



# TEST REPORT

**Reference No.** ..... : WTN21N07070019L  
**Applicant** ..... : Ningbo Ehome electronic Co.,Ltd  
**Address** ..... : Yonghe Road, Qiaotouhu Industrial Zone,Ninghai,Ningbo,China  
**Manufacturer** ..... : Same as applicant  
**Address** ..... : Same as applicant  
**Product Name** ..... : Infrared LED Sensor Lamp  
**Model No.** ..... : ST71A, ST71B, ST71AE, ST71BE, ST71AP, ST71BP  
**Standards** ..... : Luminaires —  
IEC 60598-1:2014+A1:2017  
Part 1: General requirements and tests  
IEC 60598-2-1:2020  
Part 2-1: Fixed general purpose luminaires  
Used in conjunction with EU deviations  
EN IEC 62031:2020  
EN 62471:2008  
EN 62493:2015

**Date of Receipt sample** .... : 2021-07-14  
**Date of Test**..... : 2021-07-14 to 2021-10-11  
**Date of Issue**..... : 2021-10-22  
**Test Report Form No.** ..... : WSL-6059821G-01B  
**Test Result**..... : **Pass**

Remarks: The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

**Prepared By:**

**Waltek Testing Group (Ningbo) Co., Ltd.**

Address: Zone 3, 1/F., No.6, Building 011, No.1177, Lingyun Road, Ningbo Hi-Tech Zone, Yinzhou

District, Ningbo, Zhejiang, China

Tel: +86-574-8749 3888

Fax: +86-574-8386 8018

Compiled by:

*Dorren Wang*

Dorren Wang / Project Engineer

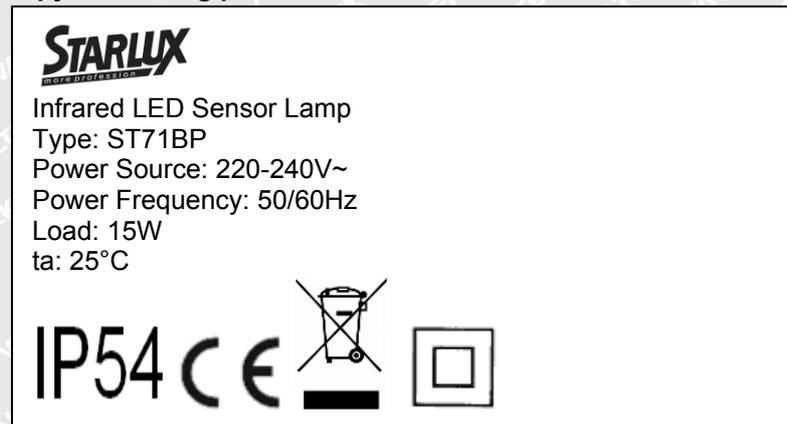
Approved by:

*Jianzhong Mao*

Jianzhong Mao/ Manager



<b>Test item description</b> .....	Infrared LED Sensor Lamp
<b>Trade Mark</b> .....	
<b>Model/Type reference</b> .....	(1) ST71A, ST71AE, ST71AP; (2)ST71B, ST71BE, ST71BP
<b>Ratings</b> .....	220-240V~, 50/60Hz, Class II, IP54, ta: 25°C; (1) 10W; (2) 15W

**Copy of marking plate:****Remark:**

1. On enclosure.
2. Rating label for other models is identical except different model name and rated power.
3. Manufacture or/and his importer shall ensure product bears label requirements in article 6 and article 8 of the 2014/35/EU relate to name, batch number, post address prior place the product into EU market.
4. Symbol 'caution, risk of electric shock' shall not less than 15x15mm.

**Summary of testing:**

1. All tests have been applied on model ST71BP.
2. The following testing standards have been evaluated:
  - EU Group Differences of EN 60598-1:2015+A1:2018 and EN 60598-2-1:1989 have been evaluated. See Annex 5.
  - EN IEC 62031:2020 has been evaluated. See Annex 6.
  - EN 62471:2008 has been evaluated. Classification group: Exempt Low risk Mod risk; See Annex 7.
  - EN 61347-2-13:2014+A1:2017 used in conjunction with EN 61347-1:2015 have been evaluated. See Annex 8.
  - The switch has been carried out the 10000 cycles test together with the lamp according to EN IEC 61058-1:2018.
  - According to the standard EN 62493:2015, the DUT belongs to unintentional radiating part of lighting equipment. Due to the reason that the DUT fulfils the inherent-compliance condition " **It is a LED-light-source technology**", the DUT is deemed to comply with requirements of this standard without testing.
3. Only the most unfavourable results are recorded in this report.

**Test items particulars:**

Classification of installation and use .....: Fixed luminaires, outdoor use

Supply Connection .....: Terminal block

**Possible test case verdicts:**

- test case does not apply to the test object .....: N (Not applicable)

- test object does meet the requirement .....: P (Pass)

- test object does not meet the requirement .....: F (Fail)

**General remarks:**

“(see remark #)” refers to a remark appended to the report.

“(see appended table)” refers to a table appended to the report.

Throughout this report a comma is used as the decimal separator.

**General product information:**

1. LED lights, for general lighting.
2. Only different model name and rated power among these models.

# WALTEK



IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
<b>1.2 (0)</b>	<b>GENERAL TEST REQUIREMENTS</b>		P
1.2 (0.3)	More sections applicable .....	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Section/s:	—
1.2 (0.5)	Components	(see Annex 1)	—
<b>1.2 (0.7)</b>	<b>Information for luminaire design in light sources standards</b>		—
1.2 (0.7.2)	Light source safety standard .....	EN IEC 62031	—
	Luminaire design in the light source safety standard		P

<b>1.4 (2)</b>	<b>CLASSIFICATION OF LUMINAIRES</b>		P
1.4 (2.2)	Type of protection .....	Class II	P
1.4 (2.3)	Degree of protection .....	IP54	—
1.4 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces.....	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
1.4 (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"/>	—

<b>1.5 (3)</b>	<b>MARKING</b>		P
1.5 (3.2)	Mandatory markings		P
	Position of the marking		P
	Format of symbols/text		P
1.5 (3.3)	Additional information		P
	Language of instructions	English	P
1.5 (3.3.1)	Combination luminaires		N
1.5 (3.3.2)	Nominal frequency in Hz		P
1.5 (3.3.3)	Operating temperature		N
1.5 (3.3.5)	Wiring diagram		P
1.5 (3.3.6)	Special conditions		N
1.5 (3.3.7)	Metal halide lamp luminaire – warning		N
1.5 (3.3.8)	Limitation for semi-luminaires		N
1.5 (3.3.9)	Power factor and supply current		N
1.5 (3.3.10)	Suitability for use indoors		N
1.5 (3.3.11)	Luminaires with remote control		N
1.5 (3.3.12)	Clip-mounted luminaire – warning		N



<b>IEC 60598-2-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict

1.5 (3.3.13)	Specifications of protective shields		N
1.5 (3.3.14)	Symbol for nature of supply		P
1.5 (3.3.15)	Rated current of socket outlet		N
1.5 (3.3.16)	Rough service luminaire		N
1.5 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments		N
1.5 (3.3.18)	Non-ordinary luminaires with PVC cable		N
1.5 (3.3.19)	Protective conductor current in instruction if applicable		N
1.5 (3.3.20)	Provided with information if not intended to be mounted within arm's reach		N
1.5 (3.3.21)	Non replaceable and non-user replaceable light sources information provided	Non-user replaceable light sources	P
1.5 (3.3.22)	Controllable luminaires, classification of insulation provided		N
1.5 (3.3.23)	Luminaire without controlgear provided with necessary information for selection of appropriate component		N
1.5 (3.3.24)	If not supplied with terminal block, information on the packaging		N
1.5 (3.4)	Test with water	Rubbing lightly for 15 s	P
	Test with hexane	Rubbing lightly for 15 s	P
	Legible after test		P
	Label attached		P

<b>1.6 (4)</b>	<b>CONSTRUCTION</b>		P
1.6 (4.2)	Components replaceable without difficulty		N
1.6 (4.3)	Wireways smooth and free from sharp edges		P
<b>1.6 (4.4)</b>	<b>Lampholders</b>		<b>N</b>
1.6 (4.4.1)	Integral lampholder		N
1.6 (4.4.2)	Wiring connection		N
1.6 (4.4.3)	Lampholder for end-to-end mounting		N
1.6 (4.4.4)	Positioning		N
	- pressure test (N) .....		—



<b>IEC 60598-2-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
	After test the lampholder comply with relevant standard sheets and show no damage		N
	After test on single-capped lampholder the lampholder have not moved from its position and show no permanent deformation		N
	- bending test (N) .....		—
	After test the lampholder have not moved from its position and show no permanent deformation		N
1.6 (4.4.5)	Peak pulse voltage		N
1.6 (4.4.6)	Centre contact		N
1.6 (4.4.7)	Parts in rough service luminaires resistant to tracking		N
1.6 (4.4.8)	Lamp connectors		N
1.6 (4.4.9)	Caps and bases correctly used		N
1.6 (4.4.10)	Light source for lampholder or connection according IEC 60061 not connected another way		N
<b>1.6 (4.5)</b>	<b>Starter holders</b>		<b>N</b>
	Starter holder in luminaires other than class II		N
	Starter holder class II construction		N
<b>1.6 (4.6)</b>	<b>Terminal blocks</b>		<b>N</b>
	Tails		N
	Unsecured blocks		N
<b>1.6 (4.7)</b>	<b>Terminals and supply connections</b>		<b>P</b>
1.6 (4.7.1)	Contact to metal parts		N
1.6 (4.7.2)	Test 8 mm live conductor		P
	Test 8 mm earth conductor		N
1.6 (4.7.3)	Terminals for supply conductors		P
1.6 (4.7.3.1)	Welded method and material		N
	- stranded or solid conductor		N
	- spot welding		N
	- welding between wires		N
	- Type Z attachment		N
	- mechanical test according to 15.6.2		N
	- electrical test according to 15.6.3		N
	- heat test according to 15.6.3.2.3 and 15.6.3.2.4		N
1.6 (4.7.4)	Terminals other than supply connection		N
1.6 (4.7.5)	Heat-resistant wiring/sleeves		N



