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TEST REPORT

EN 60598-2-21

Luminaires

Part 2: Particular requirements

Section 21: Rope Lights

Report reference No.: ED170727001S

Tested by: Coral Chen

Approved by: Kobe Mai

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Contents: 54 pages



Testing laboratory

Name: EMTEK(DONGGUAN) CO., LTD.

Address: No.281, Guantai Road, Nancheng District, Dongguan, Guangdong, China.

Testing location: Same as above

Client

Applicant name: GLOBAL(LED) LIGHTING SOLUTIONS

Address: Suite 402, 4th floor, Northbank Buiding Lane, Northbank Lane Century City Town,7441

Manufacturer name: GLOBAL(LED) LIGHTING SOLUTIONS

Address: Suite 402, 4th floor, Northbank Buiding Lane, Northbank Lane Century City Town,7441

Factory name: GLOBAL(LED) LIGHTING SOLUTIONS

Address: Suite 402, 4th floor, Northbank Buiding Lane, Northbank Lane Century City Town,7441

Test specification

Standard: EN60598-2-21:2015 used in conjunction with EN60598-1:2015


Test procedure: Safety

Procedure deviation: N/A

Non-standard test method: N/A

Test item

Product name: x-Glo strip light

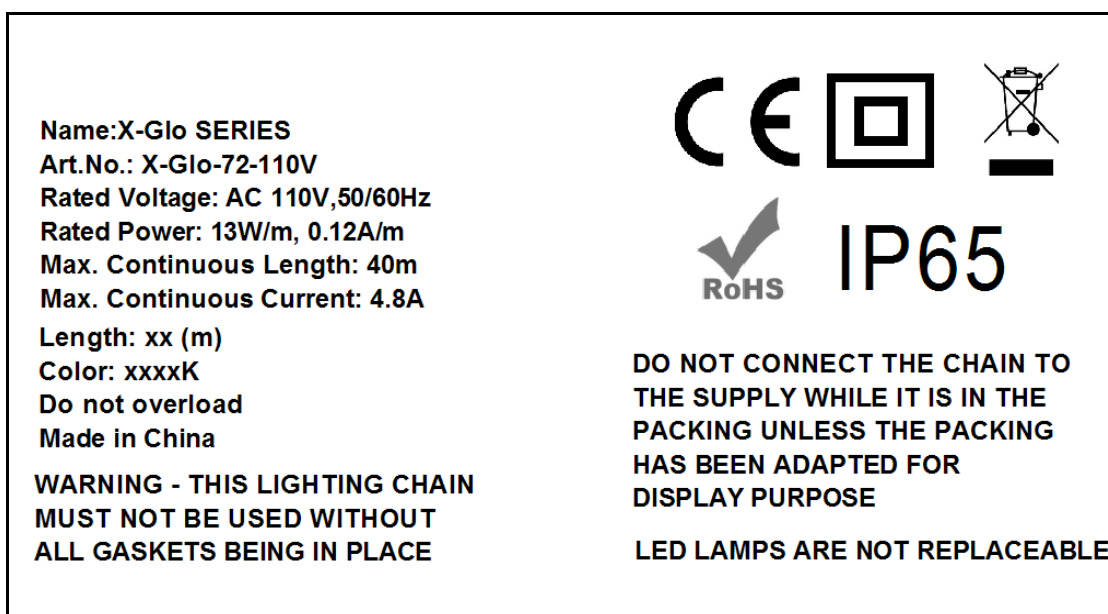
Trademark: 

Model and/or type reference: x-Glo-72-110v

Rating(s): 110V~; 50/60Hz; 13W/m, Max. 4.8A

Test item particulars	:	
Classification of installation and use	:	--
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 : July 27, 2017		
Date (s) of performance of tests : July 27, 2017 to August 16, 2017		
General remarks:		
<p>The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator.</p> <p>Clause numbers between brackets refer to clauses in IEC 60598-1</p>		
Summary of testing:		
<ol style="list-style-type: none"> 1. There are one model covered in this report. 2. Full tests were performed on model x-Glo-72-110v. And the tests results complied with the requirements of the standards mentioned in page one. 3. EN 61347-1:2015, EN 61347-2-11:2001 was considered, details see Attachment No.1 4. EN 62301:2008+A1:2013+A2:2015 was considered, details see Attachment No.2. 5. IEC/TR 62778: 2014 was considered in this report, the RG level of this product is exempt group. Details see Attachment No.3 6. EN 62471: 2008 was evaluated, classification group: exempt<input checked="" type="checkbox"/> risk 1<input type="checkbox"/> risk 2<input type="checkbox"/> risk 3<input type="checkbox"/>, details see report ED170727002S. 		

