Test Report issued under the responsibility of:

SGS Fimko Ltd.

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

Report Number. .....:	GZES190501789401
Date of issue .....:	2019-12-02
Total number of pages	37
Name of Testing Laboratory preparing the Report.....:	SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch
Applicant's name.....:	Blueview Elec-optic Tech Co., Ltd.
Address .....:	1000, Section 2, 2nd Konggang Road, Southwest Aviation Industrial Development Zone, Shuangliu, Chengdu, Sichuan, China
Test specification:	
Standard.....:	IEC 60598-2-21:2014 (First Edition) used in conjunction with IEC 60598-1:2014 (Eighth Edition)
Test procedure .....:	CB Scheme + SGS-CSTC / CE_LVD
Non-standard test method.....:	N/A
Test Report Form No.....:	IEC60598_2_21A
Test Report Form(s) Originator.....:	DEKRA Certification B.V.
Master TRF.....:	2016-01

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

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

General disclaimer:

The test results presented in this report relate only to the object tested.
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Test item description .....:	LED lighting chain (LED Silicone Neon Flex)
Trade Mark .....:	**Blueview**
Manufacturer.....:	Same as applicant
Model/Type reference.....:	ZNSR4-(c)-(d)-xx, ZNS(4)-(c)-(d)-xx, ZNDF(4)-(c) -(d)-xx, ZND(4)-(c)-(d)-xx, ZNSR(4)-(c)-(d)-xx, ZNSF(4)-(c)-(d)-xx Remark: "xx" can be "01" to "10", means the length; "c" can be "10" to "20", means the width of product (mm); "d" can be "01" to "12", means the quantity of units per meter of product.
Ratings .....:	Input: 24 V DC; Max. 15,552 W /m (Max. 1,296 W /unit; Max.12 unit/m); Class III; IP68(1m); Ta: 60 °C

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	
☐	**Associated CB Testing Laboratory:**	N/A	
Testing location/ address.....:			
Tested by (name, function, signature) .....:		Freddy Chen / Project Engineer	Freddy Chen
Approved by (name, function, signature)...:		Mon Liang / Reviewer	Mon Liang
☐	**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: Additional requirement for IEC 60589-1: 2014 / A1: 2017 (Total: 5 pages)

Attachment 2: Additional requirement of IEC/EN 62031 (Total: 7 pages)

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

Attachment 4: Diagram circuit and PCB layout (Total: 1 page)

Attachment 5: Photo documentations (Total: 3 pages)

Summary of testing:

1. The submitted samples were found to be in 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: 2008 +A1: 2012 + A2: 2014 and EN 62031: 2008 + A1: 2013 + A2: 2015.
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 RG0 and therefore no markings are required on the product or in the instructions.
4. The submitted samples were found to be in compliance with the EN 62493: 2015 according to the clause 4.2.2.
5. The model ZNSR4-(10)-(12)-10 was selected to perform the full tests, as it has maximum power consumption and onerous thermal, model ZNSR4-(20)-(12)-10 was performed additional Loading test, thermal test, Endurance test, Mechanical strength and Resistance heat test. Other models were performed the construction check.

Tests performed (name of test and test clause):	**Testing location:**
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: 2008 +A1: 2012 + A2: 2014 is equivalent to EN 62031: 2008 + A1: 2013 + A2: 2015	198 Kezhu Road, Science City, Economic & Technology Development Area, Guangzhou, Guangdong, China

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

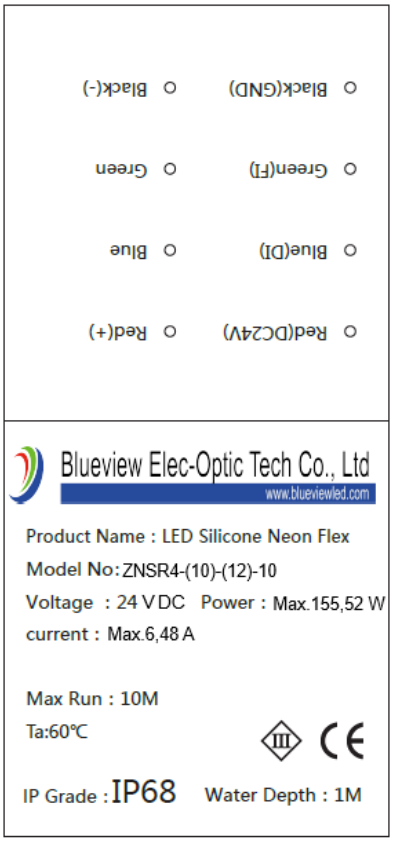
EU group differences was considered.

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

Copy of marking plate:

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

Representative:



Attached on the input 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. 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.
4. 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.
5. 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.
6. Other models have similar marking label as above, just rate power, current and model No. are different.

Test item particulars.....:	
Classification of installation and use .....:	Fixed
Supply Connection .....:	Continues
Class of equipment.....:	Class III
Degree of protection.....:	IP68
Mass of the equipment.....:	Max. 3,0 kg (for ZNSR4-(10)-(12)-10)
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 .....:	2019-06-05
Date (s) of performance of tests .....:	2019-06-06 to 2019-10-23

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.
When determining for test conclusion, measurement uncertainty of tests has been considered.