<b>IEC 60598-2-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
1.6 (4.7.6)	Multi-pole plug		N
	- test at 30 N		N
<b>1.6 (4.8)</b>	<b>Switches</b>		<b>P</b>
	- adequate rating		P
	- adequate fixing		P
	- polarized supply		N
	- compliance with IEC 61058-1 for electronic switches		P
<b>1.6 (4.9)</b>	<b>Insulating lining and sleeves</b>		<b>N</b>
1.6 (4.9.1)	Retainment		N
	Method of fixing.....:		N
1.6 (4.9.2)	Insulated linings and sleeves:		N
	Resistant to a temperature > 20 °C to the wire temperature or		N
	a) & c) Insulation resistance and electric strength		N
	b) Ageing test. Temperature (°C).....:		N
<b>1.6 (4.10)</b>	<b>Double or reinforced insulation</b>		<b>P</b>
1.6 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		N
	Safe installation fixed luminaires		N
	Capacitors and switches		N
	Interference suppression capacitors according to IEC 60384-14		N
1.6 (4.10.2)	Assembly gaps:		N
	- not coincidental		N
	- no straight access with test probe		N
1.6 (4.10.3)	Retainment of insulation:		P
	- fixed		P
	- unable to be replaced; luminaire inoperative		P
	- sleeves retained in position		N
	- lining in lampholder		N
1.6 (4.10.4)	Protective impedance device		N
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		N
	Y1 or Y2 capacitors comply with IEC 60384-14		N



<b>IEC 60598-2-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
	Resistors comply with test (a) in 14.1 of IEC 60065		N
<b>1.6 (4.11)</b>	<b>Electrical connections and current-carrying parts</b>		<b>P</b>
1.6 (4.11.1)	Contact pressure		P
1.6 (4.11.2)	Screws:		N
	- self-tapping screws		N
	- thread-cutting screws		N
1.6 (4.11.3)	Screw locking:		N
	- spring washer		N
	- rivets		N
1.6 (4.11.4)	Material of current-carrying parts	>50% Copper	P
1.6 (4.11.5)	No contact to wood or mounting surface		P
1.6 (4.11.6)	Electro-mechanical contact systems		N
<b>1.6 (4.12)</b>	<b>Screws and connections (mechanical) and glands</b>		<b>P</b>
1.6 (4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N
	Torque test: torque (Nm); part .....	LED board: $\Phi 2,94\text{mm}$ , 0,5Nm	P
	Torque test: torque (Nm); part .....	Plastic enclosure: $\Phi 2,98\text{mm}$ , 0,5Nm	P
	Torque test: torque (Nm); part .....	PCB: $\Phi 3,02\text{mm}$ , 0,6Nm	P
	Torque test: torque (Nm); part .....		N
	Torque test: torque (Nm); part .....		N
1.6 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N
1.6 (4.12.4)	Locked connections:		N
	- fixed arms; torque (Nm) .....		N
	- lampholder; torque (Nm) .....		N
	- push-button switches; torque 0,8 Nm .....		N
1.6 (4.12.5)	Screwed glands; force (Nm) .....		N
<b>1.6 (4.13)</b>	<b>Mechanical strength</b>		<b>P</b>



<b>IEC 60598-2-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
1.6 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm).....:		N
	- other parts; energy (Nm).....:	Lamp cover, Plastic enclosure: 0,35 Nm	P
	1) live parts		P
	2) linings		N
	3) protection		P
	4) covers		P
1.6 (4.13.2)	Metal parts have adequate mechanical strength		N
1.6 (4.13.3)	Straight test finger		P
1.6 (4.13.4)	Rough service luminaires		N
	- IP54 or higher		N
	a) fixed		N
	b) hand-held		N
	c) delivered with a stand		N
	d) for temporary installations and suitable for mounting on a stand		N
1.6 (4.13.6)	Tumbling barrel		N
<b>1.6 (4.14)</b>	<b>Suspensions, fixings and means of adjusting</b>		<b>P</b>
1.6 (4.14.1)	Mechanical load:		P
	A) four times the weight	0,501 Kg x 4 = 2,004 Kg	P
	B) torque 2,5 Nm		N
	C) bracket arm; bending moment (Nm).....:		N
	D) load track-mounted luminaires		N
	E) clip-mounted luminaires, glass-shelve. Thickness (mm).....:		N
	Metal rod. diameter (mm).....:		N
	Fixed luminaire or independent control gear without fixing devices		N
1.6 (4.14.2)	Load to flexible cables		N
	Mass (kg).....:		—
	Stress in conductors (N/mm <sup>2</sup> ).....:		N



<b>IEC 60598-2-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
	Mass (kg) of semi-luminaire .....		N
	Bending moment (Nm) of semi-luminaire .....		N
1.6 (4.14.3)	Adjusting devices:		N
	- flexing test; number of cycles .....		N
	- strands broken .....		N
	- electric strength test afterwards		N
1.6 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N
1.6 (4.14.5)	Guide pulleys		N
1.6 (4.14.6)	Strain on socket-outlets		N
<b>1.6 (4.15)</b>	<b>Flammable materials</b>		<b>P</b>
	- glow-wire test 650°C .....	See Test Table 1.15 (13.3.2)	P
	- spacing ≥30 mm		N
	- screen withstanding test of 13.3.1		N
	- screen dimensions		N
	- no fiercely burning material		P
	- thermal protection		N
	- electronic circuits exempted		N
1.6 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		N
	a) construction		N
	b) temperature sensing control		N
	c) surface temperature		N
<b>1.6 (4.16)</b>	<b>Luminaires for mounting on normally flammable surfaces</b>		<b>P</b>
	No lamp control gear .....	(compliance with Section 12)	N
	Provided with adaptor for a track meet the requirements for direct mounting on normally flammable surfaces		N
1.6 (4.16.1)	Lamp control gear spacing:		N
	- spacing 35 mm		N
	- spacing 10 mm		N
1.6 (4.16.2)	Thermal protection:		N
	- in lamp control gear		N



<b>IEC 60598-2-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
	- external		N
	- fixed position		N
	- temperature marked lamp control gear		N
1.6 (4.16.3)	Design to satisfy the test of 12.6	(see clause 12.6)	N
<b>1.6 (4.17)</b>	<b>Drain holes</b>		<b>N</b>
	Clearance at least 5 mm		N
<b>1.6 (4.18)</b>	<b>Resistance to corrosion</b>		<b>N</b>
1.6 (4.18.1)	- rust-resistance		N
1.6 (4.18.2)	- season cracking in copper		N
1.6 (4.18.3)	- corrosion of aluminium		N
1.6 (4.19)	Igniters compatible with ballast		N
1.6 (4.20)	Rough service vibration		N
<b>1.6 (4.21)</b>	<b>Protective shield</b>		<b>N</b>
1.6 (4.21.1)	Shield fitted if tungsten halogen lamps or metal halide lamps		N
	Shield of glass if tungsten halogen lamps		N
1.6 (4.21.2)	Particles from a shattering lamp not impair safety		N
1.6 (4.21.3)	No direct path		N
1.6 (4.21.4)	Impact test on shield		N
	Glow-wire test on lamp compartment .....	See Test Table 1.15 (13.3.2)	N
1.6 (4.22)	Attachments to lamps not cause overheating or damage		N
1.6 (4.23)	Semi-luminaires comply Class II		N
<b>1.6 (4.24)</b>	<b>Photobiological hazards</b>		<b>P</b>
1.6 (4.24.1)	No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P)		N
1.6 (4.24.2)	Retinal blue light hazard		P
	Class of risk group assessed according to IEC/TR 62778 .....	RG0 Unlimited	—
	Luminaires with $E_{thr}$ :		N
	a) Fixed luminaires		N



<b>IEC 60598-2-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
	- distance x m, borderline between RG1 and RG2....:		N
	- marking and instruction according 3.2.23		N
	b) Portable and handheld luminaires		N
	- marking according 3.2.23 if RG1 exceeded at 200 mm according to IEC/TR 62778		N
	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
<b>1.6 (4.25)</b>	<b>Mechanical hazard</b>		<b>P</b>
	No sharp point or edges		P
<b>1.6 (4.26)</b>	<b>Short-circuit protection</b>		<b>N</b>
1.6 (4.26.1)	Adequate means of uninsulated accessible SELV parts		N
1.6 (4.26.2)	Short-circuit test with test chain according 4.26.3		N
	Test chain not melt through		N
	Test sample not exceed values of Table 12.1 and 12.2		N
<b>1.6 (4.27)</b>	<b>Terminal blocks with integrated screwless earthing contacts</b>		<b>N</b>
	Test according Annex V		N
	Pull test of terminal fixing (20 N)		N
	After test, resistance < 0,05 Ω		N
	Pull test of mechanical connection (50 N)		N
	After test, resistance < 0,05 Ω		N
	Voltage drop test, resistance < 0,05 Ω		N
<b>1.6 (4.28)</b>	<b>Fixing of thermal sensing control</b>		<b>N</b>
	Not plug-in or easily replaceable type		N
	Reliably kept in position		N
	No adhesive fixing if UV radiations from a lamp can degrade the fixing		N
	Not outside the luminaire enclosure		N
	Test of adhesive fixing:		N
	Max. temperature on adhesive material (°C) .....		—
	100 cycles between t min and t max		N
	Temperature sensing control still in position		N
<b>1.6 (4.29)</b>	<b>Luminaires with non-replaceable light source</b>		<b>N</b>
	Not possible to replace light source		N