Copy of marking plate:



Sticking on the luminaires

Note:

1. The height of graphical symbols shall not be less than 5 mm.
2. The height of letters and numerals either shown separately or with or as part of symbols shall not be less than 2 mm.
3. The height of WEEE symbols shall not be less than 7 mm.

General product information:

1. LED chains, Class II; IP65.
2. The product connected to supply without plug.
3. Flexible sealed lighting chains.

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

21.4 (0)	GENERAL TEST REQUIREMENTS		P
21.4 (0.1)	Information for luminaire design considered	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Lamp standard:	—
21.4 (0.3)	More sections applicable	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Section/s:	—

21.5 (2)	CLASSIFICATION		P
21.5 (2.2)	Type of protection	Class II	P
21.5 (2.3)	Degree of protection	IP65	P
21.5 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
21.5 (2.5)	Luminaire for normal use	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	Luminaire for rough service	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
21.5.2 (-)	Class II or Class III	Class II	P
21.5.3 (-)	Rope lights for outdoor use shall be IP44 or higher	IP65	P

21.6 (3)	MARKING		P
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	English	P
21.6 (3.3.1)	Combination luminaires		N/A
21.6 (3.3.2)	Nominal frequency in Hz	50/60Hz	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		N/A
21.6 (3.3.10)	Suitability for use indoors		N/A
21.6 (3.3.11)	Luminaires with remote control		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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 Y	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 light sources	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	15S	P
	Test with hexane	15S	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		P
21.7 (4.2)	Components replaceable without difficulty		N/A
21.7 (4.3)	Wireways smooth and free from sharp edges		P

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Clause	Requirement + Test	Result - Remark	Verdict
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		P
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

EN 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	- 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		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		P
21.7 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		P
	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:		P
	- fixed		P
	- unable to be replaced; luminaire inoperative		N/A
	- sleeves retained in position		P
	- lining in lampholder		N/A
21.7 (4.11)	Electrical connections and current-carrying parts		P

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Clause	Requirement + Test	Result - Remark	Verdict
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		P
21.7 (4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N/A
	Torque test: torque (Nm); part..... :	Screw for fixing fuse box: 2.92mm, 0.5Nm	P
	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:		P
	- 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) :	2.5Nm	P
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) :	0.5 Nm	P
	1) live parts		P

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Clause	Requirement + Test	Result - Remark	Verdict
	2) linings		N/A
	3) protection		P
	4) covers		P
21.7 (4.13.3)	Straight test finger	30N	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		N/A
21.7 (4.14.1)	Mechanical load:		N/A
	A) four times the weight		N/A
	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/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

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Clause	Requirement + Test	Result - Remark	Verdict
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		N/A
	- glow-wire test 650°C	See Test Table 20.16 (13.3.2)	N/A
	- spacing ≥ 30 mm		N/A
	- screen withstanding test of 13.3.1		N/A
	- screen dimensions		N/A
	- no fiercely burning material		N/A
	- 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	(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		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
21.7 (4.18.1)	- rust-resistance		N/A
21.7 (4.18.2)	- season cracking in copper		N/A
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 20.16 (13.3.2)	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} :		P
	a) Fixed luminaires	RG0	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

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Clause	Requirement + Test	Result - Remark	Verdict
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
	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 ($^{\circ}\text{C}$) :		—
	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		P
	Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3		P

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Clause	Requirement + Test	Result - Remark	Verdict
	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 \leq 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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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		N/A
21.7.3 (-)	Terminals and supply connections		N/A
	Comply with Annex 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		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

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Clause	Requirement + Test	Result - Remark	Verdict

21.8 (11)	CREEPAGE DISTANCES AND CLEARANCES		P
21.8 (11.2)	Creepage distances and clearances	See Table 21.8 (11.2)	P
	Working voltage (V)	110V	—
	Rated pulse voltage (kV)	--	—
	Voltage form	Sinusoidal <input checked="" type="checkbox"/> Non-sinusoidal <input type="checkbox"/>	—
	PTI	< 600 <input checked="" type="checkbox"/> ≥ 600 <input type="checkbox"/>	—
	Impulse withstand category (Normal category II) (Category III Annex U)	Category II <input checked="" type="checkbox"/> Category III <input type="checkbox"/>	—