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) .....: Same as applicant
General product information: LED lighting chain, used incorporated with an independent LED driver and APP controller, Class III, IP68, Non-replaceable LEDs. All the models are same as the diagram circuit, PCB layout and used components, only different in the model name, the length and power consumption. The submitted sample should be used with an independent LED driver certified with standard IEC 61347-2-13 (fail-safe or short circuit proof, output: 24 V d.c., Max.5,4 A)

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
21.4 (0)	**GENERAL TEST REQUIREMENTS**		
21.4 (0.1)	Information for luminaire design considered.....:	Yes ☒ No ☐ IEC/EN 62031	—
21.4 (0.3)	More sections applicable.....:	Yes ☐ No ☒ Section/s:	—
21.5 (2)	**CLASSIFICATION**		
21.5 (2.2)	Type of protection .....:	Class III	P
21.5 (2.3)	Degree of protection .....:	IP68	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		N/A
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
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

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
21.6 (3.3.13)	Specifications of protective shields		N/A
21.6 (3.3.14)	Symbol for nature of supply		N/A
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		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		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**		**N/A**
	Marking if only for indoor use		N/A
21.6.4 (-)	**Marking on the packing or instructions**		**P**
	Marking a) – e)		P
21.7 (4)	**CONSTRUCTION**		
21.7 (4.2)	Components replaceable without difficulty		N/A
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

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
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
	- 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		N/A
21.7 (4.7.5)	Heat-resistant wiring/sleeves		N/A
21.7 (4.7.6)	Multi-pole plug		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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**		**N/A**
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**		**N/A**
21.7 (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
21.7 (4.10.2)	Assembly gaps:		N/A
	- not coincidental		N/A
	- no straight access with test probe		N/A
21.7 (4.10.3)	Retainment 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 (4.11)	**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

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Clause	Requirement + Test	Result - Remark	Verdict
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
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:		N/A
	- fragile parts; energy (Nm).....:		N/A
	- other parts; energy (Nm) .....:		N/A
	1) live parts		N/A
	2) linings		N/A
	3) protection		N/A
	4) covers		N/A
21.7 (4.13.3)	Straight test finger		N/A
21.7 (4.13.4)	Rough service luminaires		N/A
	- IP54 or higher		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	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	3 kg x 4 = 12 kg	P
	B) torque 2,5 Nm		N/A
	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
21.7 (4.14.2)	Load to flexible cables		N/A
	Mass (kg) .....:		—
	Stress in conductors (N/mm²) .....:		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

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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**
	No lamp control gear .....:		P
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		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

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
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 .....:		N/A
21.7 (4.22)	Attachments to lamps not cause overheating or damage		N/A
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
	Luminaires with E_{thr} :		N/A
	a) Fixed luminaires		N/A
	- distance x m, borderline between RG1 and RG2...:	RG0	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
	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		N/A
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**		N/A
	Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3		N/A
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	Socket outlets does not admit plugs of other voltage systems		N/A
	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 ≤ 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		N/A
	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:		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**
	Comply with Annex A		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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		N/A
	1) Pull test: force 60 N		N/A
	2) Torque test: torque 0,15 Nm		N/A
	b) Flexible rope lights		P
	1) Pull test: force 60 N		P
	2) Torque test: torque 0,15 Nm		P
	3) Cylinder 150 mm @ 10 times at 25 °C ± 2 °C		P
	For rope lights having an IP number over X0 Additionally: Cylinder 150 mm @ 10 times at -15 °C ± 2 °C		P
	4) Mandrel of between 4 and 5 times the diameter of test piece		P
	c) Impact test at low temperature of -15 °C ± 5 °C		P

21.8 (11)	**CREEPAGE DISTANCES AND CLEARANCES**		N/A
21.8 (11.2)	Creepage distances and clearances .....:	See Table 21.8 (11.2)	N/A
	Working voltage (V) .....:	24 V d.c.	—
	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 ☐	—

21.10 (14)	**SCREW TERMINALS**		
	Separately approved; component list		N/A
	Part of the luminaire		N/A

21.10 (15)	**SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS**		
	Separately approved; component list .....:		N/A
	Part of the luminaire .....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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 .....:	Input 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 .....:	2464	—
	Nominal cross-sectional area (mm²).....:	20 AWG	—
	Cables equal to IEC 60227 or IEC 60245		—
21.11 (5.2.3)	Type of attachment, X, Y or 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		N/A
21.11 (5.2.8)	Insulating bushings:		N/A
	- 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
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

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Clause	Requirement + Test	Result - Remark	Verdict
	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		N/A
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

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Clause	Requirement + Test	Result - Remark	Verdict
	- other standard		N/A
21.11 (5.3)	**Internal wiring**		**N/A**
21.11 (5.3.1)	Internal wiring of suitable size and type		N/A
	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		N/A
	Cross-sectional area (mm²).....:		N/A
	Insulation thickness		N/A
	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
	Adequate cross-sectional area and insulation thickness		N/A
21.11 (5.3.1.3)	Double or reinforced insulation for class II		N/A
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.		N/A
	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
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