<b>IEC 60598-2-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
	Live part not accessible after parts have been opened by hand or tools		N
<b>1.6 (4.30)</b>	<b>Luminaires with non-user replaceable light source</b>		<b>P</b>
	If protective cover provide protection against electric shock and marked with “caution, electric shock risk” symbol:		P
	Minimum two fixing means		P
<b>1.6 (4.31)</b>	<b>Insulation between circuits</b>		<b>P</b>
	Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3		P
	Controllable luminaires requiring same level of insulation for all components, the insulation between control terminals and LV supply fulfil requirements according 4.31.1 – 4.31.3		N
<b>1.6 (4.31.1)</b>	<b>SELV circuits</b>		<b>N</b>
	Used SELV source		N
	Voltage $\leq$ ELV		N
	Insulating of SELV circuits from LV supply		N
	Insulating of SELV circuits from other non SELV circuits		N
	Insulating of SELV circuits from FELV		N
	Insulating of SELV circuits from other SELV circuits		N
	SELV circuits insulated from accessible parts according Table X.1		N
	Plugs not able to enter socket-outlets of other voltage systems		N
	Socket outlets does not admit plugs of other voltage systems		N
	Plugs and socket-outlets does not have protective conductor contact		N
<b>1.6 (4.31.2)</b>	<b>FELV circuits</b>		<b>P</b>
	Used FELV source		P
	Voltage $\leq$ ELV		P
	Insulating of FELV circuits from LV supply		P
	FELV circuits insulated from accessible parts according Table X.1		P
	Plugs not able to enter socket-outlets of other voltage systems		N
	Socket outlets does not admit plugs of other voltage systems		N



IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Socket-outlets does not have protective conductor contact		N
1.6 (4.31.3)	Other circuits		N
	Other circuits insulated from accessible parts according Table X.1		N
	Class II construction with equipotential bonding for protection against indirect contacts with live parts:		N
	- conductive parts are connected together		N
	- test according 7.2.3		N
	- conductive part not cause an electric shock in case of an insulation fault		N
	- equipotential bonding in master/slave applications		N
	- master luminaire provided with terminal for accessible conductive parts of slave luminaires		N
	- slave luminaire constructed as class I		N
<b>1.6 (4.32)</b>	<b>Overvoltage protective devices</b>		<b>N</b>
	Comply with IEC 61643-11		N
	External to controlgear and connected to earth:		N
	- only in fixed luminaires		N
	- only connected to protective earth		N

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



IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict

	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 1.7 (11.2) II	N
--	---	------------------------------	---

<b>1.8 (7)</b>	<b>PROVISION FOR EARTHING</b>		N
1.8 (7.2.1 + 7.2.3)	Accessible metal parts		N
	Metal parts in contact with supporting surface		N
	Resistance < 0,5 Ω .....		N
	Self-tapping screws used		N
	Thread-forming screws		N
	Thread-forming screw used in a groove		N
	Earth makes contact first		N
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N
	Protective earthing of the luminaire not via built-in control gear		N
1.8 (7.2.2 + 7.2.3)	Earth continuity in joints, etc.		N
1.8 (7.2.4)	Locking of clamping means		N
	Compliance with 4.7.3		N
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N
1.8 (7.2.5)	Earth terminal integral part of connector socket		N
1.8 (7.2.6)	Earth terminal adjacent to mains terminals		N
1.8 (7.2.7)	Electrolytic corrosion of the earth terminal		N
1.8 (7.2.8)	Material of earth terminal		N
	Contact surface bare metal		N
1.8 (7.2.10)	Class II luminaire for looping-in		N
	Double or reinforced insulation to functional earth		N
1.8 (7.2.11)	Earthing core coloured green-yellow		N
	Length of earth conductor		N

<b>1.9 (14)</b>	<b>SCREW TERMINALS</b>		P
	Separately approved; component list	(see Annex 1)	P
	Part of the luminaire	(see Annex 3)	N



IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
<b>1.9 (15)</b>	<b>SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS</b>		N
	Separately approved; component list .....	(see Annex 1)	N
	Part of the luminaire .....	(see Annex 4)	N

<b>1.10 (5)</b>	<b>EXTERNAL AND INTERNAL WIRING</b>		P
<b>1.10 (5.2)</b>	<b>Supply connection and external wiring</b>		P
1.10 (5.2.1)	Means of connection .....	Terminal block	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
1.10 (5.2.2)	Type of cable .....		N
	Nominal cross-sectional area (mm <sup>2</sup> ) .....		N
	Cables equal to IEC 60227 or IEC 60245		N
1.10 (5.2.3)	Type of attachment, X, Y or Z		N
1.10 (5.2.5)	Type Z not connected to screws		N
1.10 (5.2.6)	Cable entries:		P
	- suitable for introduction		P
	- adequate degree of protection		P
1.10 (5.2.7)	Cable entries through rigid material have rounded edges		P
1.10 (5.2.8)	Insulating bushings:		N
	- suitably fixed		N
	- material in bushings		N
	- material not likely to deteriorate		N
	- tubes or guards made of insulating material		N
1.10 (5.2.9)	Locking of screwed bushings		N
1.10 (5.2.10)	Cord anchorage:		N
	- covering protected from abrasion		N
	- clear how to be effective		N
	- no mechanical or thermal stress		N
	- no tying of cables into knots etc.		N



<b>IEC 60598-2-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
	- insulating material or lining		N
1.10 (5.2.10.1)	Cord anchorage for type X attachment:		N
	a) at least one part fixed		N
	b) types of cable		N
	c) no damaging of the cable		N
	d) whole cable can be mounted		N
	e) no touching of clamping screws		N
	f) metal screw not directly on cable		N
	g) replacement without special tool		N
	Glands not used as anchorage		N
	Labyrinth type anchorages		N
1.10 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment		N
1.10 (5.2.10.3)	Tests:		N
	- impossible to push cable; unsafe		N
	- pull test: 25 times; pull (N).....:		N
	- torque test: torque (Nm).....:		N
	- displacement ≤ 2 mm		N
	- no movement of conductors		N
	- no damage of cable or cord		N
	- function independent of electrical connection		N
1.10 (5.2.11)	External wiring passing into luminaire		N
1.10 (5.2.12)	Looping-in terminals		N
1.10 (5.2.13)	Wire ends not tinned		N
	Wire ends tinned: no cold flow		N
1.10 (5.2.14)	Mains plug same protection		N
	Class III luminaire plug		N
	No unsafe compatibility		N
1.10 (5.2.16)	Appliance inlets (IEC 60320)		N
	Installation couplers (IEC 61535)		N



<b>IEC 60598-2-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
	Other appliance inlet or connector according relevant IEC standard		N
1.10 (5.2.17)	No standardized interconnecting cables properly assembled		N
1.10 (5.2.18)	Used plug in accordance with		N
	- IEC 60083		N
	- other standard		N
<b>1.10 (5.3)</b>	<b>Internal wiring</b>		<b>P</b>
1.10 (5.3.1)	Internal wiring of suitable size and type		P
	Through wiring		N
	- not delivered/ mounting instruction		N
	- factory assembled		N
	- socket outlet loaded (A) .....		N
	- temperatures.....	(see Annex 2)	N
	Green-yellow for earth only		N
1.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		N
	Cross-sectional area (mm <sup>2</sup> ) .....		N
	Insulation thickness (mm) .....		N
	Extra insulation added where necessary		N
1.10 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		P
	Cross-sectional area (mm <sup>2</sup> ) .....	See Annex 1	P
1.10 (5.3.1.3)	Double or reinforced insulation for class II		N
1.10 (5.3.1.4)	Conductors without insulation		N
1.10 (5.3.1.5)	SELV current-carrying parts		N
1.10 (5.3.1.6)	Insulation thickness other than PVC or rubber		N
1.10 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		P
	Joints, raising/lowering devices		N
	Telescopic tubes etc.		N
	No twisting over 360°		P



<b>IEC 60598-2-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
1.10 (5.3.3)	Insulating bushings:		N
	- suitable fixed		N
	- material in bushings		N
	- material not likely to deteriorate		N
	- cables with protective sheath		N
1.10 (5.3.4)	Joints and junctions effectively insulated		N
1.10 (5.3.5)	Strain on internal wiring		N
1.10 (5.3.6)	Wire carriers		N
1.10 (5.3.7)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		N
<b>1.10 (5.4)</b>	<b>Test to determine suitability of conductors having a reduced cross-sectional area</b>		<b>P</b>
	Under test the temperature of the luminaire wiring insulation not exceed the limits stated in Table 12.2	(see Annex 2)	P
	No damage to luminaire wiring after test		P

<b>1.11 (8)</b>	<b>PROTECTION AGAINST ELECTRIC SHOCK</b>		<b>P</b>
1.11 (8.2.1)	Live parts not accessible		P
	Basic insulated parts not used on the outer surface without appropriate protection		P
	Basic insulated parts not accessible with standard test finger on portable, settable and adjustable luminaires		N
	Basic insulated parts not accessible with Ø 50 mm probe from outside, other types of luminaires		P
	Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N
	Basic insulation only accessible under lamp or starter replacement		N
	Protection in any position		P
	Double-ended tungsten filament lamp		N
	Insulation lacquer not reliable		N
	Double-ended high-pressure discharge lamp		N