21.10 (14)	SCREW TERMINALS		N/A
	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		N/A
	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		P
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	See ANEEX 1	P
	Nominal cross-sectional area (mm²)	See ANEEX 1	P
	Cables equal to IEC 60227 or IEC 60245		N/A
21.11 (5.2.3)	Type of attachment, X, Y or Z	Type Y	P
21.11 (5.2.5)	Type Z not connected to screws		N/A
21.11 (5.2.6)	Cable entries:		P
	- suitable for introduction		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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.		N/A
	- insulating material or lining		N/A
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		P
21.11 (5.2.10.3)	Tests:		P
	- impossible to push cable; unsafe		P
	- pull test: 25 times; pull (N).....: 60N		P
	- torque test: torque (Nm): 0.25Nm		N/A
	- displacement ≤ 2 mm	0.7mm<2.0mm	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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
	- 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		N/A
	Cross-sectional area (mm ²).....		N/A
	Insulation thickness		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Extra insulation added where necessary		N/A
21.11 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		P
	Adequate cross-sectional area and insulation thickness		P
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.		N/A
	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		P
21.11 (5.3.5)	Strain on internal wiring		P
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		P
21.11.2 (-)	Cables for rope lights		P
	Type of cable :		P
	Cables not lighter than IEC 60227 or IEC 60245 for class II rope lights		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Cables not lighter than insulation according to 5.3.1 of part 1 for class III rope lights		P
	Nominal cross-sectional area (mm ²) :	(see Annex 1)	P
	Mechanical properties according 4.14.1 and 4.14.2 of part 1		P
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		P
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		N/A
	Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		P
	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		P
	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

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Clause	Requirement + Test	Result - Remark	Verdict
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		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		P
21.12 (8.2.6)	Covers reliably secured		P
21.12 (8.2.7)	Discharging of capacitors $\geq 0,5 \mu F$		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

21.13 (12)	ENDURANCE TEST AND THERMAL TEST		P
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	Acc. to user manual	—
	- test temperature (°C).....	35°C	—
	- total duration (h)	240h	—
	- supply voltage: Un factor; calculated voltage (V) ...	264V	—

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Clause	Requirement + Test	Result - Remark	Verdict
	- lamp used..... :	Integral LED	—
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)	N/A
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
	- 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		—

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Clause	Requirement + Test	Result - Remark	Verdict
	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 20.16 (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 20.16 (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		—
	- 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 <input type="checkbox"/> No <input type="checkbox"/>	—
	- manual reset cut-out	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- auto reset cut-out	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- case of abnormal conditions		—
	- highest measured temperature of fixing point/exposed part (°C):		—
	Ball-pressure test:	See Table 20.16 (13.2.1)	P
21.13.2 (-)	Test voltage		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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		P
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..... :	IP65	—
	- mounting position during test	Acc. to user manual	—
	- fixing screws tightened; torque (Nm)	--	—
	- tests according to clauses..... :	9.2.2 & 9.2.6	—
	- 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		N/A
	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		N/A
	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
21.14 (9.3)	Humidity test 48 h	25 °C, 93 % RH	P

21.15 (10)	INSULATION RESISTANCE AND ELECTRIC STRENGTH		P
21.15 (10.2.1)	Insulation resistance test		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø		—
	Insulation resistance (MΩ)		—
	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	>100M	P
	- between live parts and mounting surface	>100M	P
	- 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		N/A
	Dummy lamp		N/A
	Luminaires with ignitors after 24 h test		N/A
	Luminaires with manual ignitors		N/A
	Test voltage (V)		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

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Clause	Requirement + Test	Result - Remark	Verdict
	Other than SELV		P
	- between live parts of different polarity :	1220V	P
	- between live parts and mounting surface :	2440V	P
	- 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) :	0.1mA	P

21.16 (13)	RESISTANCE TO HEAT, FIRE AND TRACKING		P
21.16 (13.2.1)	Ball-pressure test..... :	See Test Table 20.16 (13.2.1)	P
21.16 (13.3.1)	Needle-flame test (10 s) :	See Test Table 20.16 (13.3.1)	P
21.16 (13.3.2)	Glow-wire test (650°C) :	See Test Table 20.16 (13.3.2)	P
21.16 (13.4)	Proof tracking test (IEC 60112) :	See Test Table 20.16 (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						P
Table 11.1	Minimum distances (mm) for a.c. (50/60 Hz) sinusoidal voltages						P
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						

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Clause	Requirement + Test				Result - Remark		Verdict
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							
1. Between pins of fuse link; cr.=cl.=5.0mm(Limit cr.=1.6mm, cl.=0.8mm) 2. Between L and N of fuse box: cr.=cl.=5.0mm(Limit cr.=1.6mm, cl.=0.8mm) 3. Current-carrying parts and accessible parts: Cr.=cl.=6.0mm(Limit cr.=3.2mm, cl.=1.6mm) 4. Current-carrying parts and supporting surface: Cr.=cl.=6.0mm(Limit cr.=3.2mm, cl.=1.6mm)							

