (4.4)	Lampholders		N/A
21.7 (4.4.1)	Integral lampholder		N/A
21.7 (4.4.2)	Wiring connection		N/A
21.7 (4.4.3)	Lampholder for end-to-end mounting		N/A
21.7 (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
21.7 (4.4.5)	Peak pulse voltage		N/A
21.7 (4.4.6)	Centre contact		N/A
21.7 (4.4.7)	Parts in rough service luminaires resistant to tracking		N/A
21.7 (4.4.8)	Lamp connectors		N/A
21.7 (4.4.9)	Caps and bases correctly used		N/A
21.7 (4.4.10)	Light source for lampholder or connection according IEC 60061 not connected another way		N/A
21.7 (4.5)	Starter holders		N/A
	Starter holder in luminaires other than class II		N/A
	Starter holder class II construction		N/A
21.7 (4.7)	Terminals and supply connections		P
21.7 (4.7.1)	Contact to metal parts		N/A
21.7 (4.7.2)	Test 8 mm live conductor		N/A
	Test 8 mm earth conductor		N/A
21.7 (4.7.3)	Terminals for supply conductors		N/A
21.7 (4.7.3.1)	Welded method and material		N/A
	- stranded or solid conductor		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	- spot welding		N/A
	- welding between wires		N/A
	- Type Z attachment		N/A
	- mechanical test according to 15.6.2		N/A
	- electrical test according to 15.6.3		N/A
	- heat test according to 15.6.2.3 and 15.6.2.4		N/A
21.7 (4.7.4)	Terminals other than supply connection		P
21.7 (4.7.5)	Heat-resistant wiring/sleeves		N/A
21.7 (4.7.6)	Multi-pole plug		N/A
	- test at 30 N		N/A
21.7 (4.8)	Switches		N/A
	- adequate rating		N/A
	- adequate fixing		N/A
	- polarized supply		N/A
	- compliance with IEC 61058-1 for electronic switches		N/A
21.7 (4.9)	Insulating lining and sleeves		P
21.7 (4.9.1)	Retainment		N/A
	Method of fixing		N/A
21.7 (4.9.2)	Insulated linings and sleeves:		N/A
	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
21.7 (4.10)	Double or reinforced insulation		P
21.7 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		P
	Safe installation fixed luminaires		P
	Capacitors and switches		N/A
	Interference suppression capacitors according to IEC 60384-14		N/A
21.7 (4.10.2)	Assembly gaps:		P
	- not coincidental		P
	- no straight access with test probe		P

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
21.7 (4.10.3)	Retention of insulation:		N/A
	- fixed		N/A
	- unable to be replaced; luminaire inoperative		N/A
	- sleeves retained in position		N/A
	- lining in lampholder		N/A
21.7 (4.10.4)	Protective impedance device		N/A
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		N/A
	Y1 or Y2 capacitors comply with IEC 60384-14		N/A
	Resistors comply with test (a) in 14.1 of IEC 60065		N/A
21.7 (4.11)	Electrical connections and current-carrying parts		P
21.7 (4.11.1)	Contact pressure		P
21.7 (4.11.2)	Screws:		N/A
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
21.7 (4.11.3)	Screw locking:		N/A
	- spring washer		N/A
	- rivets		N/A
21.7 (4.11.4)	Material of current-carrying parts		P
21.7 (4.11.5)	No contact to wood or mounting surface		P
21.7 (4.11.6)	Electro-mechanical contact systems		N/A
21.7 (4.12)	Screws and connections (mechanical) and glands		N/A
21.7 (4.12.1)	Screws not made of soft metal		N/A
	Screws of insulating material		N/A
	Torque test: torque (Nm); part		N/A
	Torque test: torque (Nm); part		N/A
	Torque test: torque (Nm); part		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
21.7 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
21.7 (4.12.4)	Locked connections:		N/A
	- fixed arms; torque (Nm).....:		N/A
	- lampholder; torque (Nm)		N/A
	- push-button switches; torque 0,8 Nm.....:		N/A
21.7 (4.12.5)	Screwed glands; force (Nm)		N/A
21.7 (4.13)	Mechanical strength		P
21.7 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm).....:		N/A
	- other parts; energy (Nm)	Body; 0,35	P
	1) live parts		P
	2) linings		N/A
	3) protection		P
	4) covers		P
21.7 (4.13.3)	Straight test finger		P
21.7 (4.13.4)	Rough service luminaires		N/A
	- 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
21.7 (4.13.6)	Tumbling barrel		N/A
21.7 (4.14)	Suspensions, fixings and means of adjusting		P
21.7 (4.14.1)	Mechanical load:		P
	A) four times the weight		P
	B) torque 2,5 Nm		N/A
	C) bracket arm; bending moment (Nm)		N/A
	D) load track-mounted luminaires		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	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
21.7 (4.14.2)	Load to flexible cables		N/A
	Mass (kg)		—
	Stress in conductors (N/mm ²)		N/A
	Mass (kg) of semi-luminaire		N/A
	Bending moment (Nm) of semi-luminaire		N/A
21.7 (4.14.3)	Adjusting devices:		N/A
	- flexing test; number of cycles		N/A
	- strands broken.....		N/A
	- electric strength test afterwards		N/A
21.7 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N/A
21.7 (4.14.5)	Guide pulleys		N/A
21.7 (4.14.6)	Strain on socket-outlets		N/A
21.7 (4.15)	Flammable materials		P
	- glow-wire test 650°C	See Test Table 21.16 (13.3.2)	P
	- spacing ≥30 mm		N/A
	- screen withstanding test of 13.3.1		N/A
	- screen dimensions		N/A
	- no fiercely burning material		P
	- thermal protection		N/A
	- electronic circuits exempted		N/A
21.7 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		N/A
	a) construction		N/A
	b) temperature sensing control		N/A
	c) surface temperature		N/A
21.7 (4.16)	Luminaires for mounting on normally flammable surfaces		P