<b>IEC 60598-2-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
	Relevant warning according to 3.2.18 fitted to the luminaire		N
1.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N
1.11 (8.2.3.a)	Class II luminaire:		P
	- basic insulated metal parts not accessible during starter or lamp replacement		N
	- basic insulation not accessible other than during starter or lamp replacement		P
	- glass protective shields not used as supplementary insulation		N
1.11 (8.2.3.b)	BC lampholder of metal in class I luminaires shall be earthed		N
1.11 (8.2.3.c)	SELV circuits with exposed current carrying parts:		N
	Ordinary luminaire:		N
	- voltage under load (V) .....		N
	- no-load voltage (V) .....		N
	- touch current if applicable (mA) .....		N
	One conductive part insulated if required		N
	Other than ordinary luminaire:		N
	- nominal voltage (V) .....		N
	Class III luminaire only for connection to SELV		N
	Class III luminaire not provided with means for protective earthing		N
1.11 (8.2.4)	Portable luminaire has protection independent of supporting surface		N
1.11 (8.2.5)	Compliance with the standard test finger or relevant probe		P
1.11 (8.2.6)	Covers reliably secured		P
1.11 (8.2.7)	Luminaire other than below with capacitor > 0,5 $\mu$ F not exceed 50 V 1 min after disconnection	0,0005 $\mu$ F	N
	Portable luminaire with capacitor > 0,1 $\mu$ F (0.25) not exceed 34 V 1 s after disconnection		N
	Other luminaires with capacitor > 0,1 $\mu$ F (0.25) with plug and track adaptors not exceed 60 V 5 s after disconnection		N



<b>IEC 60598-2-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
<b>1.12 (12)</b>	<b>ENDURANCE TEST AND THERMAL TEST</b>		<b>P</b>
1.12 (-)	If IP > IP 20 relevant test of (12.4), (12.5) and (12.6) after (9.2) before (9.3) specified in 1.13		—
<b>1.12 (12.2)</b>	<b>Selection of lamps and ballasts</b>		<b>—</b>
	Lamp used according Annex B	(Lamp used see Annex 2)	—
	Controlgear if separate and not supplied	(Controlgear used see Annex 2)	—
<b>1.12 (12.3)</b>	<b>Endurance test</b>		<b>P</b>
	a) mounting-position .....	Acc. to user manual	—
	b) test temperature (°C) .....	35	—
	c) total duration (h) .....	240	—
	d) supply voltage (V) .....	264	—
	d) if not equipped with controlgear, constant voltage/current (V) or (A) .....	---	—
	e) luminaire ceases to operate		—
1.12 (12.3.2)	After endurance test:		<b>P</b>
	- no part unserviceable		<b>P</b>
	- luminaire not unsafe		<b>P</b>
	- no damage to track system		<b>N</b>
	- marking legible		<b>P</b>
	- no cracks, deformation etc.		<b>P</b>
<b>1.12 (12.4)</b>	<b>Thermal test (normal operation)</b>	(see Annex 2)	<b>P</b>
<b>1.12 (12.5)</b>	<b>Thermal test (abnormal operation)</b>	(see Annex 2)	<b>P</b>
<b>1.12 (12.6)</b>	<b>Thermal test (failed lamp control gear condition):</b>		<b>N</b>
1.12 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A) .....		—
	- case of abnormal conditions .....		—
	- electronic lamp control gear		<b>N</b>
	- measured winding temperature (°C): at 1,1 Un .....		—
	- measured mounting surface temperature (°C) at 1,1 Un .....		<b>N</b>
	- calculated mounting surface temperature (°C) .....		<b>N</b>
	- track-mounted luminaires		<b>N</b>
1.12 (12.6.2)	Temperature sensing control		<b>N</b>
	- case of abnormal conditions .....		—



<b>IEC 60598-2-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
	- thermal link		N
	- manual reset cut-out		N
	- auto reset cut-out		N
	- measured mounting surface temperature (°C) .....		N
	- track-mounted luminaires		N
<b>1.12 (12.7)</b>	<b>Thermal test (failed lamp control gear in plastic luminaires):</b>		<b>N</b>
1.12 (12.7.1)	Luminaire without temperature sensing control		N
1.12 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		N
	Test method 12.7.1.1 or Annex W .....		—
	Test according to 12.7.1.1:		N
	- case of abnormal conditions .....		—
	- Ballast failure at supply voltage (V) .....		—
	- Components retained in place after the test		N
	- Test with standard test finger after the test		N
	Test according to Annex W:		N
	- case of abnormal conditions .....		—
	- measured winding temperature (°C): at 1,1 Un .....		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un .....		—
	- calculated temperature of fixing point/exposed part (°C) .....		—
	Ball-pressure test .....	See Test Table 1.15 (13.2.1)	N
1.12 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		N
	- case of abnormal conditions .....		—
	- measured winding temperature (°C): at 1,1 Un .....		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un .....		—
	- calculated temperature of fixing point/exposed part (°C) .....		—
	Ball-pressure test .....	See Test Table 1.15 (13.2.1)	N
1.12 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N
	- case of abnormal conditions .....		—
	- Components retained in place after the test		N
	- Test with standard test finger after the test		N



IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.12 (12.7.2)	Luminaire with temperature sensing control		N
	- 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 Test Table 1.15 (13.2.1)	N

<b>1.13 (9)</b>	<b>RESISTANCE TO DUST AND MOISTURE</b>		P
1.13 (-)	If IP > IP 20 the order of tests as specified in clause 1.12		P
1.13 (9.2)	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP .....	IP54	—
	- mounting position during test.....	Acc. to user manual	—
	- fixing screws tightened; torque (Nm) .....	0,33	—
	- tests according to clauses .....	Cl. 9.2.1, Cl.9.2.5	—
	- electric strength test afterwards	Cl.10	P
	a) no deposit in dust-proof luminaire		P
	b) no talcum in dust-tight luminaire		N
	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
	d) no water in watertight or pressure watertight luminaire		N
	e) no contact with live parts (IP 2X)		N
	e) no entry into enclosure (IP 3X and IP 4X)		N
	e) no contact with live parts through drain holes and ventilation slots (IP3X and IP4X)		N
	f) no trace of water on part of lamp requiring protection from splashing water		P
	g) no damage of protective shield or glass envelope		N
1.13 (9.3)	Humidity test 48 h	25 °C, 93%RH	P



<b>IEC 60598-2-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
<b>1.14 (10)</b>	<b>INSULATION RESISTANCE AND ELECTRIC STRENGTH</b>		<b>P</b>
1.14 (10.2.1)	Insulation resistance test		P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø .....	Metal foil	—
	Insulation resistance (MΩ) .....	See below	—
	<b>SELV</b>		<b>N</b>
	- between current-carrying parts of different polarity :	---	<b>N</b>
	- between current-carrying parts and mounting surface .....	---	<b>N</b>
	- between current-carrying parts and metal parts of the luminaire .....	---	<b>N</b>
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts .....	---	<b>N</b>
	- Insulation bushings as described in Section 5 .....	---	<b>N</b>
	<b>Other than SELV</b>		<b>P</b>
	- between live parts of different polarity .....	>100 MΩ	<b>P</b>
	- between live parts and mounting surface .....	>100 MΩ	<b>P</b>
	- between live parts and metal parts .....	>100 MΩ for Class II construction	<b>P</b>
	- between live parts of different polarity through action of a switch .....	---	<b>N</b>
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts .....	---	<b>N</b>
	- Insulation bushings as described in Section 5 .....	---	<b>N</b>
1.14 (10.2.2)	Electric strength test		<b>P</b>
	Dummy lamp		<b>N</b>
	Luminaires with ignitors after 24 h test		<b>N</b>
	Luminaires with manual ignitors		<b>N</b>
	Test voltage (V) .....	See below	<b>P</b>
	<b>SELV</b>		<b>N</b>
	- between current-carrying parts of different polarity :	---	<b>N</b>
	- between current-carrying parts and mounting surface .....	---	<b>N</b>
	- between current-carrying parts and metal parts of the luminaire .....	---	<b>N</b>



IEC 60598-2-1			
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
	- Insulation bushings as described in Section 5 .....	---	N
	Other than SELV		P
	- between live parts of different polarity .....	1480V	P
	- between live parts and mounting surface .....	2960V	P
	- between live parts and metal parts .....	2960V for Class II construction	P
	- between live parts of different polarity through action of a switch .....	---	N
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts .....	---	N
	- Insulation bushings as described in Section 5 .....	---	N
1.14 (10.3)	Touch current or protective conductor current (mA):	Touch conductor: 0,023 mA < 0,7 mA	P

<b>1.15 (13)</b>	<b>RESISTANCE TO HEAT, FIRE AND TRACKING</b>		P
1.15 (13.2.1)	Ball-pressure test .....	See Test Table 1.15 (13.2.1)	P
1.15 (13.3.1)	Needle-flame test (10 s).....	See Test Table 1.15 (13.3.1)	P
1.15 (13.3.2)	Glow-wire test (650°C).....	See Test Table 1.15 (13.3.2)	P
1.15 (13.4)	Proof tracking test (IEC 60112) .....	See Test Table 1.15 (13.4)	N