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Clause	Requirement + Test	Result - Remark	Verdict
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
21.11.2 (-)	**Cables for rope lights**		**P**
	Type of cable .....:	2464	P
	Cables not lighter than IEC 60227 or IEC 60245 for class II rope lights		N/A
	Cables not lighter than insulation according to 5.3.1 of part 1 for class III rope lights		N/A
	Nominal cross-sectional area (mm²) .....:	20 AWG	P
	Mechanical properties according 4.14.1 and 4.14.2 of part 1		N/A
21.11.3 (-)	**Cord anchorage test**		**N/A**
	Pull test 30 N 25 times on single-core cable		N/A
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 mm² cable		N/A
	Maximum length 150 m for 0,75 mm² cable		N/A
21.12 (8)	**PROTECTION AGAINST ELECTRIC SHOCK**		
21.12 (8.2.1)	Live parts not accessible		N/A
	Basic insulated parts not used on the outer surface without appropriate protection		N/A
	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		N/A
	Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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
21.12 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N/A
21.12 (8.2.3.a)	Class II luminaire:		N/A
	- 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
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
	Other than ordinary luminaire:		N/A
	- nominal voltage .....:		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		N/A
21.12 (8.2.6)	Covers reliably secured		N/A
21.12 (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

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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		P
21.13 (12.3)	Endurance test:		P
	- mounting-position .....:	As normal use	—
	- test temperature (°C).....:	70	—
	- total duration (h) .....:	240	—
	- supply voltage: Un factor; calculated voltage (V) ...:	1,1 Un; 264 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
	- manual reset cut-out		N/A
	- auto reset cut-out		N/A
	- measured mounting surface temperature (°C).....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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 .....:		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.....:		N/A
21.13 (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
21.13 (12.7.2)	Luminaire with temperature sensing control		N/A
	- thermal link .....:	Yes ☐ No ☐	—
	- manual reset cut-out.....:	Yes ☐ No ☐	—

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Clause	Requirement + Test	Result - Remark	Verdict
	- auto reset cut-out .....:	Yes ☐ No ☐	—
	- case of abnormal conditions.....:		—
	- highest measured temperature of fixing point/ exposed part (°C): .....:		—
	Ball-pressure test:.....:		N/A
21.13.2 (-)	**Test voltage**		**P**
	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 .....:	IP68	—
	- mounting position during test .....:	As normal use	—
	- fixing screws tightened; torque (Nm).....:	—	—
	- tests according to clauses .....:	The clause 9.2.2 and clause 9.2.9 of IEC 60598-1	—
	- electric strength test afterwards		P
	a) no deposit in dust-proof luminaire		N/A
	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)		N/A
	f) no entry into enclosure (IP 3X and IP 4X)		N/A
	f) no contact with live parts (IP3X and IP4X)		N/A
	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

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Clause	Requirement + Test	Result - Remark	Verdict
21.14 (9.3)	Humidity test 48 h	25 °C; 93 % RH	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).....:		—
	SELV		P
	- between current-carrying parts of different polarity :		N/A
	- between current-carrying parts and mounting surface.....:	> 20 MΩ	P
	- 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		N/A
	- between live parts of different polarity.....:		N/A
	- between live parts and mounting surface.....:		N/A
	- between live parts and metal parts.....:		N/A
	- 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
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).....:		P
	SELV		P
	- between current-carrying parts of different polarity :		N/A
	- between current-carrying parts and mounting surface.....:	500 V	P
	- between current-carrying parts and metal parts of the luminaire.....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts .....:		N/A
	- Insulation bushings as described in Section 5 .....:		N/A
	Other than SELV		N/A
	- between live parts of different polarity.....:		N/A
	- between live parts and mounting surface.....:		N/A
	- between live parts and metal parts.....:		N/A
	- 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
21.15 (10.3)	Touch current or protective conductor current (mA).:		N/A

21.16 (13)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		
21.16 (13.2.1)	Ball-pressure test .....:		N/A
21.16 (13.3.1)	Needle-flame test (10 s) .....:		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)	P
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)	**TABLES: Creepage distances and clearances**	N/A
Table 11.1	**Minimum distances (mm) for a.c. (50/60 Hz) sinusoidal voltages**	N/A

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						
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						
Required supplementary insulation PTI < 600	-	1,6	2,5	5	8	10
Measured						
Required reinforced insulation	-	3,2	5	6	8	11
Measured						
Clearances						
Required basic insulation	0,2	0,8	1,5	3	4	5,5
Measured						
Required supplementary insulation	-	0,8	1,5	3	4	5,5
Measured						
Required reinforced insulation	-	1,6	3	6	8	11
Measured						

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

21.16 (13.2.1)	**TABLE: Ball Pressure Test of Thermoplastics**				**N/A**
Allowed impression diameter (mm) .....:		≤ 2			—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)		
—	—	—	—		
Supplementary information: —					

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)	Verdict	
—	—	—	—	—	—	
Supplementary information: —						

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	
Flexible pipe	See Annex 1	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).....:				Yes	
Supplementary information: —					

21.16 (13.4)	**TABLE: Proof tracking test (IEC 60112)**					**P**
Test voltage PTI .....:		175 V				—
Object/ Part No./ Material	Manufacturer/ trademark	Withstand 50 drops without failure on three places or on three specimens			Verdict	
Flexible pipe	See Annex 1	Yes	Yes	Yes	P	
Supplementary information: —						

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**

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Clause	Requirement + Test	Result - Remark	Verdict
	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
	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