21.16 (13.2.1)	TABLE: Ball Pressure Test of Thermoplastics				P
Allowed impression diameter (mm) :			2mm		—
Object/ Part No./ Material		Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)	
Fuse box		--	75°C	1.2mm	
PCB of Fuse		--	125°C	1.0mm	
Supplementary information:					

21.16 (13.3.1)	TABLE: Needle-flame test (IEC 60695-11-5)					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	
Connector	--	10s	No	--	P	
PCB of Fuse	--	10s	No	--	P	
PCB of LED	--	10s	No	--	P	
Supplementary information:						

21.16 (13.3.2)	TABLE: Glow-wire test (IEC 60695-2-11)				P	
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Clause	Requirement + Test		Result - Remark	Verdict
Glow wire temperature : 650°C				—
Object/ Part No./ Material	Manufacturer/ trademark	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Fuse box	--	No	0	P
Diffuser enclosure	--	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
Diffuser enclosure	--	Yes	Yes	Yes	P
Supplementary information:					

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Clause	Requirement + Test	Result - Remark	Verdict
ANNEX A	Requirements for interconnecting connectors for use in rope lights		N/A
	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
	Number of cycles 50		—

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Clause	Requirement + Test	Result - Remark	Verdict
	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

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Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 1: components			P
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object/part No.	code	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity
External wire	B	Yuyao Jingyi Electronics Co., Ltd.	H05RN-F	2x1.0mm ²	--	VDE 40017356
Fuse box	C	Dongguan Long Ran Plastic Electronic Co., Ltd.	Q7103	IP65, 130°C	--	Tested with appliance
Rubber ring	C	Dongguan Long Ran Plastic Electronic Co., Ltd.	O-ring(Q7103)	Rubber, 130°C	--	Tested with appliance
PCB of Fuse	B	SHENZHEN HENGLONGXIN ELECTRONICS TECHNOLOGY CO LTD	HLX-D	130°C, V-0	--	UL E340113
PCB of LED	B	HUIZHOU CHUANLIAN ELECTRONIC TECHNOLOGY CO LTD	CL-Y	105°C, V-0	--	UL E362158
Varistor	B	CERGLASS MFG INC	10D471K	423-517V, 0.4W	--	VDE 40028836
Fuse	B	SUNNY EAST ENTERPRISE CO LTD	CFD	250V, 6.3A	--	VDE 40030246
Connector	B	SHENZHEN CHOGORI TECHNOLOGY CO LTD	22003421-02(female), 22003121-02(male)	250V/10A, 40~105°C IP67	--	UL E356943 TUV B121281970001
LED	C	ShenZhen JuFei Optoelectronics Co., Ltd.	2835	60mA, 2.9-3.4V	--	Tested with appliance
Diffuser enclosure	C	KINGFA SCI & TECH CO LTD	PVC-1018	V-0, any color	--	Tested with appliance

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

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Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		P			
	Type reference :	x-Glo-72-110v	—			
	Lamp used..... :	Integral LED	—			
	Lamp control gear used..... :	See annex 1	—			
	Mounting position of luminaire :	As normal used according instruction manual	—			
	Supply wattage (W) :	554.5W	—			
	Supply current (A) :	5.05A	—			
	Calculated power factor..... :	0.997	—			
	Table: measured temperatures corrected for ta = 25 °C:					
	- abnormal operating mode :	During the sample tested under fault condition, the LED driver shut down or fuse open	—			
	- test 1: rated voltage..... :	--	—			
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage :	1,06 times rated voltage	—			
	- 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	Clause 12.4 – normal				Clause 12.5 – abnormal	
	test 1	test 2	test 3	limit	test 4	limit
Fuse box plastic enclosure outside	--	37.5	--	Ref.	--	--
Fuse box plastic enclosure inside	--	43.2	--	Ref.	--	--
ZV1	--	58.6	--	85	--	--
PCB of Fuse	--	76.4	--	Ref.	--	--
Connector	--	28.9	--	Ref.	--	--
Input wire	--	28.1	--	90	--	--
Input Connector outside	--	31.5	--	Ref.	--	--
Input Connector inside	--	36.1	--	Ref.	--	--
PCB of LED, nearest to center LED	--	79.5	--	105	--	--
Diffuser outside	--	37.1	--	Ref.	--	--

EN 60598-2-21						
Clause	Requirement + Test			Result - Remark		Verdict
Diffuser inside	--	79.1	--	Ref.	--	--
Mounting surface	--	27.4	--	90	--	--
Ambient	--	25.0	--	--	--	--
Supplementary information:						

EN 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
ANNEX 4	Screwless terminals (part of the luminaire)		N/A
(15)	SCREWLESS TERMINALS		N/A
(15.2)	Type of terminal..... :		—
	Rated current (A) :		—
(15.3.1)	Material		N/A
(15.3.2)	Clamping		N/A
(15.3.3)	Stop		N/A
(15.3.4)	Unprepared conductors		N/A
(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