IEC 60598-2-1							
Clause	Requirement + Test				Result - Remark		Verdict
<b>1.7 (11.2)</b>	<b>TABLE I: Creepage distances and clearances</b>						<b>P</b>
	<b>Minimum distances (mm) for a.c. up to 30 kHz sinusoidal voltages</b>						<b>P</b>
	<b>Applicable part of IEC 60598-1 Table 11.1.A*, 11.1.B* and 11.2*</b>						<b>P</b>
	Insulation type **	Measured clearance	Required		Measured creepage	Required	
			clearance	*Table		creepage	*Table
Distance 1:	B	3,06	1,5	11.1.B	3,06	2,4	11.1.A
Working voltage (V).....:					240		—
PTI.....:					< 600 <input checked="" type="checkbox"/> ≥ 600 <input type="checkbox"/>		—
Pulse voltage or U <sub>P</sub> if applicable (kV).....:					---		—
Supplementary information: Different polarity							
Distance 2:	R	>3,9	3,0	11.1.B	>6,2	4,8	11.1.A
Working voltage (V).....:					240		—
PTI.....:					< 600 <input checked="" type="checkbox"/> ≥ 600 <input type="checkbox"/>		—
Pulse voltage or U <sub>P</sub> if applicable (kV).....:					---		—
Supplementary information: Live part and outer accessible part							
Distance 3:	R	>3,9	3,0	11.1.B	>6,2	4,8	11.1.A
Working voltage (V).....:					240		—
PTI.....:					< 600 <input checked="" type="checkbox"/> ≥ 600 <input type="checkbox"/>		—
Pulse voltage or U <sub>P</sub> if applicable (kV).....:					---		—
Supplementary information: Live part and mounting surface							

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

<b>1.7 (11.2)</b>	<b>TABLE II: Creepage distances and clearances</b>						<b>N</b>
	<b>Minimum distances (mm) for a.c. higher than 30 kHz sinusoidal voltages</b>						
	<b>Applicable part of IEC 61347-1 Table 7 and 8* or IEC 60664-4 Table 1 and 2</b>						
Distances	Insulation type **	Measured clearance	Required		Measured creepage	Required	
			clearance	*Table		creepage	*Table
Distance 1:							
Working voltage (V).....:							—
Frequency if applicable (kHz).....:							—
PTI.....:					< 600 <input type="checkbox"/> ≥ 600 <input type="checkbox"/>		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV).....:							—
Supplementary information:							
Distance 2:							



IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
Working voltage (V).....:			—
Frequency if applicable (kHz).....:			—
PTI.....:		< 600 <input type="checkbox"/> ≥ 600 <input type="checkbox"/>	—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV).....:			—
Supplementary information:			
Distance 3:			
Working voltage (V).....:			—
Frequency if applicable (kHz).....:			—
PTI.....:		< 600 <input type="checkbox"/> ≥ 600 <input type="checkbox"/>	—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV).....:			—
Supplementary information:			

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

1.15 (13.2.1)	TABLE: Ball Pressure Test of Thermoplastics			P
Allowed impression diameter (mm) .....		2		—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)	
Lamp cover	See Annex 1	75	0,8	
Plastic enclosure		76,9	0,9	
Terminal block		125	1,8	
PCB		125	1,0	
Bobbin		125	1,1	
Supplementary information:				

1.15 (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
Terminal block	See Annex 1	10	No	0	P
PCB		10	No	0	P
Bobbin		10	No	0	P
Wire connector		10	No	0	P



IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:

1.15 (13.3.2)	TABLE: Glow-wire test (IEC 60695-2-11)			P
Glow wire temperature .....		650°C	—	
Object/ Part No./ Material	Manufacturer/ trademark	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Plastic enclosure	See Annex 1	No	0	P
Lamp cover		No	0	P
Sensor cover		No	0	P
Insulation tape		No	0	P
Supplementary information:				

1.15 (13.4)	TABLE: Proof tracking test (IEC 60112)			N
Test voltage PTI .....		175 V	—	
Object/ Part No./ Material	Manufacturer/ trademark	Withstand 50 drops without failure on three places or on three specimens		Verdict
Supplementary information:				



IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 1 TABLE: Critical components information						P
Object / part No.	Code	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity <sup>1)</sup>
Lamp cover	C	SABIC JAPAN L L C	940(f1)	V-0	IEC 60598-1 IEC 60598-2-1	UL E207780 + tested with appliance
Plastic enclosure	C	SABIC JAPAN L L C	940(f1)	V-0	IEC 60598-1 IEC 60598-2-1	UL E207780 + tested with appliance
Sensor cover	C	SABIC JAPAN L L C	940(f1)	V-0	IEC 60598-1 IEC 60598-2-1	UL E207780 + tested with appliance
LED	C	HONGLIZHIHUI GROUP Co.,Ltd	2835	VF:3V IF:60mA CCT:3000-6000K	EN 62471 IEC/TR 62778	Tested with appliance
Terminal block	B	Shen zhen hongyu electronic co.ltd.	HYT-500; HYT-500WP	24A, 450V, T110, 1,0-2,5mm <sup>2</sup>	EN 60998-1 EN 60998-2-1	VDE 40020423
Alt.	B	Foshan city shunde district kaicheng plastic hardware ltd	500;	24A, 450V, T110, 1,0-2,5mm <sup>2</sup>	EN 60998-1 EN 60998-2-1	VDE 40023327
Alt.	B	Ninghai Chengguan Fangzheng Rubber&Plastic Hardware Factory	KP-10A	32A, 450V, T110, 1,5-4,0mm <sup>2</sup>	EN 60998-1 EN 60998-2-1	VDE 40019217
PCB	C	WENZHOU BOXUN SCIENCE & TECHNOLOGY CO LTD	BOUNCE	V-0; 130°C	EN 61347-1 EN 61347-2-13	UL E321346 + tested with appliance
Alt.	C	WENZHOU JUJI ELECTRONIC TECHNOLOGY CO., LTD.	JY-D	V-0; 130°C	EN 61347-1 EN 61347-2-13	UL E492597 + tested with appliance
Alt.	C	GUANGDE SANYANG ELECTRONICS CO LTD	SY-S	V-0; 130°C	EN 61347-1 EN 61347-2-13	UL E473856 + tested with appliance
Fuse resistor	C	Yageo Components (Suzhou) Co. Ltd.	FKN series	2W, 22Ω	EN 61347-1 EN 61347-2-13	UL E323780 + tested with appliance



IEC 60598-2-1						
Clause	Requirement + Test			Result - Remark		Verdict
Varistor	B	Cerglass MFG Inc	07D471K	T85	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 40028836
Y1 capacitor	B	JYA-NAY CO., LTD	JN102M	1000PF, 400V, T125	EN 60384-14	TÜV Rheinland R 50232059
Transformer	C	SHENZHENSHIJ IASHANLIANBA O Electronics Co., Ltd.	EFD25-1MH	1mH; N1: Φ0,35mm x 77Ts N2: Φ0,35mm x 11Ts	EN 61347-1 EN 61347-2-13	Tested with appliance
Pri. winding	C	NINGBO JINTIAN NEW MATERIAL CO LTD.	UEW	130°C	EN 61347-1 EN 61347-2-13	UL E227047 + tested with appliance
Sec. winding	C	NINGBO JINTIAN NEW MATERIAL	PEW/155	155°C	EN 61347-1 EN 61347-2-13	UL E227047 + tested with appliance
Teflon tube	C	Changchun Plastic Co., Ltd	T375J	V-0; 150°C	EN 61347-1 EN 61347-2-13	UL E59481 + tested with appliance
Bobbin	C	GREAT HOLDING INDUSTRIAL CO LTD	TLFL,TFT	150V, 200°C	EN 61347-1 EN 61347-2-13	UL E156256 + tested with appliance
Insulation tape	C	3M COMPANY ELECTRICAL MARKETS DIV(EMD)	1350F-1; 1350F-2	MIN.130°C	EN 61347-1 EN 61347-2-13	UL E17385 + tested with appliance
Input wire	C	NINGBO TIAN HONG WIRE&CABLE CO LTD..	1007	18AWG, 80°C, 300V	EN 61347-1 EN 61347-2-13	UL E348905 + tested with appliance
Alt.	C	Ningbo Haoguang Electric Appliance Co.,Ltd	1007	18AWG, 80°C, 300V	EN 61347-1 EN 61347-2-13	UL E192545 + tested with appliance
Alt.	C	YANG TAI WIRE & CABLE CO LTD	1007	18AWG, 80°C, 300V	EN 61347-1 EN 61347-2-13	UL E214859 + tested with appliance
Output wire	C	DONGGUAN WENCHANG ELECTRONIC CO LTD	1007	22AWG, 80°C, 300V	EN 61347-1 EN 61347-2-13	UL E214500 + tested with appliance

**IEC 60598-2-1**

Clause	Requirement + Test	Result - Remark	Verdict
--------	--------------------	-----------------	---------

Wire connector	C ZHEJIANG LIANHE ELECTRONIC CO LTD	PH ---	EN 61347-1 EN 61347-2-13 UL E364711 + tested with appliance
----------------	---	-----------	---

## Supplementary information:

<sup>1)</sup> 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

# WALTEK



IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	TABLE: Thermal tests of Section 12	P	
	Type reference .....	ST71BP	—
	Lamp used .....	Integral LED module	—
	Lamp control gear used .....	Integral LED control gear	—
	Mounting position of luminaire .....	Acc. to user manual	—
	Supply wattage (W).....	15,4	—
	Supply current (A).....	0,118	—
	Temperatures in test 1 - 4 below are corrected for ta (°C) .....	25	—
	- abnormal operating mode.....	SC LED output	—
1.12 (12.4)	- test 1: rated voltage .....	---	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current .....	1,06 x 240 = 254,4 V	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage.....	---	—
	Through wiring or looping-in wiring loaded by a current of A during the test .....	---	—
1.12 (12.5)	- test 4: 1,1 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current.....	1,1x240=264V	—