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	No lamp control gear:	(compliance with Section 12)	N/A
21.7 (4.16.1)	Lamp control gear spacing:		N/A
	- spacing 35 mm		N/A
	- spacing 10 mm		N/A
21.7 (4.16.2)	Thermal protection:		N/A
	- in lamp control gear		N/A
	- external		N/A
	- fixed position		N/A
	- temperature marked lamp control gear		N/A
21.7 (4.16.3)	Design to satisfy the test of 12.6	(see clause 12.6)	N/A
21.7 (4.17)	Drain holes		N/A
	Clearance at least 5 mm		N/A
21.7 (4.18)	Resistance to corrosion		P
21.7 (4.18.1)	- rust-resistance		N/A
21.7 (4.18.2)	- season cracking in copper		P
21.7 (4.18.3)	- corrosion of aluminium		N/A
21.7 (4.19)	Ignitors compatible with ballast		N/A
21.7 (4.20)	Rough service vibration		N/A
21.7 (4.21)	Protective shield		N/A
21.7 (4.21.1)	Shield fitted if tungsten halogen lamps or metal halide lamps		N/A
	Shield of glass if tungsten halogen lamps		N/A
21.7 (4.21.2)	Particles from a shattering lamp not impair safety		N/A
21.7 (4.21.3)	No direct path		N/A
21.7 (4.21.4)	Impact test on shield		N/A
	Glow-wire test on lamp compartment:	See Test Table 21.16 (13.3.2)	N/A
21.7 (4.22)	Attachments to lamps not cause overheating or damage		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
21.7 (4.23)	Semi-luminaires comply Class II		N/A
21.7 (4.24)	Photobiological hazards		P
21.7 (4.24.1)	No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P)		N/A
21.7 (4.24.2)	Retinal blue light hazard		P
	Class of risk group assessed according to IEC/TR 62778	RG1	—
	Luminaires with E_{thr} :		N/A
	a) Fixed luminaires		N/A
	- distance x m, borderline between RG1 and RG2...:		N/A
	- marking and instruction according 3.2.23		N/A
	b) Portable and handheld luminaires		N/A
	- 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
21.7 (4.25)	Mechanical hazard		P
	No sharp point or edges		P
21.7 (4.26)	Short-circuit protection		N/A
21.7 (4.26.1)	Adequate means of uninsulated accessible SELV parts		N/A
21.7 (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
21.7 (4.27)	Terminal blocks with integrated screwless earthing contacts		N/A
	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
21.7 (4.28)	Fixing of thermal sensing control		N/A
	Not plug-in or easily replaceable type		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	Reliably kept in position		N/A
	No adhesive fixing if UV radiations from a lamp can degrade the fixing		N/A
	Not outside the luminaire enclosure		N/A
	Test of adhesive fixing:		N/A
	Max. temperature on adhesive material (°C).....:		—
	100 cycles between t min and t max		N/A
	Temperature sensing control still in position		N/A
21.7 (4.29)	Luminaires with non-replaceable light source		P
	Not possible to replace light source		P
	Live part not accessible after parts have been opened by hand or tools		P
21.7 (4.30)	Luminaires with non-user replaceable light source		N/A
	If protective cover provide protection against electric shock and marked with “caution, electric shock risk” symbol:		N/A
	Minimum two fixing means		N/A
21.7 (4.31)	Insulation between circuits		P
	Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3		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
21.7 (4.31.1)	SELV circuits		N/A
	Used SELV source		N/A
	Voltage ≤ ELV		N/A
	Insulating of SELV circuits from LV supply		N/A
	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		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

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Clause	Requirement + Test	Result - Remark	Verdict
	Plugs and socket-outlets does not have protective conductor contact		N/A
21.7 (4.31.2)	FELV circuits		N/A
	Used FELV source		N/A
	Voltage $\leq$ 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
21.7 (4.31.3)	Other circuits		P
	Other circuits insulated from accessible parts according Table X.1		P
	Class II construction with equipotential bonding for protection against indirect contacts with live parts:		N/A
	- conductive parts are connected together		N/A
	- test according 7.2.3		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
21.7 (4.32)	Overvoltage protective devices		N/A
	Comply with IEC 61643-11		N/A
	External to controlgear and connected to earth:		N/A
	- only in fixed luminaires		N/A
	- only connected to protective earth		N/A
21.7.2 (-)	Terminal blocks		N/A
	Clause 4.6 of IEC 60598-1 referring to terminal blocks does not apply		—
21.7.3 (-)	Terminals and supply connections		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Comply with Annex A		N/A
21.7.4 (-)	Control units		N/A
	Forming an integral part enclosed in non-flammable insulating material tested according 21.16		N/A
	Securely fixed to the cable		N/A
	Electronic control device comply with IEC 61347-2-11		N/A
	LED driver comply with IEC 61347-2-13		N/A
21.7.5 (-)	Mechanical strength		P
	a) Rigid rope lights		P
	1) Pull test: force 60 N		P
	2) Torque test: torque 0,15 Nm		P
	b) Flexible rope lights		N/A
	1) Pull test: force 60 N		N/A
	2) Torque test: torque 0,15 Nm		N/A
	3) Cylinder 150 mm @ 10 times at 25 °C ± 2 °C		N/A
	For rope lights having an IP number over X0 Additionally: Cylinder 150 mm @ 10 times at -15 °C ± 2 °C		N/A
	4) Mandrel of between 4 and 5 times the diameter of test piece		N/A
	c) Impact test at low temperature of -15 °C ± 5 °C		P

21.8 (11)	CREEPAGE DISTANCES AND CLEARANCES		
21.8 (11.2.1)	Impulse withstand category (Normal category II)	Category II ☒ Category III ☐	—
	Category III according Annex U		N/A
	Protected against pollution, reduced creepage and clearance according Annex P of IEC 61347-1		N/A
1.7 (11.2.2)	Creepage distances for frequency up to 30 kHz	See Test Table 1.7 (11.2) I	P
	Creepage distances for frequency over 30 kHz:		N/A
	- Controlgear marked with $\hat{U}_{OUT}$ and f_{UOUT} according IEC 61347-1, clause 7.1, item w	See Test Table 1.7 (11.2) II	N/A
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 1.7 (11.2) II	N/A
1.7 (11.2.3)	Clearances for frequency up to 30 kHz	See Test Table 1.7 (11.2) I	P
	Clearances distances for frequency over 30 kHz:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- Controlgear marked with U_p	See Test Table 1.7 (11.2) II	N/A
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 1.7 (11.2) II	N/A
21.10 (14)	SCREW TERMINALS		
	Separately approved; component list	(see Annex 1)	N/A
	Part of the luminaire	(see Annex 3)	N/A
21.10 (15)	SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS		
	Separately approved; component list	(see Annex 1)	N/A
	Part of the luminaire	(see Annex 4)	N/A
21.11 (5)	EXTERNAL AND INTERNAL WIRING		
21.11 (5.2)	Supply connection and external wiring		P
21.11 (5.2.1)	Means of connection	supply cord	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
21.11 (5.2.2)	Type of cable	Replaced by 21.11.2	—
	Nominal cross-sectional area (mm ²).....	Replaced by 21.11.2	—
	Cables equal to IEC 60227 or IEC 60245	Replaced by 21.11.2	—
21.11 (5.2.3)	Type of attachment, X, Y or Z	Type Z	P
21.11 (5.2.5)	Type Z not connected to screws		P
21.11 (5.2.6)	Cable entries:		P
	- suitable for introduction		P
	- adequate degree of protection		P
21.11 (5.2.7)	Cable entries through rigid material have rounded edges		P
21.11 (5.2.8)	Insulating bushings:		N/A
	- suitably fixed		N/A
	- material in bushings		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- material not likely to deteriorate		N/A
	- tubes or guards made of insulating material		N/A
21.11 (5.2.9)	Locking of screwed bushings		N/A
21.11 (5.2.10)	Cord anchorage:		P
	- 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
21.11 (5.2.10.1)	Cord anchorage for type X attachment:		N/A
	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
21.11 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment	Type Z	P
21.11 (5.2.10.3)	Tests:		P
	- impossible to push cable; unsafe		P
	- pull test: 25 times; pull (N)	60	P
	- torque test: torque (Nm)	0,15	P
	- displacement ≤ 2 mm		P
	- no movement of conductors		P
	- no damage of cable or cord		P
	- function independent of electrical connection		P
21.11 (5.2.11)	External wiring passing into luminaire		P