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

Attachment No.1

EN 61347-2-11			
Clause	Requirement + Test	Result - Remark	Verdict
4 (4)	GENERAL REQUIREMENTS		P
- (4)	Insulation materials according requirements in Annex N of IEC 61347-1	(see Annex N)	N/A
- (4)	Compliance of independent controlgear enclosure with IEC 60 598-1		N/A
- (4)	Built-in electronic controlgear with double or reinforced insulation comply with Annex O of IEC 61347-1	(see Annex O)	N/A
- (4)	SELV controlgear comply with Annex L of IEC 61347-1	(see Annex L)	N/A
6 (6)	CLASSIFICATION		P
	Built-in controlgear	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	Independent controlgear	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	Integral controlgear	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
7 (7)	MARKING		N/A
7.1 (7.1)	Mandatory markings (other than integral miscellaneous electronic circuits)		N/A
	a) mark of origin		N/A
	b) model number or type reference		N/A
	d) correlation between interchangeable parts and controlgear marked		N/A
	e) rated supply voltage (V)		N/A
	supply frequency (Hz)		N/A
	supply current (A)		N/A
	f) earthing symbol		N/A
	k) wiring diagram		N/A
	l) value of t_c alternative t_a		N/A
7.1 (-)	- control terminals identified, if applicable		N/A
- (7.2)	Marking durable and legible		N/A
	Rubbing 15 s water, 15 s petroleum; marking legible		N/A
7.2 (7.1)	Information to be provided, if applicable:		N/A
	h) declaration on protection against accidental contact		N/A
	i) cross-section of conductors (mm ²)		N/A
	j) number, type and wattage of lamp(s)		N/A
- (7.2)	Marking durable and legible		N/A

Attachment No.1

EN 61347-2-11			
Clause	Requirement + Test	Result - Remark	Verdict
	Rubbing 15 s water, 15 s petroleum; marking legible		N/A
8 (10)	PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS		P
- (10.1)	Controlgear protected against accidental contact with live parts	Rely upon final luminaries	P
- (A2)	Voltage measured with 50 k Ω	(see Annex A)	N/A
- (A3)	Voltage > 35 V r.m.s. or > 60 V d.c. or protective impedance device	(see Annex A)	N/A
- (10.1)	Lacquer or enamel not used for protection or insulation		N/A
	Adequate mechanical strength on parts providing protection		N/A
- (10.2)	Capacitors > 0,5 μ F: 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 \leq 25 V r.m.s. or \leq 60 V d.c.		N/A
	If output voltage > 25 V r.m.s. or > 60 V d.c.; No load output \leq 35 V peak or \leq 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

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EN 61347-2-11			
Clause	Requirement + Test	Result - Remark	Verdict
	Resistors comply with test (a) in 14.1 of IEC 60065		N/A
9 (8)	TERMINALS		N/A
- (8)	Screw terminals according section 14 of IEC 60598-1:		N/A
	Separately approved; component list	(see Annex 1)	N/A
	Part of the controlgear	(see Annex 2)	N/A
	Screwless terminals according section 15 of IEC 60598-1:		N/A
	Separately approved; component list	(see Annex 1)	N/A
	Part of the controlgear	(see Annex 3)	N/A
10 (9)	PROVISION FOR PROTECTIVE EARTHING		N/A
- (9.1)	Provisions for protective earthing		N/A
	Terminal complying with clause 9		N/A
	Locked against loosening and not possible to loosen by hand		N/A
	Not possible to loosen clamping means unintentionally on screwless terminals		N/A
	Earthing via means of fixing		N/A
	Earthing terminal only used for the earthing of the control gear		N/A
	All parts of material minimizing the danger of electrolytic corrosion		N/A
	Made of brass or equivalent material		N/A
	Contact surface bare metal		N/A
- (9.2)	Provision for functional earthing		N/A
	Comply with clause 8 and 9.1		N/A
- (9.3)	Earth contact via the track on the printed board		N/A
	Test with a current of 25 A between earthing terminal and each of the accessible metal parts; measured resistance (Ω) at ≥ 10 A according 7.2.3 of IEC 60598-1: $< 0,5 \Omega$		N/A
- (9.4)	Earthing of built-in lamp controlgear		N/A
	Earth by means of fixing to earthed metal of luminaire in compliance of 7.2 of IEC 60598-1		N/A
	Earthing terminal only for earthing the built-in controlgear		N/A
- (9.5)	Earthing via independent controlgear		N/A