**Temperature measurements (°C)**

Part	Ambient	Cl. 12.4 – normal				Cl. 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Sensor ambient	25	---	31,8	---	55	---	---
Lamp cover (inside)	25	---	39,5	---	Cl.13	---	---
Terminal block	25	---	48,2	---	110	---	---
LED board	25	---	53,4	---	Ref.	---	---
Output wire (LED wire)	25	---	52,9	---	80	---	---
Plastic enclosure (inside)	25	---	51,9	---	Cl.13	---	---
PCB	25	---	79,7	---	Cl.13	---	---
Varistor	25	---	49,9	---	85	---	---
L1	25	---	56,0	---	120	---	---
C2	25	---	57,8	---	105	---	---
C3	25	---	59,1	---	105	---	---
CY1	25	---	66,4	---	125	---	---
C4	25	---	63,2	---	105	---	---
C6	25	---	53,2	---	105	---	---

**IEC 60598-2-1**

Clause	Requirement + Test			Result - Remark			Verdict
Pri. winding	25	---	74,5	---	120	76,4	180
Sec. winding	25	---	73,3	---	120	73,9	180
Bobbin	25	---	70,6	---	Cl.13	---	---
Wire connector	25	---	65,8	---	Cl.13	---	---
Mounting surface (flammable surface)	25	---	43,3	---	90	44,8	130
Surface illuminated by lamp(0.1m)	25	---	27,9	---	90	28,2	Ref.
Supplementary information:							

# WALTEK



IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
<b>NNEX 3</b>	<b>Screw terminals (part of the luminaire)</b>		N
<b>(14)</b>	<b>SCREW TERMINALS</b>		N
(14.2)	Type of terminal .....		—
	Rated current (A) .....		—
(14.3.2.1)	One or more conductors		N
(14.3.2.2)	Special preparation		N
(14.3.2.3)	Terminal size		N
	Cross-sectional area (mm <sup>2</sup> ) .....		—
(14.3.3)	Conductor space (mm) .....		N
(14.4)	Mechanical tests		N
(14.4.1)	Minimum distance		N
(14.4.2)	Cannot slip out		N
(14.4.3)	Special preparation		N
(14.4.4)	Nominal diameter of thread (metric ISO thread).....	M	N
	External wiring		N
	No soft metal		N
(14.4.5)	Corrosion		N
(14.4.6)	Nominal diameter of thread (mm) .....		N
	Torque (Nm).....		N
(14.4.7)	Between metal surfaces		N
	Lug terminal		N
	Mantle terminal		N
	Pull test; pull (N).....		N
(14.4.8)	Without undue damage		N



<b>IEC 60598-2-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
<b>ANNEX 4</b>	<b>Screwless terminals (part of the luminaire)</b>		N
<b>(15)</b>	<b>SCREWLESS TERMINALS</b>		N
(15.2)	Type of terminal .....		—
	Rated current (A) .....		—
(15.3.1)	Material		N
(15.3.2)	Clamping		N
(15.3.3)	Stop		N
(15.3.4)	Unprepared conductors		N
(15.3.5)	Pressure on insulating material		N
(15.3.6)	Clear connection method		N
(15.3.7)	Clamping independently		N
(15.3.8)	Fixed in position		N
(15.3.10)	Conductor size		N
	Type of conductor		N
(15.5)	Terminals and connections for internal wiring		N
(15.5.1)	Mechanical tests		N
(15.5.1.1.1)	Pull test spring-type terminals (4 N, 4 samples).....		N
(15.5.1.1.2)	Pull test pin or tab terminals (4 N, 4 samples).....		N
	Insertion force not exceeding 50 N		N
(15.5.1.2)	Permanent connections: pull-off test (20 N)		N
(15.5.2)	Electrical tests		N
	Voltage drop (mV) after 1 h (4 samples) .....		N
	Voltage drop of two inseparable joints		N
	Number of cycles:		—
	Voltage drop (mV) after 10th alt. 25th cycle (4 samples) .....		N
	Voltage drop (mV) after 50th alt. 100th cycle (4 samples) .....		N
	After ageing, voltage drop (mV) after 10th alt. 25th cycle (4 samples).....		N
	After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples).....		N
(15.6)	Terminals and connections for external wiring		N
(15.6.1)	Conductors		N
	Terminal size and rating		N



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

<b>(15.6.3.1)</b> <b>(15.6.3.2)</b>	<b>TABLE: Contact resistance test / Heating tests</b>										N
	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:											



EU Group Differences			
Clause	Requirement + Test	Result - Remark	Verdict
<b>ANNEX 5</b>	<b>CENELEC COMMON MODIFICATIONS (EN 60598-1:2015+A1:2018 and EN 60598-2-1:1989)</b>		<b>P</b>
<b>1.5 (3)</b>	<b>MARKING</b>		<b>N</b>
1.5 (3.3.101)	For luminaires not supplied with terminal block: Adequate warning on the package		N
<b>1.6 (4)</b>	<b>CONSTRUCTION</b>		<b>N</b>
1.6 (4.11.6)	Electro-mechanical contact systems		N
<b>1.10 (5)</b>	<b>EXTERNAL AND INTERNAL WIRING</b>		<b>N</b>
1.10 (5.2.1)	Connecting leads		N
	- without a means for connection to the supply		N
	- terminal block specified		N
	- relevant information provided		N
	- compliance with 4.6, 4.7.1, 4.7.2, 4.10.1, 11.2, 12 and 13.2 of Part 1		N
1.10 (5.2.2)	Cables equal to EN 50525		N
	Replace table 5.1 – Supply cord		N
<b>1.12 (12)</b>	<b>ENDURANCE TESTS AND THERMAL TESTS</b>		<b>P</b>
1.12 (12.4.2c)	Thermal test (normal operation) see footnote c to table 12.2 relating to unsleeved fixed wiring		P
<b>ZB</b>	<b>ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)</b>		<b>N</b>
(3.3)	DK: power supply cords of class I luminaires with label		N
(4.5.1)	DK: socket-outlets		N
(5.2.1)	CY, DK, FI, GB: type of plug		N
<b>ZC</b>	<b>ANNEX ZC, NATIONAL DEVIATIONS (EN)</b>		<b>N</b>
(4 & 5)	FR: Shuttered socket-outlets 10/16A		N



EU Group Differences			
Clause	Requirement + Test	Result - Remark	Verdict
	FR: Safety requirements for high buildings (Arrêté du 30 décembre 2011 portant règlement de sécurité pour la construction des immeubles de grande hauteur et leur protection contre les risques d'incendie et de panique; Section VIII; Article GH 48, Eclairage) Glow-wire test for outer parts of luminaires:		N
	- 850°C for luminaires in stairways and horizontal travel paths		N
	- 650°C for indoor luminaires		N
	GB: Requirements according to United Kingdom Building Regulation		N

# WALTEK



EN IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
<b>ANNEX 6</b>	<b>LED modules for general lighting – Safety specifications</b> <b>EN IEC 62031:2020</b>		<b>P</b>

<b>4</b>	<b>GENERAL REQUIREMENTS</b>		<b>P</b>
4.2	Classification		<b>P</b>
	Built-in module .....	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	Independent module.....	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	Integral module .....	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
4.6	Independent modules comply with requirements in IEC 60598-1:2014/AMD1:2017		<b>N</b>
4.8	Modules with integrated controlgear providing SELV comply with requirements according to IEC 61347-1:2015/AMD1:2017 clause L.5 to L.11.	(see Annex 1)	<b>N</b>

<b>6</b>	<b>MARKING</b>		<b>P</b>
<b>6.2</b>	<b>Contents of marking for built-in and for independent LED modules</b>		<b>N</b>
	a) mark of origin		<b>N</b>
	b) model number, type reference		<b>N</b>
	c1) constant voltage module; rated supply voltage and supply frequency		<b>N</b>
	c2) constant current module; rated supply current and supply frequency		<b>N</b>
	d) rated power		<b>N</b>
	e) indication of connections, wiring diagram		<b>N</b>
	f) value of $t_c$ and place on the module		<b>N</b>
	g) Ethr if required		<b>N</b>
	h) symbol for built-in modules		<b>N</b>
	i) heat transfer temperature $t_d$		<b>N</b>
	j) power for heat-conduction $P_d$		<b>N</b>
	k) working voltage for insulation		<b>N</b>
<b>6.3</b>	<b>Location of marking for built-in LED modules</b>		<b>N</b>
	- marking of a) and b) in 6.2 on the modules		<b>N</b>
	- marking of other applicable items in 6.2 on the modules or in data sheet, leaflet or website		<b>N</b>
<b>6.4</b>	<b>Location of marking for independent LED modules</b>		<b>N</b>
	- marking of a), b), c) and f) in 6.2 on the modules		<b>N</b>



EN IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	- marking of other applicable items in 6.2 on the modules or in data sheet, leaflet or website		N
<b>6.5</b>	<b>Marking of integral LED modules</b>		<b>P</b>
	- information in 6.2 a) to g) in data sheet, leaflet or website		P
<b>6.6</b>	<b>Durable and legibility of marking</b>		<b>P</b>
	- marking on the LED module legible after test with water		P
	- marking not on the LED module legible		N