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Clause	Requirement + Test	Result - Remark	Verdict
21.11 (5.2.12)	Looping-in terminals		N/A
21.11 (5.2.13)	Wire ends not tinned		N/A
	Wire ends tinned: no cold flow		P
21.11 (5.2.14)	Mains plug same protection		N/A
	Class III luminaire plug		N/A
	No unsafe compatibility		N/A
21.11 (5.2.16)	Appliance inlets (IEC 60320)		N/A
	Installation couplers (IEC 61535)		N/A
	Other appliance inlet or connector according relevant IEC standard		N/A
21.11 (5.2.17)	No standardized interconnecting cables properly assembled		N/A
21.11 (5.2.18)	Used plug in accordance with		N/A
	- IEC 60083		N/A
	- other standard		N/A
21.11 (5.3)	Internal wiring		P
21.11 (5.3.1)	Internal wiring of suitable size and type		P
	Through wiring		N/A
	- 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
21.11 (5.3.1.1)	Internal wiring connected directly to fixed wiring		P
	Cross-sectional area (mm ²)	2 x 0,75 mm ²	P
	Insulation thickness		P
	Extra insulation added where necessary		N/A
21.11 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Adequate cross-sectional area and insulation thickness		N/A
21.11 (5.3.1.3)	Double or reinforced insulation for class II		P
21.11 (5.3.1.4)	Conductors without insulation		N/A
21.11 (5.3.1.5)	SELV current-carrying parts		N/A
21.11 (5.3.1.6)	Insulation thickness other than PVC or rubber		N/A
21.11 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		P
	Joints, raising/lowering devices		N/A
	Telescopic tubes etc.		N/A
	No twisting over 360°		P
21.11 (5.3.3)	Insulating bushings:		N/A
	- suitable fixed		N/A
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- cables with protective sheath		N/A
21.11 (5.3.4)	Joints and junctions effectively insulated		N/A
21.11 (5.3.5)	Strain on internal wiring		N/A
21.11 (5.3.6)	Wire carriers		N/A
21.11 (5.3.7)	Wire ends not tinned		N/A
	Wire ends tinned: no cold flow		N/A
21.11 (5.4)	Test to determine suitability of conductors having a reduced cross-sectional area		N/A
	Under test the temperature of the luminaire wiring insulation not exceed the limits stated in Table 12.2	(see Annex 2)	N/A
	No damage to luminaire wiring after test		N/A
21.11.2 (-)	Cables for rope lights		P
	Type of cable:	H05VV-F	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Cables not lighter than IEC 60227 or IEC 60245 for class II rope lights		P
	Cables not lighter than insulation according to 5.3.1 of part 1 for class III rope lights		N/A
	Nominal cross-sectional area (mm ²):	2 x 0,75	P
	Mechanical properties according 4.14.1 and 4.14.2 of part 1		N/A
21.11.3 (-)	Cord anchorage test		P
	Pull test 30 N 25 times on single-core cable		P
21.11.4 (-)	Plugs and cable length		N/A
	Splash-proof plug or permanent connection if for outdoor use		N/A
	Length of the cable between the plug and the connection to the rope light not less than 1,5 m		N/A
21.11.5 (-)	Maximum length of extendable class II rope lights		N/A
	Maximum length 100 m for 0,5 mm ² cable		N/A
	Maximum length 150 m for 0,75 mm ² cable		N/A
21.12 (8)	PROTECTION AGAINST ELECTRIC SHOCK		
21.12 (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		N/A
	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		P
	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
21.12 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N/A
21.12 (8.2.3.a)	Class II luminaire:		P
	- basic insulated metal parts not accessible during starter or lamp replacement		N/A
	- basic insulation not accessible other than during starter or lamp replacement		P
	- glass protective shields not used as supplementary insulation		N/A
21.12 (8.2.3.b)	BC lampholder of metal in class I luminaires shall be earthed		N/A
21.12 (8.2.3.c)	SELV circuits with exposed current carrying parts:		N/A
	Ordinary luminaire:		N/A
	- touch current		N/A
	- no-load voltage		N/A
	- touch current if applicable (mA)		N/A
	Other than ordinary luminaire:		N/A
	- nominal voltage		N/A
	Class III luminaire only for connection to SELV		N/A
	Class III luminaire not provided with means for protective earthing		N/A
21.12 (8.2.4)	Portable luminaire have protection independent of supporting surface		N/A
21.12 (8.2.5)	Compliance with the standard test finger or relevant probe		P
21.12 (8.2.6)	Covers reliably secured		P
21.12 (8.2.7)	Discharging of capacitors $\geq 0,5 \mu\text{F}$	Discharged voltage: 32 V	P
	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

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Clause	Requirement + Test	Result - Remark	Verdict
21.13 (12)	ENDURANCE TEST AND THERMAL TEST		
21.13.1 (-)	If IP > IP 20 relevant test of (12.4), (12.5) and (12.6) after (9.2) before (9.3) specified in 21.14		—
21.13 (12.3)	Endurance test:		P
	- mounting-position	As normal use	—
	- test temperature (°C)	35	—
	- total duration (h)	240	—
	- supply voltage: Un factor; calculated voltage (V) ...	1,1 Un = 253 V	—
	- lamp used	Non replaceable LEDs	—
21.13 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N/A
	- marking legible		P
	- no cracks, deformation etc.		P
21.13 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
21.13 (12.5)	Thermal test (abnormal operation)	(see Annex 2)	P
21.13 (12.6)	Thermal test (failed lamp control gear condition):		N/A
21.13 (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
21.13 (12.6.2)	Temperature sensing control		N/A
	- case of abnormal conditions		—
	- thermal link		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- manual reset cut-out		N/A
	- auto reset cut-out		N/A
	- measured mounting surface temperature (°C)		N/A
	- track-mounted luminaires		N/A
21.13 (12.7)	Thermal test (failed lamp control gear in plastic luminaires):		N/A
21.13 (12.7.1)	Luminaire without temperature sensing control		N/A
21.13 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		N/A
	Test method 12.7.1.1 or Annex W		—
	Test according to 12.7.1.1:		N/A
	- case of abnormal conditions.....		—
	- Ballast failure at supply voltage (V)		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
	Test according to Annex W:		N/A
	- 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 21.16 (13.2.1)	N/A
21.13 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		N/A
	- case of abnormal conditions.....		—
	- measured winding temperature (°C): at 1,1 Un.....		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un.....		—
	- calculated temperature of fixing point/exposed part (°C)		—
	Ball-pressure test.....	See Table 21.16 (13.2.1)	N/A
21.13 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N/A
	- case of abnormal conditions.....		—