Attachment No.1

EN 61347-2-11			
Clause	Requirement + Test	Result - Remark	Verdict
- (9.5.1)	Earth connection to other equipment		N/A
	Looping or through connection, conductor min. 1,5 mm ² and of copper or equivalent		N/A
	Protective earthing wires in line with 5.3.1.1 and clause 7		N/A
- (9.5.2)	Earthing of the lamp compartments powered via the independent lamp controlgear		N/A
	Test with a current of 25 A between input and output earth terminals; measured resistance (Ω) between earthing terminal and each of the accessible metal parts at ≥ 10 A according 7.2.3 of IEC 60598-1: $< 0,5 \Omega$		N/A
	Output earthing terminal marked as in 7.1 t) of IEC 61347-1		N/A
11 (11)	MOISTURE RESISTANCE AND INSULATION		P
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V ($M\Omega$):		P
	For basic insulation $\geq 2 M\Omega$	Between different pole of input terminal: 100 $M\Omega$	P
	For double or reinforced insulation $\geq 4 M\Omega$		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		P
- (12)	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V		N/A
	Working voltage ≤ 50 V, test voltage 500 V		N/A
	Working voltage > 50 V ≤ 1000 V, test voltage (V):		P
	Basic insulation, $2U + 1000$ V	1220V	P
	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
14 (14)	FAULT CONDITIONS		P
- (14)	When operated under fault conditions the controlgear:		P

Attachment No.1

EN 61347-2-11			
Clause	Requirement + Test	Result - Remark	Verdict
	- 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	(see appended table)	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)	(see appended table)	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	(see appended table)	P
- (14.4)	Short-circuit across electrolytic capacitors	(see appended table)	N/A
- (14.5)	After the tests has been carried out on three samples:		P
	The insulation resistance $\geq 1 \text{ M}\Omega$		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
- (14.6)	Relevant fault condition tests with high-power supply		—
15 (15)	CONSTRUCTION		P
- (15.1)	Wood, cotton, silk, paper and similar fibrous material		N/A
	Wood, cotton, silk, paper and similar fibrous material not used as insulation		N/A
- (15.2)	Printed circuits		P
	Printed circuits used as internal connections complies with clause 14		P
- (15.3)	Plugs and socket-outlets used in SELV or ELV circuits		N/A
	No dangerous compatibility between output socket-outlet and a plug for socket-outlets for input circuit in relation to installation rules, voltages and frequencies		N/A
	Plugs and socket-outlets for SELV comply with IEC 60906-3 and IEC 60884-2-4		N/A

Attachment No.1

EN 61347-2-11			
Clause	Requirement + Test	Result - Remark	Verdict
	Plugs and socket-outlets for SELV ≤ 3 A, ≤ 25 V r.m.s. or ≤ 60 V d.c. and ≤ 72 W comply with IEC 60906-3 and IEC 60884-2-4 or:		N/A
	- plugs not able to enter socket-outlets of other standardised system		N/A
	- socket-outlets not admit plugs of other standardised system		N/A
	- socket-outlets without protective earth		N/A
16 (16)	CREEPAGE DISTANCES AND CLEARANCES		P
- (16)	Creepage distances and clearances according to Table 3 and 4, as appropriate		P
	Controlgears providing SELV comply with L.1 in Annex L		N/A
	Insulating lining of metallic enclosures		N/A
	Basic insulation on printed boards tested according to clause 14		P
	Distances subjected to both sinusoidal voltage as non-sinusoidal pulses not less than value in either Table 3 or 4		P
	Creepage distances not less than minimum clearance		P
17 (17)	SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS		P
	Screws, current-carrying parts and connections in compliance with IEC 60598-1 (clause numbers between parentheses refer to IEC 60598-1)		P
(4.11)	Electrical connections		P
(4.11.1)	Contact pressure		N/A
(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

Attachment No.1

EN 61347-2-11			
Clause	Requirement + Test	Result - Remark	Verdict
	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:		P
	- part tested; temperature (°C) :	See 60598 part	P
	- part tested; temperature (°C) :		N/A
- (18.2)	Test of printed boards:		P
	- part tested :	See 60598 part	P
	- part tested :		N/A
- (18.3)	Glow-wire test (650°C):		P
	- part tested :	See 60598 part	P
	- part tested :		N/A
- (18.4)	Needle flame test (10 s):		P
	- part tested :	See 60598 part	P
	- part tested :		N/A
- (18.5)	Tracking test:		P
	- part tested :	See 60598 part	P
	- part tested :		N/A
19 (19)	RESISTANCE TO CORROSION		N/A
	- test according 4.18.1 of IEC 60598-1		N/A
	- adequate varnish on the outer surface		N/A
20 (-)	ANNEXES		P
	Comply with appropriate annexes of IEC 61347-1	(see Annexes)	P