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Clause	Requirement + Test	Result - Remark	Verdict

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					
Object / part No.	**Code**	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Input cord	B	Guangdong Hichain Electricity Co., Ltd.	2464	20 AWG; PVC	IEC 60598-2-21: 2014 IEC 60598-1: 2014 +A1: 2017 EN 60598-2-21: 2015 EN 60598-1: 2015 +A1: 2018 UL 758 (3ed.): 2014	UL E304337 & Tested with appliance
Flexible pipe and end cap	B	Sisun Silicone Technology Co., Ltd.	XS1110-ZA	105 °C; V-0; Silicone	IEC 60598-2-21: 2014 IEC 60598-1: 2014 +A1: 2017 EN 60598-2-21: 2015 EN 605981: 2015 + A1: 2018 UL 764C (7ed.): 2018	UL E487505 & Tested with appliance
LED module	B	Yuliang	YLL-T4040GRB-3-AJ-01	I_F = 20 mA x 3; V_{FRGB} = R: 2,0-2,4 V / G: 3,0-3,4 V / B: 3,0-3,4 V	IEC 62031: 2008 +A1: 2012 + A2: 2014 EN 62031: 2008 + A1: 2013 + A2: 2015	Tested with 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 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		P
	Type reference.....:	ZNSR4-(10)-(12)-10	—
	Lamp used.....:	Non-replaceable LEDs	—
	Lamp control gear used.....:	LED driver with suitable output	—
	Mounting position of luminaire.....:	As normal use	—
	Supply wattage (W).....:	128,6	—
	Supply current (A).....:	1,18	—
	Calculated power factor.....:	0,42	—
	Table: measured temperatures corrected for ta = 60 °C:		P
	- abnormal operating mode.....:	LED Short-circuited	—
	- test 1: rated voltage.....:	—	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....:	1,06 x 240 V = 254,4 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 240 V = 264 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
Translucent soft pipe	58,4	—	86,7	—	105	—	—
Input wire of lighting chain	58,4	—	80,0	—	90	—	—
Input wire by clamped	58,4	—	77,5	—	75+5	—	—
Mounting surface	58,4	—	87,4	—	90	81,6	130
Object lighted (0,1 m)	58,4	—	81,1	—	90	97,6	175

Supplementary information: —

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

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		P
	Type reference.....:	ZNSR4-(20)-10	—
	Lamp used.....:	Non-replaceable LEDs	—
	Lamp control gear used.....:	LED driver with suitable output	—
	Mounting position of luminaire.....:	As normal use	—
	Supply wattage (W).....:	130,6	—
	Supply current (A).....:	1,22	—
	Calculated power factor.....:	0,42	—
	Table: measured temperatures corrected for ta = 60 °C:		P
	- abnormal operating mode.....:	—	—
	- test 1: rated voltage.....:	—	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....:	1,06 x 240 V = 254,4 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.....:	—	—
	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
Translucent soft pipe	59,0	—	72,2	—	105	—	—
Input wire of lighting chain	59,0	—	64,6	—	90	—	—
Input wire by clamped	59,0	—	65,9	—	75	—	—
Mounting surface	59,0	—	81,7	—	90	—	—
Object lighted (0,1 m)	59,0	—	60,5	—	90	—	—

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 (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) .....:	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
	Terminal size and rating		N/A
15.6.2	Mechanical tests		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
(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: Additional requirement for IEC 60589-1: 2014 / A1: 2017			
Clause	Requirement + Test	Result - Remark	Verdict

0	**GENERAL TEST REQUIREMENTS**		
0.7	**Information for luminaire design in light sources standards**		—
0.7.2	Light source safety standard .....:	IEC/EN 62031	—
	Luminaire design in the light source safety standard		N/A

3	**MARKING**		
3.2	Mandatory markings		P
	Position of the marking		P
	Format of symbols/text		P
3.3.4	Deleted: Symbol or warning notice		—
3.3.21	Non replaceable and non-user replaceable light sources information provided		P
3.3.23	Luminaire without controlgear provided with necessary information for selection of appropriate component		P
3.3.24	If not supplied with terminal block, information on the packaging		P

4	**CONSTRUCTION**		
4.7	**Terminals and supply connections**		**N/A**
4.7.3	Terminals for supply conductors		N/A
4.14	**Suspensions, fixings and means of adjusting**		**N/A**
4.14.1	Mechanical load:		N/A
	E) clip-mounted luminaires, glass-shelve. Thickness (mm) .....:		N/A
4.16	**Luminaires for mounting on normally flammable surfaces**		**N/A**
	Provided with adaptor for a track meet the requirements for direct mounting on normally flammable surfaces		N/A

5	**EXTERNAL AND INTERNAL WIRING**		
5.2	**Supply connection and external wiring**		**P**
5.2.1	Means of connection .....:	Input cord	P
5.2.2	Type of cable .....:	2464	P
	Nominal cross-sectional area (mm²).....:	20 AWG	P
	Cables equal to IEC 60227 or IEC 60245		N/A
5.3	**Internal wiring**		**N/A**
5.3.1.1	Internal wiring connected directly to fixed wiring		N/A

Attachment 1: Additional requirement for IEC 60589-1: 2014 / A1: 2017			
Clause	Requirement + Test	Result - Remark	Verdict