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Clause	Requirement + Test	Result - Remark	Verdict
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
21.13 (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 21.16 (13.2.1)	N/A
21.13.2 (-)	Test voltage		N/A
	Provision of 12.3.1 d) of part 1 and if class III rope lights 1,1 x rated voltage of transformer/convertor		—
	Provision of 12.4.1 d) of part 1 and if class III rope lights 1,06 x rated voltage of transformer/convertor		—
21.13.3 (-)	Short-circuit test of rectifier		N/A
	No emission of flames or molten material or production of flammable gases and no live parts accessible when short-circuit output of the rectifier		N/A

21.14 (9)	RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE		
21.14 (-)	If IP > IP 20 the order of tests as specified in clause 21.13		—
21.14 (9.2)	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP	IP20	—
	- mounting position during test	As normal use	—
	- fixing screws tightened; torque (Nm).....	—	—
	- tests according to clauses	The clause 9.2.0 of IEC/EN 60598-1	—
	- electric strength test afterwards		P
	a) no deposit in dust-proof luminaire		N/A
	b) no talcum in dust-tight luminaire		N/A
	c) no trace of water on current-carrying parts or on insulation where it could become a hazard		N/A
	c) i) For luminaires without drain holes – no water entry		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	c) ii) For luminaires with drain holes – no hazardous water entry		N/A
	d) no water in watertight luminaire		N/A
	e) no contact with live parts (IP 2X)		P
	e) no entry into enclosure (IP 3X and IP 4X)		N/A
	e) no contact with live parts (IP3X and IP4X)		N/A
	f) no trace of water on part of lamp requiring protection from splashing water		N/A
	g) no damage of protective shield or glass envelope		N/A
21.14 (9.3)	Humidity test 48 h		P

21.15 (10)	INSULATION RESISTANCE AND ELECTRIC STRENGTH		
21.15 (10.2.1)	Insulation resistance test		P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø	Covered by metal foil	—
	Insulation resistance (MΩ).....	As below	—
	SELV		N/A
	- 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		P
	- between live parts of different polarity	> 20 MΩ	P
	- between live parts and mounting surface	> 20 MΩ	P
	- between live parts and metal parts.....	> 20 MΩ	P
	- between live parts of different polarity through action of a switch		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts	> 20 MΩ	P
	- Insulation bushings as described in Section 5		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
21.15 (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)	As below	P
	SELV		N/A
	- 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		P
	- between live parts of different polarity	1460 V	P
	- between live parts and mounting surface	2920 V	P
	- between live parts and metal parts	2920 V	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	2920 V	P
	- Insulation bushings as described in Section 5		N/A
21.15 (10.3)	Touch current or protective conductor current (mA):	Touch current: 0,23 mA	P

21.16 (13)	RESISTANCE TO HEAT, FIRE AND TRACKING		
21.16 (13.2.1)	Ball-pressure test	See Test Table 21.16 (13.2.1)	P
21.16 (13.3.1)	Needle-flame test (10 s)	See Test Table 21.16 (13.3.1)	N/A
21.16 (13.3.2)	Glow-wire test (650°C)	See Test Table 21.16 (13.3.2)	P
21.16 (13.4)	Proof tracking test (IEC 60112)	See Test Table 21.16 (13.4)	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
20.16 (-)	Flexible pipes of rope lights in compliance with IEC 60811-508		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

21.8 (11.2)	TABLE I: Creepage distances and clearances						P
	Minimum distances (mm) for a.c. up to 30 kHz sinusoidal voltages						P
	Applicable part of IEC 60598-1 Table 11.1.A*, 11.1.B* and 11.2*						P
	Insulation type **	Measured clearance	Required		Measured creepage	Required	
			clearance	*Table		creepage	*Table
Distance 1:	B	2,6	1,5	11.1.B	2,6	2,5	11.1.A
Working voltage (V).....:					230		—
PTI.....:					< 600 ☒ ≥ 600 ☐		—
Pulse voltage or U_P if applicable (kV)					—		—
Supplementary information: Measured at L&N							
Distance 2:	R	> 6,5	3,0	11.1.B	> 6,5	5,0	11.1.A
Working voltage (V).....:					230		—
PTI.....:					< 600 ☒ ≥ 600 ☐		—
Pulse voltage or U_P if applicable (kV)					—		—
Supplementary information: Measured at live part to accessible part							
Distance 3:	R	> 6,5	3,0	11.1.B	> 6,5	5,0	11.1.A
Working voltage (V).....:					230		—
PTI.....:					< 600 ☒ ≥ 600 ☐		—
Pulse voltage or U_P if applicable (kV)					—		—
Supplementary information: Measured at live part to mounting surface							

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

21.8 (11.2)	TABLE II: Creepage distances and clearances						N/A
	Minimum distances (mm) for a.c. higher than 30 kHz sinusoidal voltages						
	Applicable part of IEC 61347-1 Table 7 and 8* or IEC 60664-4 Table 1 and 2						
Distances	Insulation type **	Measured clearance	Required		Measured creepage	Required	
			clearance	*Table		creepage	*Table
Distance 1:							
Working voltage (V).....:							—
Frequency if applicable (kHz).....:							—
PTI.....:					< 600 ☐ ≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV)							—

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:							
Distance 2:							
Working voltage (V).....:							—
Frequency if applicable (kHz).....:							—
PTI.....:					< 600 ☐ ≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV)							—
Supplementary information:							
Distance 3:							
Working voltage (V).....:							—
Frequency if applicable (kHz).....:							—
PTI.....:					< 600 ☐ ≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV)							—
Supplementary information:							

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

21.16 (13.2.1)	TABLE: Ball Pressure Test of Thermoplastics			P
Allowed impression diameter (mm)		≤ 2		—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)	
Plastic enclosure of supply unit	Formosa Chemicals & Fibre Corp Plastics DIV	75	1,0	
Supplementary information: —				

21.16 (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)
Supplementary information: —					

IEC 60598-2-21					
Clause	Requirement + Test		Result - Remark		Verdict
21.16 (13.3.2)	TABLE: Glow-wire test (IEC 60695-2-11)				P
Glow wire temperature		650°C			—
Object/ Part No./ Material	Manufacturer/ trademark		Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Plastic enclosure of supply unit	Formosa Chemicals & Fibre Corp Plastics DIV		No	0	P
Diffuser	Dongguan BaiWei Lighting Technology Co., Ltd.		No	0	P
—	—		—	—	—
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: —					