Attachment No.1

EN 61347-2-11			
Clause	Requirement + Test	Result - Remark	Verdict
14	TABLE: tests of fault conditions		P
Part	Simulated fault		Hazard
Varistor	S-C, fuse open		NO

Attachment No.1

EN 61347-2-11							
Clause	Requirement + Test			Result - Remark			Verdict
16 (16)	TABLES: Creepage distances and clearances						P
Table 3	Minimum distances (mm) for a.c. (50/60 Hz) sinusoidal voltages						P
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			5.0				
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			5.0				
Clearances							
Required basic insulation		0,2	0,8	1,5	3	4	5,5
Measured			5.0				
Required supplementary insulation		-	0,8	1,5	3	4	5,5
Measured							
Required reinforced insulation		-	1,6	3	6	8	11
Measured			5.0				
Table 4	Minimum distances (mm) for non-sinusoidal pulse voltages						N/A
Rated pulse voltage (peak kV)		2,0	2,5	3,0	4,0	5,0	6,0
Required clearances		1,0	1,5	2	3	4	5,5
Measured							
Rated pulse voltage (peak kV)		10	12	15	20	25	30
Required clearances		11	14	18	25	33	40
Measured							
Rated pulse voltage (peak kV)		50	60	80	100	-	-
Required clearances		75	90	130	170	-	-
Measured							

Attachment No.1

EN 61347-2-11			
Clause	Requirement + Test	Result - Remark	Verdict
A	ANNEX A - TEST TO ESTABLISH WHETHER A CONDUCTIVE PART IS A LIVE PART WHICH MAY CAUSE AN ELECTRIC SHOCK		P
A.1	Comply with A.2 or A.3		N/A
A.2	Voltage ≤ 35 V peak or ≤ 60 V d.c. :		N/A
A.3	If voltage > 35 V r.m.s. or > 60 V d.c. or protective impedance device; touch current does not exceed 0,7 mA (peak) or 2 mA d.c. :		N/A
	Comply with Annex G of IEC 60598-1		P
C	ANNEX C – PARTICULAR REQUIREMENTS FOR ELECTRONIC LAMP CONTROLGEAR WITH MEANS OF PROTECTION AGAINST OVERHEATING		N/A
C3	GENERAL REQUIREMENTS		N/A
C3.1	Thermal protection means integral with the controlgear, protected against mechanical damage		N/A
	Renewable only by means of a tool		N/A
	If function depending on polarity, for cord-connected equipment protection means in both leads		N/A
	Thermal links comply with IEC 60691		N/A
	Electrical controls comply with IEC 60730-2-3		N/A
C3.2	No risk of fire by breaking (clause C7)		N/A
C5	CLASSIFICATION		N/A
	a) automatic resetting type		—
	b) manual resetting type		—
	c) non-renewable, non-resetting type		—
	d) renewable, non-resetting type		—
	e) other type of thermal protection; description .. :		N/A
C6	MARKING		N/A
C6.1	Symbol for temperature declared thermally protected controlgear		N/A
C6.2	Declaration of the type of protection provided		N/A
C7	LIMITATION OF HEATING		N/A
C7.1	Preselection test:		N/A
	Test sample placed for at least 12 h in an oven having temperature ($t_c - 5$) K		N/A
	No operation of the protection device		N/A
C7.2	Functioning of protection means:		N/A

Attachment No.1

EN 61347-2-11			
Clause	Requirement + Test	Result - Remark	Verdict
	Normal operation of the sample in a test enclosure according to Annex D at an ambient temperature such that ($t_c + 0$; -5) °C is obtained		N/A
	No operation of the protection device		N/A
	Introducing of the most onerous test condition determined during test of clause 14		N/A
	Output of windings connected to the mains supply short-circuited, and other part of the controlgear operated under normal conditions		N/A
	Increasing of the current through the windings continuously until operation of the protection means		N/A
	Continuous measuring of the highest surface temperature		N/A
	Controlgear according to C5 a) or C5 e) operated until stable conditions are achieved		N/A
	Automatic-resetting thermal protectors working 3 times		N/A
	Controlgear according to C5 b) working 6 times		N/A
	Controlgear according to C5 c) and C5) d) working once		N/A
	Highest temperature does not exceed the marked value		N/A
	Any overshoot of 10% over the marked value within 15 min		N/A
D	ANNEX D – REQUIREMENTS FOR CARRY OUT THE HEATING TESTS OF THERMALLY PROTECTED LAMP CONTROLGEAR		N/A
	Tests in C7 performed in accordance with Annex D, if applicable		N/A
E	ANNEX E – USE OF CONSTANT S OTHER THAN 4500 IN t_w TESTS		N/A
	Comply with tests according Annex E, if applicable		N/A
F	ANNEX F - DRAUGHT-PROOF ENCLOSURE		N/A
	Draught-proof enclosure in accordance with the description		N/A
	Dimensions of the enclosure		N/A
	Other design; description		N/A