	Cross-sectional area (mm²) .....:		N/A
	Insulation thickness		N/A
	Extra insulation added where necessary		N/A
5.3.1.2	Internal wiring connected to fixed wiring via internal current-limiting device		N/A
	Cross-sectional area (mm²) .....:		N/A
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

9	**RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE**		
9.2	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP .....:	IP68	—
	- mounting position during test .....:	As normal use	—
	- fixing screws tightened; torque (Nm).....:	—	—
	- tests according to clauses .....:	The clause 9.2.2 and clause 9.2.9 of IEC 60598-1	—
	- electric strength test afterwards		P
	a) no deposit in dust-proof luminaire		N/A
	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
	c.1) For luminaires without drain holes – no water entry		P
	c.2) For luminaires with drain holes – no hazardous water entry		N/A
	d) no water in watertight or pressure watertight luminaire		P
	e) no contact with live parts (IP 2X)		N/A
	e) no entry into enclosure (IP 3X and IP 4X)		N/A
	e) no contact with live parts through drain holes and ventilation slots (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

11	**CREEPAGE DISTANCES AND CLEARANCES**		N/A
11.2.1	Impulse withstand category (Normal category II)	Category II ☒ Category III ☐	—

Attachment 1: Additional requirement for IEC 60589-1: 2014 / A1: 2017			
Clause	Requirement + Test	Result - Remark	Verdict

	Category III according Annex U		N/A
	Protected against pollution, reduced creepage and clearance according Annex P of IEC 61347-1		N/A
11.2.2	Creepage distances for frequency up to 30 kHz	See Test Table 11.2 I	N/A
	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		N/A
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347		N/A
11.2.3	Clearances for frequency up to 30 kHz	See Test Table 11.2 I	N/A
	Clearances distances for frequency over 30 kHz:		N/A
	- Controlgear marked with U_P		N/A
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347		N/A

12	**ENDURANCE TEST AND THERMAL TEST**		
12.2	**Selection of lamps and ballasts**		**—**
	Lamp used according Annex B	(Lamp used see Annex 2)	—
	Controlgear if separate and not supplied	(Controlgear used see Annex 2)	—
12.3	Endurance test:		P
	a) mounting-position .....:	As normal use	—
	b) test temperature (°C).....:	70	—
	c) total duration (h) .....:	240	—
	d) supply voltage (V).....:	264	—
	d) if not equipped with controlgear, constant voltage/current (V) or (A) .....:	—	—
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
12.4	**Thermal test (normal operation)** .....:	(see Annex 2)	**P**
12.5	**Thermal test (abnormal operation)**.....:	(see Annex 2)	**N/A**

Attachment 1: Additional requirement for IEC 60589-1: 2014 / A1: 2017			
Clause	Requirement + Test	Result - Remark	Verdict

15	**SCREWLESS TERMINALS**										
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:											

Attachment 1: Additional requirement for IEC 60589-1: 2014 / A1: 2017			
Clause	Requirement + Test	Result - Remark	Verdict

11.2	**TABLE I: Creepage distances and clearances**	**N/A**

11.2	**TABLE II: Creepage distances and clearances**	**N/A**

- - - - End of attachment 1 - - - -

Attachment 2: Additional test of IEC/EN 62031			
Clause	Requirement + Test	Result - Remark	Verdict
4	**GENERAL REQUIREMENTS**		
4.4	Integral modules tested assembled in the luminaire		P
4.5	Independent modules comply with requirements in IEC 60598-1		N/A
5	**GENERAL TEST REQUIREMENTS**		
5.5	SELV-operated LED modules comply with Annex I of IEC 61347-2-13		N/A
	General conditions for tests in Annex A	(see Annex A)	P
6	**CLASSIFICATION**		
	Built-in module .....:	Yes ☐ No ☒	—
	Independent module .....:	Yes ☐ No ☒	—
	Integral module .....:	Yes ☒ No ☐	—
	For Integral module; Note to 1.2.1 in IEC 60598-1 applies.		—
7	**MARKING**		**N/A**
8	**TERMINALS**		
	Screw terminals according section 14 of IEC 60598-1:		N/A
	Separately approved; component list	(see Annex 2)	N/A
	Part of the luminaire	(see Annex 3)	N/A
	Screwless terminals according section 15 of IEC 60598-1:		N/A
	Separately approved; component list	(see Annex 2)	N/A
	Part of the luminaire	(see Annex 4)	N/A
	Connectors according IEC 60838-2-2:		N/A
	Separately approved; component list	(see Annex 2)	N/A
9 (9)	**PROVISION FOR PROTECTIVE EARTHING**		**N/A**
10 (10)	**PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS**		**P**
- (10.1)	Controlgear protected against accidental contact with live parts		P
- (A2)	The current flowing between the part concerned and earth is measured and does not exceed 0,7 mA (peak) or 2 mA d.c. .....:		N/A
- (A2)	For frequencies above 1 kHz, the current does not exceed 0,7 mA (peak) multiplied by the value of the frequency in kilohertz or 70 mA (peak) .....:		N/A