21.16 (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: —					

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
ANNEX A	Requirements for interconnecting connectors for use in rope lights		
	This Annex A consist relevant requirements and modifications of IEC 61984		N/A
5.2	Classification according to protection against electric shock		N/A
	Only enclosed connectors		N/A
5.3	Classification according to the style of connector		N/A
	Only free connectors		N/A
5.4	Classification according to additional characteristics of connectors		N/A
	According b), d), e), f), h), and j)		N/A
6.2.1	Identification		N/A
	According a) and b)		N/A
6.4.1	Non accessibility of live parts		N/A
	Test with test finger on class II rope lights		N/A
6.9.1	Polarisation		N/A
	Improper connection of mating parts is prevented		N/A
	No unsafe compatibility between connectors for class II and class III rope lights of the same manufacturer		N/A
	Male part of class III rope lights not make contact in the female contact of low voltage connectors (e.g. IEC 60320)		N/A
	Manufacturer designed connectors, no unsafe compatibility with systems according IEC 60320 and IEC 60906 and national domestic plug and socket-outlet systems in the country where the rope light is placed on the market		N/A
6.9.3	Connection of conductors		N/A
	Cross sectional area of the contact making part of the interconnecting coupler not less than the corresponding conductor in the interconnected cable		N/A
6.10	Design of a CBC		N/A
	Adequate breaking capacity		N/A
	Female part at the end of the rope light, other than ordinary, provided with sealing device securely fixed to the coupler		N/A
6.13	Dielectric strength		N/A
	Test according clause 21.15 of this standard		N/A
6.14.2	Electrical endurance (CBC)		N/A
	Meet the specified breaking capacity		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	Number of cycles 50		—
	Test according 7.3.5		N/A
6.14.3	Bendings (non-rewirable connectors)		N/A
	Meet the specified number of bendings		N/A
	Number of cycles 1000		—
	Test according 7.3.10		N/A
6.17	Cable clamp		N/A
	Test according clause 21.11.3 of this standard		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 1	TABLE: Critical components information						P
Object / part No.	Code	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾	
Power cord & interconnecting cable	B	Shenzhen Yuxin Wire & Cable Co., Ltd.	H05VV-F	2 x 1,0 mm²	EN 50525-2-11	VDE 40012386	
LED	B	HongLi	HL-ATS-2835D9VW-S1-08-PCT-HR3	I _f = 60 mA; V _f = 10 V; 5000-6000K	IEC/EN 62031	Tested with appliance	
PCB of LED module	B	Sichuan Hengbixin Electronics Technology Co., Ltd.	H-01	Thickness 1,0 & 1,2 mm; V-0; 90 °C	IEC/EN 60598-1 IEC/EN 60598-2-21	UL E466772 & tested with appliance	
Plastic enclosure of supply unit	B	Formosa Chemicals & Fibre Corp Plastics DIV	AC310(+)	V-0; 60 °C	IEC/EN 60598-1 IEC/EN 60598-2-21	UL E162823 & tested with appliance	
Diffuser	B	Dongguan BaiWei Lighting Technology Co., Ltd.	PC2330	PC material	IEC/EN 60598-1 IEC/EN 60598-2-21	Tested with appliance	
SMT Fuse (No marking)	B	AEM Components (Suzhou) Co., Ltd.	MF2410	1 A; AC 250 V	EN 60127-1 EN 60127-4	VDE 40034853	
	D	Nanjing Sart Science & Technology Development Co., Ltd.	S6125-M2-1A	1 A; AC 250 V	EN 60127-1 EN 60127-4	TUV RH 50260452	

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 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		P				
	Type reference.....:	A4.2.0-1212	—				
	Lamp used	Non-replaceable LEDs	—				
	Lamp control gear used	—	—				
	Mounting position of luminaire	As normal use	—				
	Supply wattage (W)	26,57	—				
	Supply current (A).....:	0,205	—				
	Calculated power factor	0,53	—				
	Table: measured temperatures corrected for ta = 25 °C:		P				
	- abnormal operating mode.....:	LED Short-circuited LEDs	—				
	- test 1: rated voltage	—	—				
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage	1,06 x 230 V = 243,8 V	—				
	- 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	1,1 x 230 = 253 V	—				
	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
Power cord	25,0	—	26,1	—	90	—	—
Power cord by clamped	25,0	—	28,9	—	75	—	—
Plastic enclosure	25,0	—	29,6	—	Cl. 13.2	—	—
PCB of supply unit	25,0	—	35,2	—	90	—	—
Potting of cover supply unit	25,0	—	34,4	—	Cl. 13.2	—	—
Diffuser	25,0	—	44,6	—	Cl. 13.2	—	—
Lighted objects (0,1 m)	25,0	—	29,1	—	90	28,9	175

IEC 60598-2-21							
Clause	Requirement + Test				Result - Remark		Verdict
Mounting surface	25,0	—	29,0	—	90	25,0	130
Supplementary information: —							

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 3	Screw terminals (part of the luminaire)		
(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 (mm ²).....:		—
(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)	M	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

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 4	Screwless terminals (part of the luminaire)		
(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
(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)	Terminals and connections for internal wiring		N/A
(15.5.1)	Mechanical tests		N/A
(15.5.1.1.1)	Pull test spring-type terminals (4 N, 4 samples).....:		N/A
(15.5.1.1.2)	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 and connections for external wiring		N/A
(15.6.1)	Conductors		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	Terminal size and rating		N/A
15.6.2	Mechanical tests		N/A
(15.6.2.1)	Pull test spring-type terminals or welded connections (4 samples); pull (N)		N/A
(15.6.2.2)	Pull test pin or tab terminals (4 samples); pull (N)		N/A
(15.6.3)	Electrical tests		N/A
	Tests according 15.6.3.1 + 15.6.3.2 in IEC 60598-1		N/A

(15.6.3.1) (15.6.3.2)	TABLE: Contact resistance test / Heating tests										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										
	Voltage drop after 10th alt. 25th cycle										
	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										
	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										
	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										
	Max. allowed voltage drop (mV)										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
Supplementary information: —											

----- End of main report -----

Attachment 1: European Group differences and National differences of IEC 60598-1

Clause	Requirement + Test	Result - Remark	Verdict
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	CENELEC COMMON MODIFICATIONS (EN)	
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3	MARKING		
3.3.101	For luminaires not supplied with terminal block: Adequate warning on the package		N/A

4	CONSTRUCTION		
4.11.6	Electro-mechanical contact systems		N/A

5	EXTERNAL AND INTERNAL WIRING		
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
5.2.2	Cables equal to EN 50525		N/A
	Replace table 5.1 – Supply cord		N/A

12	ENDURANCE TEST AND THERMAL TEST		
12.4.2c	Thermal test (normal operation) see footnote c to table 12.2 relating to unsleeved fixed wiring		N/A

Attachment 1: European Group differences and National differences of IEC 60598-1

Clause	Requirement + Test	Result - Remark	Verdict
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ZB	ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)		
(3.3)	DK: power supply cords of class I luminaires with label		N/A
(4.5.1)	DK: socket-outlets		N/A
(5.2.1)	CY, DK, FI, GB: type of plug		N/A

ZC	ANNEX ZC, NATIONAL DEVIATIONS (EN)		
(4 & 5)	FR: Shuttered socket-outlets 10/16A		N/A
	FR: Safety requirements for high buildings (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:		N/A
	- 850°C for luminaires in stairways and horizontal travel paths		N/A
	- 650°C for indoor luminaires		N/A
(13.3)	GB: Requirements according to United Kingdom Building Regulation		N/A