Attachment No.1

EN 61347-2-11			
Clause	Requirement + Test	Result - Remark	Verdict
H	ANNEX H - TESTS		P
	All tests performed in accordance with the advice given in Annex H, if applicable		P
I	ANNEX I - ADDITIONAL REQUIREMENTS FOR BUILT-IN MAGNETIC BALLASTS WITH DOUBLE OR REINFORCED INSULATION		N/A
	Comply with tests according Annex I, if applicable		N/A

Attachment No.2

EN 62031			
Clause	Requirement – Test	Result – Remark	Verdict
13.2	Module withstands overpower condition >15 min.		P
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		N/A
	During the tests, tissue paper, spread below module, does not ignite		P

Attachment No.3

IEC 62778			
Clause	Requirement – Test	Result – Remark	Verdict

Tests according to IEC/TR 62778:2014				
Item	Symbol	Units	Result	Remark
Correlated colour temperature	CCT	K	/	/
x/y colour coordinates			/	/
Blue light hazard radiance	LB	W/(m ² •sr1)	33	/
Blue light hazard irradiance	EB	W/m ²	/	/
Luminance	L	cd/m ²	2.055e+004	/
Illuminance	E	lx	321	/
Supplementary information:				

Pictures



Figure 1: Overview for model x-Glo-72-110v



Figure 2: Driver overview for model x-Glo-72-110v

Pictures

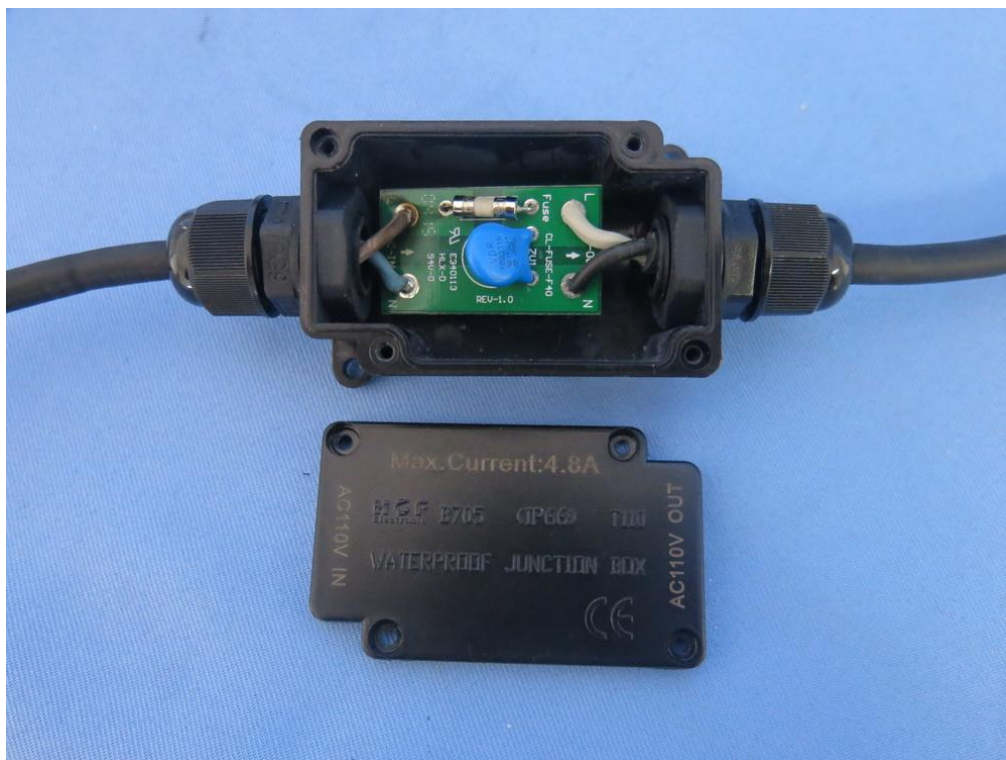


Figure 3: Driver view for model x-Glo-72-110v



Figure 4: Driver front view for model x-Glo-72-110v

Pictures



Figure 5: Driver rear view for model x-Glo-72-110v



Figure 6: Connector view for model x-Glo-72-110v

Pictures



Figure 7: Connector view for model x-Glo-72-110v



Figure 8: Input view for model x-Glo-72-110v

Pictures



Figure 9: The end view for model x-Glo-72-110v

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