Attachment 2: Additional test of IEC/EN 62031			
Clause	Requirement + Test	Result - Remark	Verdict
- (A3)	The voltage between the part concerned and any accessible part is measured and does not exceed 34 V (peak) .....:		N/A
- (10.1)	Lacquer or enamel not used for protection or insulation		P
	Adequate mechanical strength on parts providing protection		P
- (10.2)	Capacitors > 0,5 μF: voltage after 1 min (V): < 50 V .....:		N/A
- (10.3)	Controlgear providing SELV		N/A
	Accessible conductive parts are insulated from live parts by double or reinforced insulation in SELV controlgear		N/A
	No connection between output circuit and the body or protective earthing circuit		N/A
	No possibility of connection between output circuit and the body or protective earthing circuit through other conductive parts		N/A
	SELV outputs separated by at least basic insulation		N/A
	ELV conductive parts insulated as live parts		N/A
	Tests according Annex L of IEC 61347-1		N/A
- (10.4)	Accessible conductive parts in SELV circuits		N/A
	Output voltage under load ≤ 25 V r.m.s. or ≤ 60 V d.c.		N/A
	If output voltage > 25 V r.m.s. or > 60 V d.c.; No load output ≤ 35 V peak or ≤ 60 V d.c and touch current does not exceed 0,7 mA (peak) or 2 mA d.c. .....:		N/A
	One conductive part is insulated if output voltage or current exceeding the values above and withstand test voltage 500 V		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

11 (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 ≥ 2 MΩ .....:	20 MΩ	P

Attachment 2: Additional test of IEC/EN 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	For double or reinforced insulation ≥ 4 MΩ .....:		N/A
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		N/A
12 (12)	**ELECTRIC STRENGTH**		
	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V		P
	Working voltage ≤ 50 V, test voltage 500 V		N/A
	Working voltage > 50 V ≤ 1000 V, test voltage (V):		N/A
	Basic insulation, 2U + 1000 V		N/A
	Supplementary insulation, 2U + 1000 V		N/A
	Double or reinforced insulation, 4U + 2000 V		N/A
	No flashover or breakdown		P
	Solid or thin sheet insulation for double or reinforced insulation fulfil the requirements in Annex N in IEC 61347-1		N/A
13 (14)	**FAULT CONDITIONS**		
- (14)	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		P
- (14.1)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (except between live parts and accessible metal parts)		N/A
	Creepage distances on printed boards less than specified in clause 16 in Part 1 provided with coating according to IEC 60664-3		N/A
- (14.2)	Short-circuit or interruption of semiconductor devices	(see appended table)	P
- (14.3)	Short-circuit across insulation consisting of lacquer, enamel or textile		N/A
- (14.4)	Short-circuit across electrolytic capacitors		N/A
- (14.5)	After the tests has been carried out on three samples:		P
	The insulation resistance ≥ 1 MΩ :	20 MΩ	P

Attachment 2: Additional test of IEC/EN 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	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
- (14.6)	Relevant fault condition tests with high-power supply		N/A
13.2	**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
15	**CONSTRUCTION**		
	Wood, cotton, silk, paper and similar fibrous material not used as insulation		P
16 (16)	**CREEPAGE DISTANCES AND CLEARANCES**		
- (16)	Creepage and distances and clearances in compliance with IEC 61347-1	(see appended table)	N/A
	Insulating lining of metallic enclosures		N/A
	Basic insulation on printed boards tested according to clause 14		N/A
	Distances subjected to both sinusoidal voltage as non-sinusoidal pulses not less than value in Table 16		N/A
	Creepage distances not less than minimum clearance		N/A
16 (-)	Conductive accessible parts in compliance with applicable parts of IEC 60598-1		N/A
17 (17)	**SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS**		
	Cl. 17 refer to Cl. 17 of IEC 61347-1 which refer to Cl. 4.11 and 4.12 of 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

Attachment 2: Additional test of IEC/EN 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	- 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

18 (18)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		**P**
- (18.1)	Ball-pressure test .....:		N/A
- (18.2)	Test of printed boards .....:		N/A
- (18.3)	Glow-wire test (650°C) .....:	See Test Table 18 (18.3)	P
- (18.4)	Needle-flame test (10 s) .....:		N/A
- (18.5)	Proof tracking test .....:		N/A

19 (19)	**RESISTANCE TO CORROSION**	**N/A**

20	**INFORMATION FOR LUMINAIRE DESIGN**	**N/A**

21	**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	RG0	P
22.3	**Infrared radiation**		**N/A**
	Requirements for infrared radiation when required		N/A

Attachment 2: Additional test of IEC/EN 62031			
Clause	Requirement + Test	Result - Remark	Verdict

A	**ANNEX A - TESTS**		
	All tests performed in accordance with the advice given in Annex H of IEC 61347-1, if applicable		P

13 (14)	**TABLE: tests of fault conditions**	**P**
Part	**Simulated fault**	**Hazard**
LED	Short-circuited	NO
LED	Open circuit	NO
IC(Pin 1&6)	Short-circuited	NO

16 (16)	**TABLE: clearance and creepage distance measurements (mm)**						**N/A**
Applicable part of IEC 61347-1 Table 7 – 11*							
Distances	**Insulation type ****	**Measured clearance**	**Required**		**Measured creepage**	**Required**	
			clearance	***Table**		**creepage**	***Table**
Distance 1:	—	—	—	—	—	—	—
Working voltage (V).....:					240		—
Frequency if applicable (kHz).....:					—		—
PTI.....:					< 600 ☐ ≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) .....:					—		—
Pulse voltage if applicable (kV) .....:					—		—
Supplementary information: —							