<b>7</b>	<b>TERMINALS</b>		<b>N</b>
<b>7.1</b>	<b>Integral terminals</b>		<b>N</b>
	Screw terminals comply with section 14 of IEC 60598-1	(see Annex 3)	N
	Screwless terminals comply with section 15 of IEC 60598-1	(see Annex 4)	N
<b>7.2</b>	<b>Terminals other than integral terminals</b>		<b>N</b>
	Separately approved; component list	(see Annex 2)	N
	Ratings suit the conditions		N
	Satisfy additional relevant requirements of this standard		N

<b>8 (9)</b>	<b>EARTHING</b>		<b>N</b>
<b>- (9.1)</b>	<b>Provisions for protective earthing</b>		<b>N</b>
	Terminal complying with clause 8		N
	Locked against loosening and not possible to loosen by hand		N
	Not possible to loosen clamping means unintentionally on screwless terminals		N
	Earthing via means of fixing		N
	Earthing terminal only used for the earthing of the control gear		N
	All parts of material minimizing the danger of electrolytic corrosion		N
	Made of brass or equivalent material		N
	Contact surface bare metal		N
	Test according 7.2.3 of IEC 60598-1		N
<b>- (9.2)</b>	<b>Provision for functional earthing</b>		<b>N</b>
	Comply with clause 8 and 9.1		N



<b>EN IEC 62031</b>			
Clause	Requirement + Test	Result - Remark	Verdict
	Functional earth insulated from live parts by double or reinforced insulation		N
<b>- (9.3)</b>	<b>Lamp controlgear with conductors for protective earthing by tracks on printed circuit board</b>		<b>N</b>
	Test with a current of 25 A between earthing terminal and each of the accessible metal parts; measured resistance ( $\Omega$ ) at $\geq 10$ A according 7.2.3 of IEC 60598-1: $< 0,5 \Omega$ .....		N
<b>- (9.4)</b>	<b>Earthing of built-in lamp controlgear</b>		<b>N</b>
	Earth by means of fixing to earthed metal of luminaire in compliance of 7.2 of IEC 60598-1		N
	Earthing terminal only for earthing the built-in controlgear		N
<b>- (9.5)</b>	<b>Earthing via independent controlgear</b>		<b>N</b>
- (9.5.1)	Earth connection to other equipment		N
	Looping or through connection, conductor min. 1,5 mm <sup>2</sup> and of copper or equivalent		N
	Protective earthing wires in line with 5.3.1.1 and clause 7		N
- (9.5.2)	Earthing of the lamp compartments powered via the independent lamp controlgear		N
	Test with a current of 25 A between input and output earth terminals; measured resistance ( $\Omega$ ) between earthing terminal and each of the accessible metal parts at $\geq 10$ A according 7.2.3 of IEC 60598-1: $< 0,5 \Omega$ .....		N
	Output earthing terminal marked as in 7.1 t) of IEC 61347-1		N

<b>9 (10)</b>	<b>PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS</b>		<b>N</b>
- (10.1)	Controlgear protected against accidental contact with live parts		N
- (A2)	Voltage measured with 50 k $\Omega$	(see Annex A)	N
- (A3)	Voltage $> 35$ V peak or $> 60$ V d.c. or protective impedance device	(see Annex A)	N
- (10.1)	Lacquer or enamel not used for protection or insulation		N
	Adequate mechanical strength on parts providing protection		N
- (10.2)	Capacitors $> 0,5 \mu\text{F}$ : voltage after 1 min (V): $< 50$ V .....		N
- (10.3)	Controlgear providing SELV		N



<b>EN IEC 62031</b>			
Clause	Requirement + Test	Result - Remark	Verdict
	Accessible conductive parts are insulated from live parts by double or reinforced insulation in SELV controlgear		N
	No connection between output circuit and the body or protective earthing circuit		N
	No possibility of connection between output circuit and the body or protective earthing circuit through other conductive parts		N
	SELV outputs separated from earth by at least basic insulation		N
	ELV conductive parts insulated as live parts		N
	Tests according Annex L of IEC 61347-1		N
- (10.4)	Accessible conductive parts in SELV circuits		N
	Output voltage under load $\leq 25$ V r.m.s. or $\leq 60$ V d.c.		N
	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
	One conductive part is insulated if output voltage or current exceeding the values above and withstand test voltage 500 V		N
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		N
	Y1 or Y2 capacitors comply with IEC 60384-14		N
	Resistors comply with test (a) in 14.1 of IEC 60065		N

<b>10 (11)</b>	<b>MOISTURE RESISTANCE AND INSULATION</b>		<b>P</b>
	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 $\Omega$ .....	$>100$ M $\Omega$	P
	For double or reinforced insulation $\geq 4$ M $\Omega$ .....		N
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		N

<b>11 (12)</b>	<b>ELECTRIC STRENGTH</b>		<b>P</b>
	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V		N



EN IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	Working voltage $\leq 50$ V, test voltage 500 V		P
	Working voltage $> 50$ V $\leq 1000$ V, test voltage (V):		P
	Basic insulation, 2U + 1000 V	1480 V (test with appliance)	P
	Supplementary insulation, 2U + 1000 V		N
	Double or reinforced insulation, 4U + 2000 V		N
	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

<b>12 (14)</b>	<b>FAULT CONDITIONS</b>		<b>P</b>
- (14.1)	When operated under fault conditions the controlgear:		P
	- does not emit flames or molten material		P
	- does not produce flammable gases		P
	- protection against accidental contact not impaired		P
	Thermally protected controlgear does not exceed the marked temperature value		N
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected	(see appended table)	P
- (14.2)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (after any reduction in 14.2 - 14.5)	(see appended table)	N
- (14.3)	Short-circuit or interruption of semiconductor devices	(see appended table)	P
- (14.4)	Short-circuit across insulation consisting of lacquer, enamel or textile	(see appended table)	N
- (14.5)	Short-circuit across electrolytic capacitors	(see appended table)	N
	Short-circuit or interruption of SPDs	(see appended table)	N
- (14.6)	After the tests has been carried out on three samples:		P
	The insulation resistance $\geq 1$ M $\Omega$ ..... :	>100M $\Omega$	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
- (14.7)	Relevant fault condition tests with high-power a.c. supply and in turn to a d.c. supply		—
<b>12.2</b>	<b>Overpower condition</b>		<b>P</b>
	Module withstands overpower condition >15 min.		P

**EN IEC 62031**

Clause	Requirement + Test	Result - Remark	Verdict
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		N
	No fire, smoke or flammable gas is produced		P
	Molten material does not ignite tissue paper, spread below the module		P

<b>14 (15)</b>	<b>CONSTRUCTION</b>		<b>P</b>
<b>- (15.1)</b>	<b>Wood, cotton, silk, paper and similar fibrous material</b>		<b>P</b>
	Wood, cotton, silk, paper and similar fibrous material not used as insulation		P
<b>- (15.2)</b>	<b>Printed circuits</b>		<b>P</b>
	Printed circuits used as internal connections complies with clause 14		P

<b>15 (16)</b>	<b>CREEPAGE DISTANCES AND CLEARANCES</b>		<b>P</b>
<b>- (16.1)</b>	<b>General</b>		<b>P</b>
	Creepage distances and clearances according to 16.2 and 16.3		P
	Controlgears providing SELV comply with additional requirements in Annex L		N
	Insulating lining of metallic enclosures		N
	Controlgear protected against pollution comply with Annex P		N
<b>- (16.2)</b>	<b>Creepage distances</b>		<b>P</b>
<b>- (16.2.2)</b>	Minimum creepage distances for working voltages		<b>P</b>
	Creepage distances according to Table 7	(see appended table)	P
<b>- (16.2.3)</b>	Creepage distances for working voltages with frequencies above 30 kHz		<b>N</b>
	Creepage distances according to Table 8	(see appended table)	N
<b>- (16.3)</b>	<b>Clearances</b>		<b>P</b>
<b>- (16.3.2)</b>	Clearances for working voltages		<b>P</b>
	Clearances distances according to Table 9	(see appended table)	P
<b>- (16.3.3)</b>	Clearances for ignition voltages and working voltages with higher frequencies		<b>N</b>
	Clearances distances for basic or supplementary insulation according to Table 10		N
	Clearances distances for reinforced insulation according to Table 11		N



EN IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

<b>16 (17)</b>	<b>SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS</b>		<b>P</b>
	Screws, current-carrying parts and connections in compliance with IEC 60598-1 (clause numbers between parentheses refer to IEC 60598-1)		—
<b>(4.11)</b>	<b>Electrical connections</b>		<b>P</b>
(4.11.1)	Contact pressure		P
(4.11.2)	Screws:		N
	- self-tapping screws		N
	- thread-cutting screws		N
(4.11.3)	Screw locking:		N
	- spring washer		N
	- rivets		N
(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
<b>(4.12)</b>	<b>Mechanical connections and glands</b>		<b>P</b>
(4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N
	Torque test: torque (Nm); part.....	LED board: $\Phi 2,94\text{mm}$ , 0,5Nm	P
	Torque test: torque (Nm); part.....		N
	Torque test: torque (Nm); part.....		N
(4.12.2)	Screws with diameter < 3 mm screwed into metal		N
(4.12.4)	Locked connections:		N
	- fixed arms; torque (Nm) .....		N
	- lampholder; torque (Nm) .....		N
	- push-button switches; torque 0,8 Nm .....		N
(4.12.5)	Screwed glands; force (Nm).....		N