--- End of attachment 1 ---

Attachment 2: Additional test of IEC 62031: 2018 / EN IEC 62031: 2020			
Clause	Requirement + Test	Result - Remark	Verdict
4	GENERAL REQUIREMENTS		
4.2	Classification		
	Built-in module	Yes ☐ No ☒	—
	Independent module	Yes ☐ No ☒	—
	Integral module	Yes ☒ No ☐	—
4.6	Independent modules comply with requirements in IEC 60598-1:2014/AMD1:2017		N/A
4.8	Modules with integrated controlgear providing SELV comply with requirements according to IEC 61347-1:2015/AMD1:2017 clause L.5 to L.11.	(see Annex 1)	N/A
6	MARKING		N/A
7	TERMINALS		N/A
8 (9)	EARTHING		N/A
9 (10)	PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS		N/A
10 (11)	MOISTURE RESISTANCE AND INSULATION		
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (MΩ):		P
	For basic insulation $\geq 2 \text{ M}\Omega$	20 MΩ	P
	For double or reinforced insulation $\geq 4 \text{ M}\Omega$		N/A
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		N/A
11 (12)	ELECTRIC STRENGTH		
	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V		N/A
	Working voltage $\leq 50 \text{ V}$, test voltage 500 V		N/A
	Working voltage $> 50 \text{ V} \leq 1000 \text{ V}$, test voltage (V):		P
	Basic insulation, $2U + 1000 \text{ V}$	1460 V	P
	Supplementary insulation, $2U + 1000 \text{ V}$		N/A
	Double or reinforced insulation, $4U + 2000 \text{ V}$		N/A
	No flashover or breakdown		P

Attachment 2: Additional test of IEC 62031: 2018 / EN IEC 62031: 2020			
Clause	Requirement + Test	Result - Remark	Verdict
	Solid or thin sheet insulation for double or reinforced insulation fulfil the requirements in Annex N in IEC 61347-1		N/A
12 (14)	FAULT CONDITIONS		
- (14.1)	When operated under fault conditions the controlgear:		P
	- does not emit flames or molten material		P
	- does not produce flammable gases		P
	- protection against accidental contact not impaired		P
	Thermally protected controlgear does not exceed the marked temperature value		N/A
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected		N/A
- (14.2)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (after any reduction in 14.2 - 14.5)		N/A
- (14.3)	Short-circuit or interruption of semiconductor devices		N/A
- (14.4)	Short-circuit across insulation consisting of lacquer, enamel or textile		N/A
- (14.5)	Short-circuit across electrolytic capacitors		N/A
	Short-circuit or interruption of SPDs		N/A
- (14.6)	After the tests has been carried out on three samples:		P
	The insulation resistance $\geq 1 \text{ M}\Omega$	20 M Ω	P
	No flammable gases		P
	No accessible parts have become live		P
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
- (14.7)	Relevant fault condition tests with high-power a.c. supply and in turn to a d.c. supply		—
12.2	Overpower condition		P
	Module withstands overpower condition >15 min.		P
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		N/A
	No fire, smoke or flammable gas is produced		P
	Molten material does not ignite tissue paper, spread below the module		P

Attachment 2: Additional test of IEC 62031: 2018 / EN IEC 62031: 2020			
Clause	Requirement + Test	Result - Remark	Verdict
14 (15)	CONSTRUCTION		
- (15.1)	Wood, cotton, silk, paper and similar fibrous material		P
	Wood, cotton, silk, paper and similar fibrous material not used as insulation		P
- (15.2)	Printed circuits		N/A
	Printed circuits used as internal connections complies with clause 14		N/A
15 (16)	CREEPAGE DISTANCES AND CLEARANCES		N/A
16 (17)	SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS		
	Screws, current-carrying parts and connections in compliance with IEC 60598-1 (clause numbers between parentheses refer to IEC 60598-1)		—
(4.11)	Electrical connections		P
(4.11.1)	Contact pressure		P
(4.11.2)	Screws:		N/A
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
(4.11.3)	Screw locking:		N/A
	- spring washer		N/A
	- rivets		N/A
(4.11.4)	Material of current-carrying parts		P
(4.11.5)	No contact to wood or mounting surface		P
(4.11.6)	Electro-mechanical contact systems		N/A
(4.12)	Mechanical connections and glands		N/A
(4.12.1)	Screws not made of soft metal		N/A
	Screws of insulating material		N/A
	Torque test: torque (Nm); part.....:		N/A
	Torque test: torque (Nm); part.....:		N/A
	Torque test: torque (Nm); part.....:		N/A
(4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
(4.12.4)	Locked connections:		N/A
	- fixed arms; torque (Nm)		N/A
	- lampholder; torque (Nm)		N/A
	- push-button switches; torque 0,8 Nm.....		N/A
(4.12.5)	Screwed glands; force (Nm).....		N/A

Attachment 2: Additional test of IEC 62031: 2018 / EN IEC 62031: 2020			
Clause	Requirement + Test	Result - Remark	Verdict
17 (18)	RESISTANCE TO HEAT, FIRE AND TRACKING		N/A
18	RESISTANCE TO CORROSION		N/A
20	HEAT MANAGEMENT		N/A
22	PHOTOBIOLOGICAL SAFETY		
22.1	UV radiation		P
	Luminous radiation not exceed 2mW/klm		P
22.2	Blue light hazard		P
	Assessed according to IEC TR 62778	RG1	P
22.3	Infrared radiation		P
	Requirements for infrared radiation when required		P
A	ANNEX A - TESTS		
	All tests performed in accordance with the advice given in Annex H of IEC 61347-1, if applicable		P
12 (14)	TABLE: tests of fault conditions		
Part	Simulated fault		Hazard
LED	Opened circuit; no damage, recoverable when removed the fault		NO
LED	Opened circuit; no damage, recoverable when removed the fault		NO
Input	Short-circuited		NO
(A)	ANNEX A - TEST TO ESTABLISH WHETHER A CONDUCTIVE PART IS A LIVE PART WHICH MAY CAUSE AN ELECTRIC SHOCK		N/A
ANNEX 1	LED MODULES WITH INTEGRAL CONTROLGEAR PROVIDING SELV		N/A