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

18 (18.1)	**TABLE: Ball Pressure Test of Thermoplastics**	**N/A**

18 (18.2)	**TABLE: Test of printed boards**	**N/A**

18 (18.3)	**TABLE: Glow-wire test**				**P**
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
Flexible pipe	See Annex 1	30	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).....:					Yes
Supplementary information: —					

Attachment 2: Additional test of IEC/EN 62031			
Clause	Requirement + Test	Result - Remark	Verdict

18 (18.4)	**TABLE: Needle-flame test**				P
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: —					

18 (18.5)	**TABLE: Proof tracking test**	**N/A**

ANNEX 1	**SELV-operated LED modules**	**N/A**

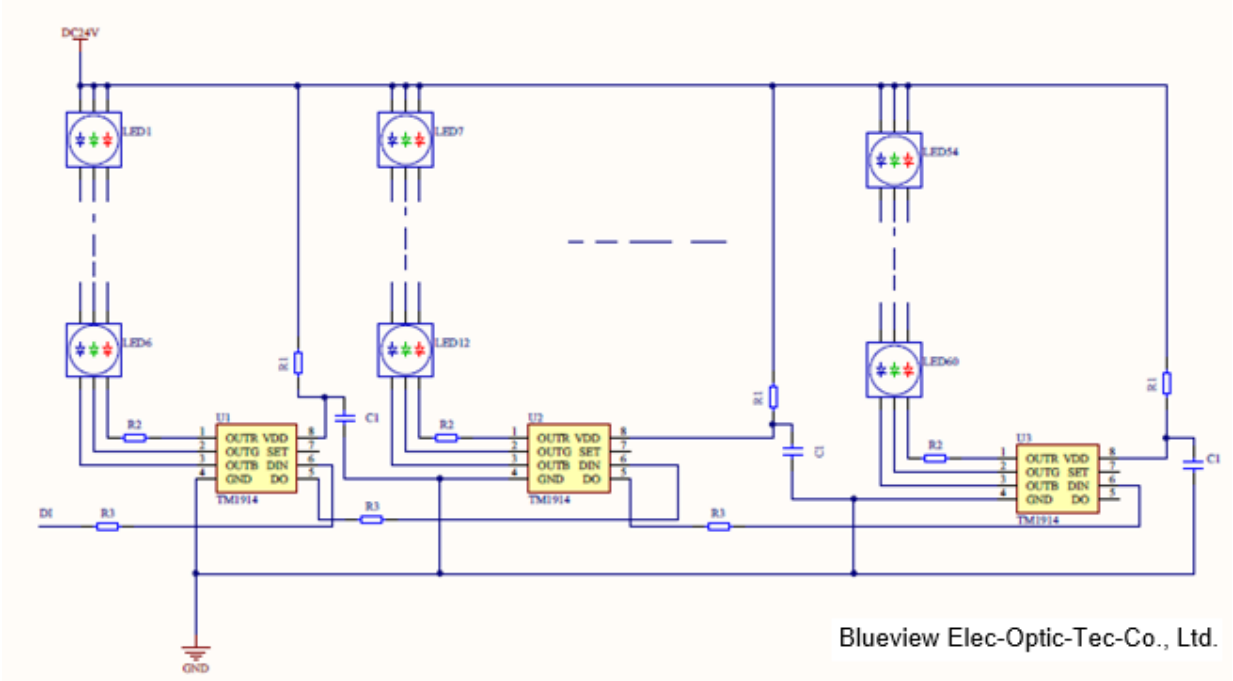
- - - End of attachment 2 - - -

Attachment 3: Additional test for EN 62493: 2015			
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 ≤ 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

Diagram circuit:



PCB layout:

- - - End of attachment 4 - - -

Attachment 5: Photo documentations

Details of: General view for ZNSR4-(10)-(12)-10, same as other models, just the length is different among them.

View:

[x] general

[ ] front

[ ] rear

[ ] right

[ ] left

[ ] top

[ ] bottom

Details of: Connector view (it is glued with flexible pipe)

View:

[x] general

[ ] front

[ ] rear

[ ] right

[ ] left

[ ] top

[ ] bottom

Attachment 5: Photo documentations

Details of: End cover view (it is glued with flexible pipe)

View:

[x] general

[ ] front

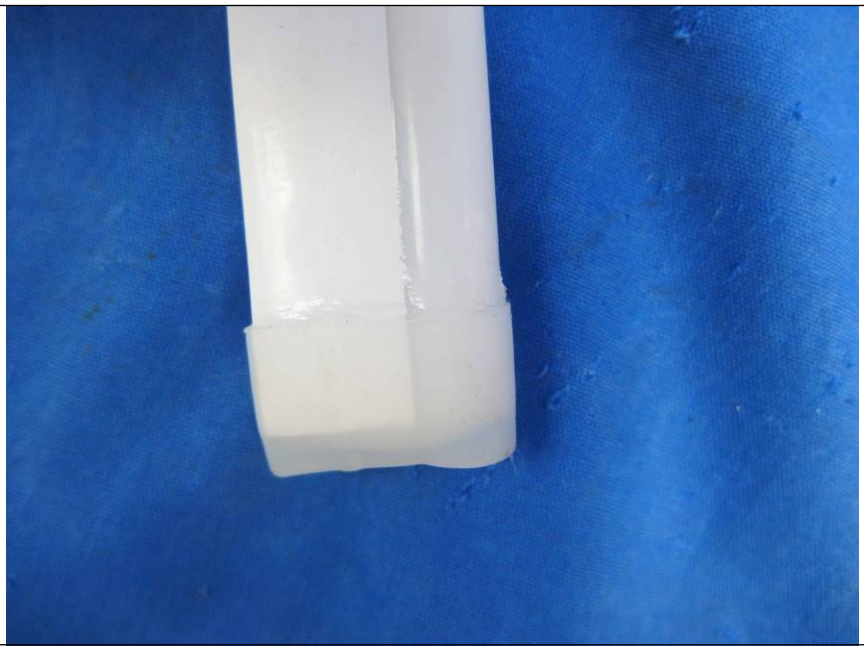
[ ] rear

[ ] right

[ ] left

[ ] top

[ ] bottom



Details of: End cover view

View:

[x] general

[ ] front

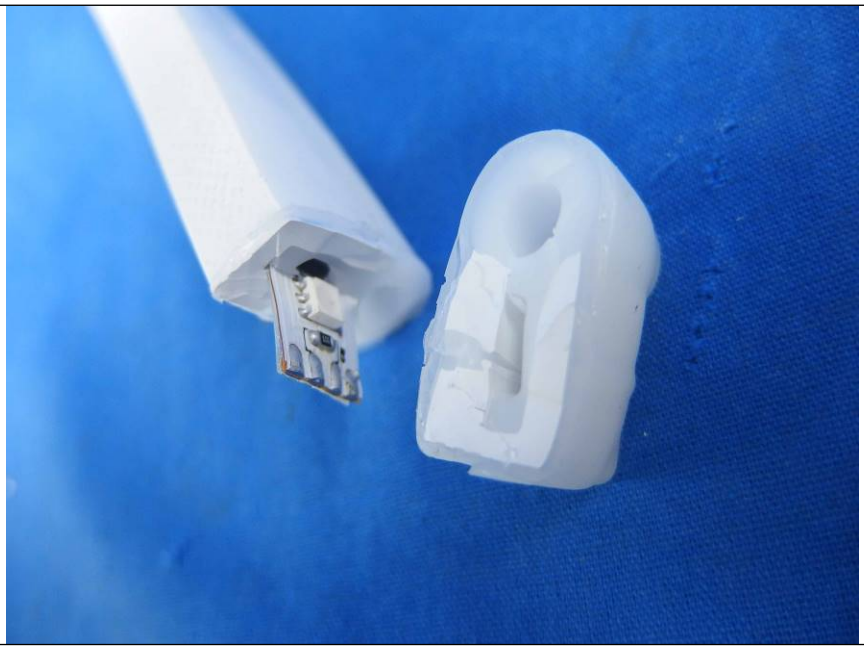
[ ] rear

[ ] right

[ ] left

[ ] top

[ ] bottom



Attachment 5: Photo documentations

Details of: LED view

View:

[x] general

[ ] front

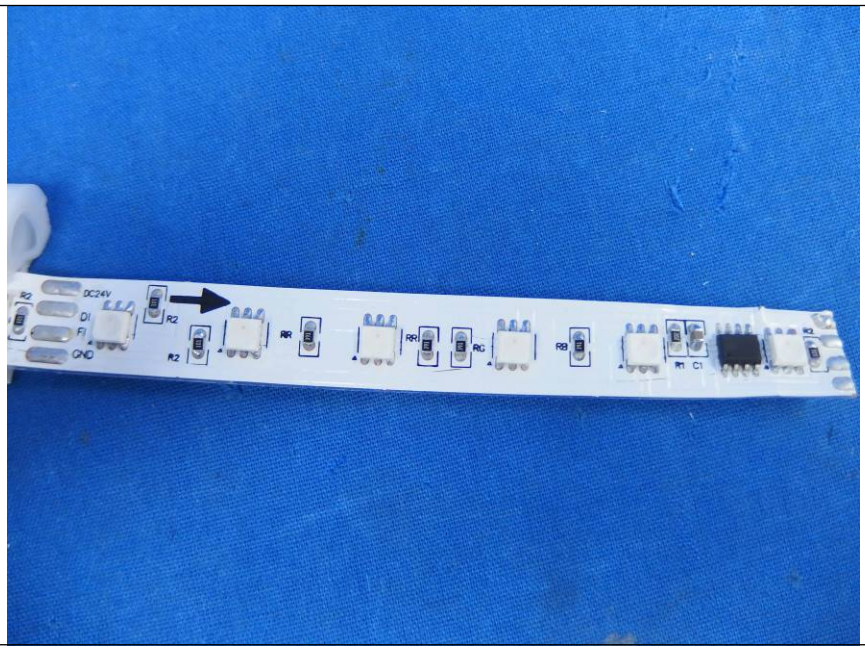
[ ] rear

[ ] right

[ ] left

[ ] top

[ ] bottom



- - - End of attachment 5 - - -