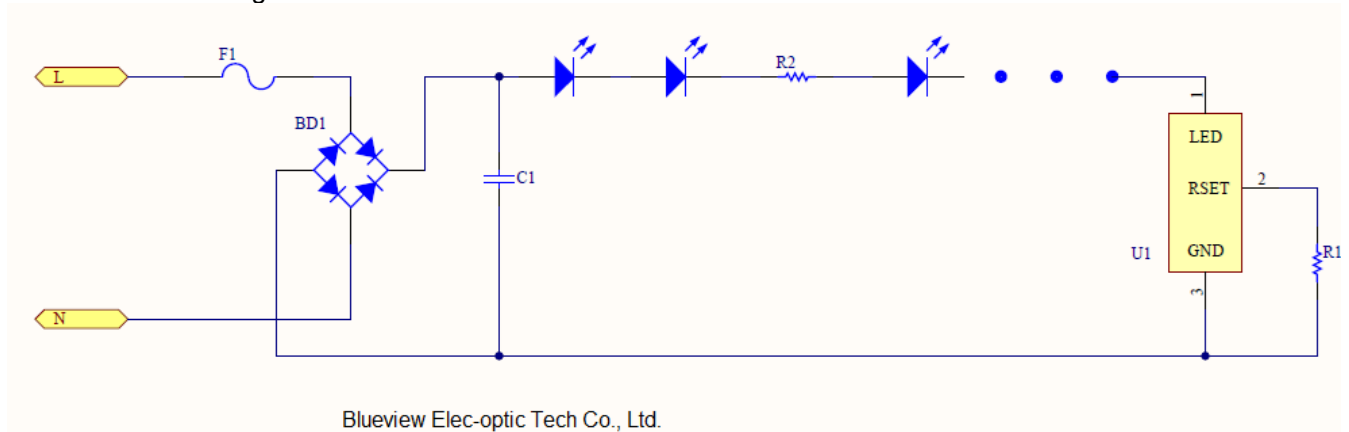
--- End of attachment 2 ---

Attachment 3: IEC/EN 62493			
Clause	Requirement + Test	Result - Remark	Verdict
4	LIMITS (Test summary)		P
4.2.2	Lighting equipment deemed to comply with the Van der Hoofden test without testing		P
4.2.3	Unintentional radiating part of lighting equipment	factor $F \leq 1$	N/A
4.3	Intentional radiating part of lighting equipment	No intentional radiating from EUT	N/A

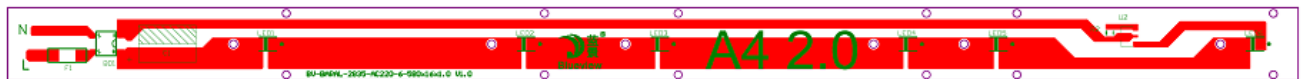
- - - End of attachment 3 - - -

Attachment 4: Schematic circuit diagram and PCB layout

Schematic circuit diagram:



PCB layout:



- - - End of attachment 4 - - -

Attachment 5: Photo documentations

Details of: General view for A4 2.0-1212, same as A4 2.0-1010 and A4 2.0-0606

View:

☒ general

☐ front

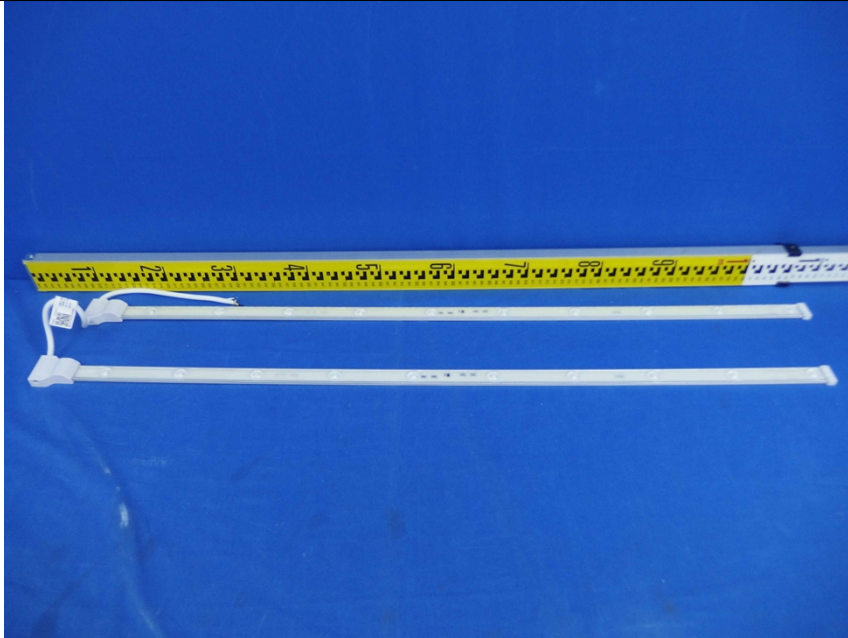
☐ rear

☐ right

☐ left

☐ top

☐ bottom



Details of: Supply box view (it cannot be removed by hand)

View:

☒ general

☐ front

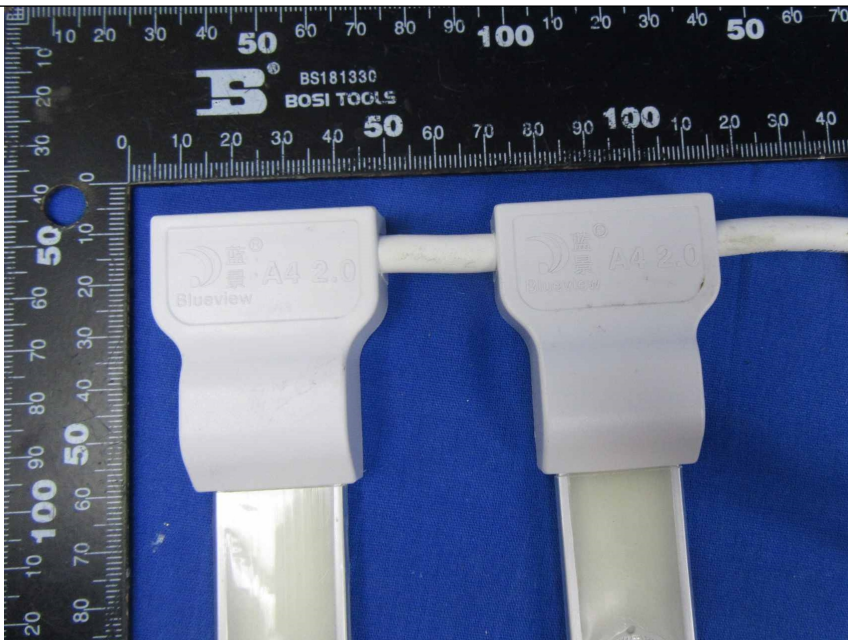
☐ rear

☐ right

☐ left

☐ top

☐ bottom



Attachment 5: Photo documentations

Details of: Bottom view for cover (all the screws are glued)

View:

☐ general

☐ front

☐ rear

☐ right

☐ left

☐ top

☒ bottom



Details of: Side of supply box view

View:

☒ general

☐ front

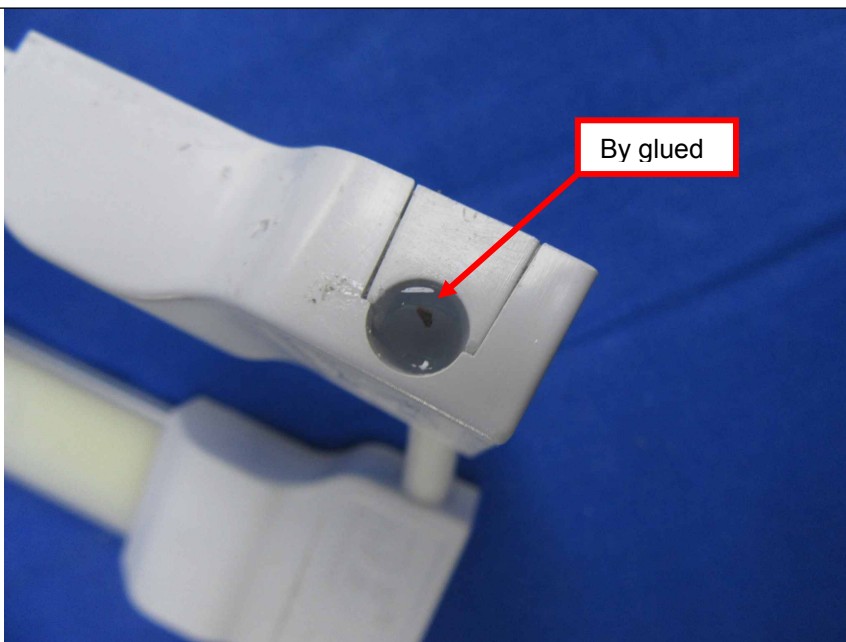
☐ rear

☐ right

☐ left

☐ top

☐ bottom



Attachment 5: Photo documentations

Details of: Remover the plastic cover

View:

☒ general

☐ front

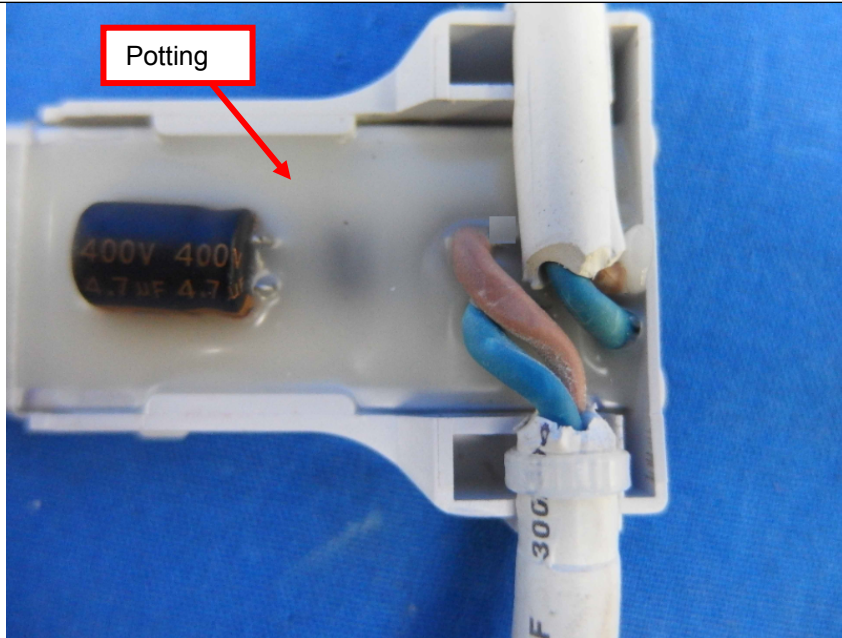
☐ rear

☐ right

☐ left

☐ top

☐ bottom



Details of: Remover the plastic cover view for supply box, before potting (after remover the ribbon)

View:

☒ general

☐ front

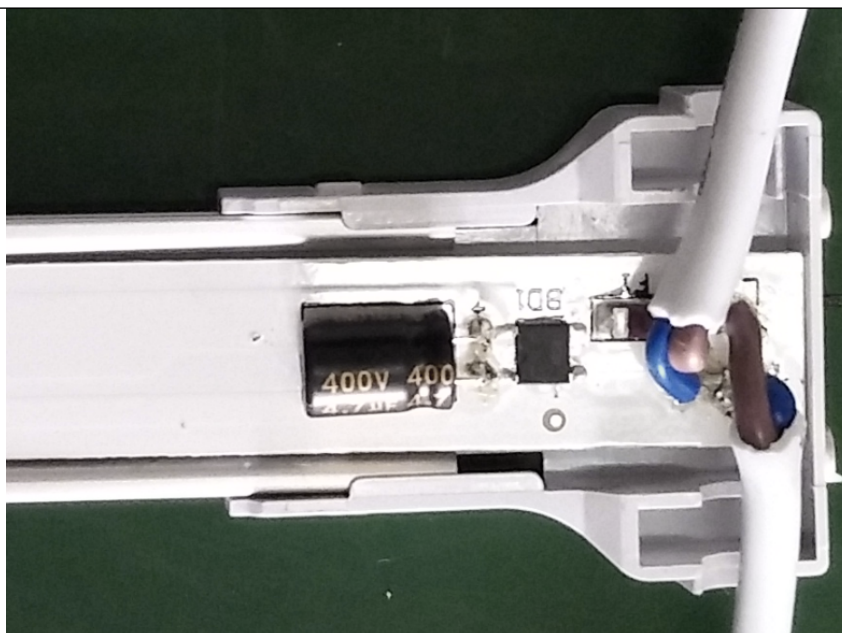
☐ rear

☐ right

☐ left

☐ top

☐ bottom



Attachment 5: Photo documentations

Details of: Circuit diagram near the LED view

View:

☒ general

☐ front

☐ rear

☐ right

☐ left

☐ top

☐ bottom



Details of: LED view

View:

☒ general

☐ front

☐ rear

☐ right

☐ left

☐ top

☐ bottom



Attachment 5: Photo documentations

Details of: The installation accessory view

View:

☒ general

☐ front

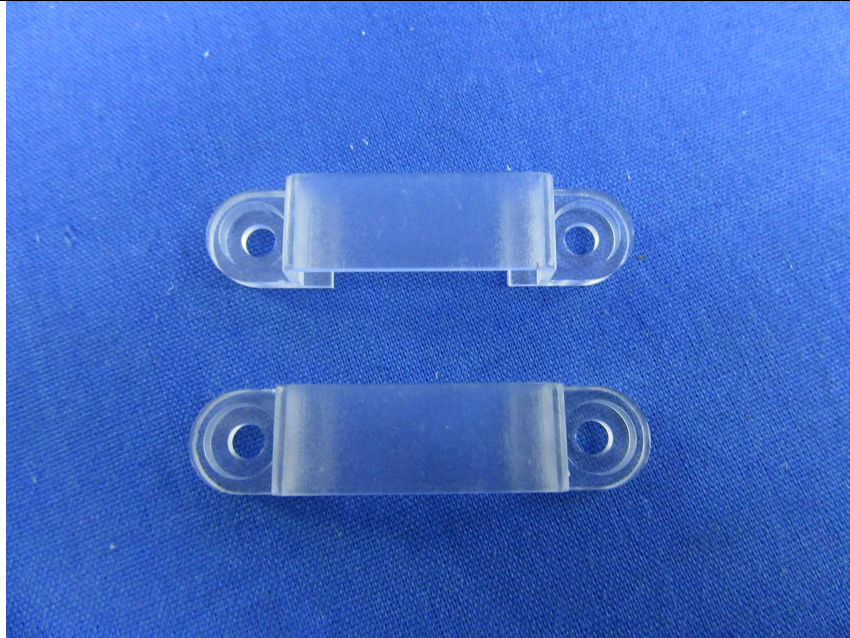
☐ rear

☐ right

☐ left

☐ top

☐ bottom



- - - End of attachment 5 - - -