<b>17 (18)</b>	<b>RESISTANCE TO HEAT, FIRE AND TRACKING</b>		<b>N</b>
- (18.1)	Ball-pressure test .....	See Test Table 17 (18.1)	N
- (18.2)	Test of printed boards .....	See Test Table 17 (18.2)	N
- (18.3)	Glow-wire test (650°C) .....	See Test Table 17 (18.3)	N
- (18.4)	Needle-flame test (10 s) .....	See Test Table 17 (18.4)	N
- (18.5)	Proof tracking test .....	See Test Table 17 (18.5)	N



EN IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
<b>18</b>	<b>RESISTANCE TO CORROSION</b>		<b>N</b>
	Comply with requirements according 4.18 of IEC 60598-1		N

<b>20</b>	<b>HEAT MANAGEMENT</b>		<b>N</b>
<b>20.1</b>	<b>General</b>		<b>N</b>
	Fulfil clause 20 if replaceable LED module and when heat conducting thermal interface is needed.		N
<b>20.2</b>	<b>Thermal interface material</b>		<b>N</b>
	Thermal interface material delivered with the module if necessary		N
<b>20.3</b>	<b>Heat protection</b>		<b>N</b>
	Not impair safety when operated under poor heat-conduction conditions according Annex D		N

<b>22</b>	<b>PHOTOBIOLOGICAL SAFETY</b>		<b>P</b>
<b>22.1</b>	<b>UV radiation</b>		<b>N</b>
	Luminous radiation not exceed 2mW/klm		N
<b>22.2</b>	<b>Blue light hazard</b>		<b>P</b>
	Assessed according to IEC TR 62778	RG0 Unlimited	P
<b>22.3</b>	<b>Infrared radiation</b>		<b>N</b>
	Requirements for infrared radiation when required		N

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

<b>12 (14)</b>	<b>TABLE: tests of fault conditions</b>		<b>P</b>
<b>Part</b>	<b>Simulated fault</b>		<b>Hazard</b>
One LED	SC: 240V, 0,106A, 14,5W. Six LEDs are no working.		YES/NO
One LED	OC: 240V, 0,112A, 15,5W. One LED is no working.		YES/NO



EN 62471			
Clause	Requirement + Test	Result - Remark	Verdict

<b>ANNEX 7</b>	<b>Photobiological safety evaluated according to standard EN 62471:2008</b>	<b>P</b>
----------------	---	----------

Emission limits for risk groups of continuous wave lamps									P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	S <sub>UV</sub> (λ)	E <sub>s</sub>	W•m <sup>-2</sup>	0,001	---	---	---	---	---
Near UV	---	E <sub>UVA</sub>	W•m <sup>-2</sup>	0,33	---	---	---	---	---
Blue light	B(λ)	L <sub>B</sub>	W•m <sup>-2</sup> •sr <sup>-1</sup>	100	3,840e0	10000	---	4000000	---
Blue light, small source	B(λ)	E <sub>B</sub>	W•m <sup>-2</sup>	0,01*	---	1,0	---	400	---
Retinal thermal	R(λ)	L <sub>R</sub>	W•m <sup>-2</sup> •sr <sup>-1</sup>	28000/α	6,959e1	28000/α	---	71000/α	---
Retinal thermal, weak visual stimulus*	R(λ)	L <sub>IR</sub>	W•m <sup>-2</sup> •sr <sup>-1</sup>	545000	---	---	---	---	---
				0,0017 ≤ α ≤ 0,011					
				6000/α					
				0,011 ≤ α ≤ 0,1					
IR radiation, eye	---	E <sub>IR</sub>	W•m <sup>-2</sup>	100	---	570	---	3200	---

\* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.

\*\* Involves evaluation of non-GLS source

Assessment:

Lamp classification group  Exempt  Low risk  Mod risk



EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
<b>ANNEX 8</b>	<b>Lamp controlgear - Particular requirements for d.c. or a.c. supplied electronic controlgear for LED modules according to EN 61347-2-13:2014+A1:2017 used in conjunction with EN 61347-1:2015</b>		<b>P</b>

4 (4)	<b>GENERAL REQUIREMENTS</b>		<b>P</b>
- (4)	Insulation materials according requirements in Annex N of IEC 61347-1	(see Annex N)	N
- (4)	Compliance of independent controlgear enclosure with IEC 60598-1		N
- (4)	Built-in electronic controlgear with double or reinforced insulation comply with Annex O of IEC 61347-1	(see Annex O)	N
4 (4)	SELV controlgear comply with Annex I of this part 2 and Annex L of IEC 61347-1	(see Annex L)	N
4 (-)	Transformer comply with IEC 61558		N
	Dielectric strength test of insulated winding wires is limited to 3 kV if input voltage ≤ 300 V		N

6 (6)	<b>CLASSIFICATION</b>		<b>P</b>
	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"/>	—
6 (-)	Auto-wound controlgear .....	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	Separating controlgear .....	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	Isolating controlgear .....	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	SELV controlgear .....	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—

7 (7)	<b>MARKING</b>		<b>N</b>
7.1 (7.1)	Mandatory markings		N
	a) mark of origin		N
	b) model number or type reference		N
	c) symbol for independent controlgear, if applicable		N
	d) correlation between interchangeable parts and controlgear marked		N
	e) rated supply voltage (V)		N
	supply frequency (Hz)		N
	supply current (A)		N



EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	f) earthing symbol		N
	k) wiring diagram		N
	l) value of $t_c$	See rating label	N
	m) symbol for declared temperature		N
	t) LUM earthing symbol		N
	u) if not SELV maximum working voltage $U_{out}$ between:		N
	- output terminals (V) .....	See rating label	N
	- output terminals and earth (V) .....		N
7.1 (-)	Constant voltage type:	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- rated output power $P_{rated}$ (W) .....		N
	- rated output voltage $U_{rated}$ (V) .....		N
	Constant current type:	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- rated output power $P_{rated}$ (W) .....	See rating label	N
	- rated output current $I_{rated}$ (A) .....	See rating label	N
	Indication if for LED modules only		N
7.1 (7.2)	Marking durable and legible		N
	Rubbing 15 s water, 15 s petroleum; marking legible		N
7.2 (7.1)	Information to be provided, if applicable		N
	h) declaration on protection against accidental contact		N
	i) cross-section of conductors (mm <sup>2</sup> )		N
	j) number, type and wattage of lamp(s)		N
	s) SELV symbol		N
7.2 (-)	- declaration of mains connected windings		N

<b>8 (10)</b>	<b>PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS</b>		<b>P</b>
- (10.1)	Controlgear protected against accidental contact with live parts		P
- (A2)	Voltage measured with 50 kΩ	(see Annex A)	P
- (A3)	Voltage > 35 V peak or > 60 V d.c. or protective impedance device	(see Annex A)	N
- (10.1)	Lacquer or enamel not used for protection or insulation		N
	Adequate mechanical strength on parts providing protection		P



<b>EN 61347-2-13</b>			
Clause	Requirement + Test	Result - Remark	Verdict
- (10.2)	Capacitors > 0,5 $\mu$ F: voltage after 1 min (V): < 50 V .....	0,0005 $\mu$ F	N
- (10.3)	Controlgear providing SELV		N
	Accessible conductive parts are insulated from live parts by double or reinforced insulation in SELV controlgear		N
	No connection between output circuit and the body or protective earthing circuit		N
	No possibility of connection between output circuit and the body or protective earthing circuit through other conductive parts		N
	SELV outputs separated by at least basic insulation		N
	ELV conductive parts insulated as live parts		N
	Tests according Annex L of IEC 61347-1	(see Annex L)	N
- (10.4)	Accessible conductive parts in SELV circuits		N
	Output voltage under load $\leq$ 25 V r.m.s. or $\leq$ 60 V d.c.		N
	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. ....	No load: 73,8V	N
	One conductive part is insulated if output voltage or current exceeding the values above and withstand test voltage 500 V		N
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		N
	Y1 or Y2 capacitors comply with IEC 60384-14		N
	Resistors comply with test (a) in 14.1 of IEC 60065		N

<b>9 (8)</b>	<b>TERMINALS</b>		<b>N</b>
- (8.1)	<b>Integral terminals</b>		N
	Screw terminals according section 14 of IEC 60598-1:		N
	Separately approved; component list	(see Annex 1)	N
	Part of the controlgear	(see Annex 2)	N
	Screwless terminals according section 15 of IEC 60598-1:		N
	Separately approved; component list	(see Annex 1)	N
	Part of the controlgear	(see Annex 3)	N



EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
<b>- (8.2)</b>	<b>Terminals other than integral terminals</b>		<b>N</b>
	Comply with relevant IEC standard	(see Annex 1)	N
	Suit the conditions		N
	Satisfy additional relevant requirements of this standard		N
<b>10 (9)</b>	<b>PROVISION FOR PROTECTIVE EARTHING</b>		<b>N</b>
- (9.1)	Provisions for protective earthing		N
	Terminal complying with clause 8		N
	Locked against loosening and not possible to loosen by hand		N
	Not possible to loosen clamping means unintentionally on screwless terminals		N
	All parts of material minimizing the danger of electrolytic corrosion		N
	Made of brass or equivalent material		N
	Contact surface bare metal		N
	Test according 7.2.3 of IEC 60598-1		N
- (9.2)	Provision for functional earthing		N
	Comply with clause 8 and 9.1		N
	Functional earth insulated from live parts by double or reinforced insulation		N
- (9.3)	Lamp controlgear with conductors for protective earthing by tracks on printed circuit board		N
	Test with a current of 25 A between earthing terminal or earthing contact and each of the accessible metal parts; measured resistance ( $\Omega$ ) at $\geq 10$ A according 7.2.3 of IEC 60598-1: $< 0,5 \Omega$ .....		N
- (9.4)	Earthing of built-in lamp controlgear		N
	Earth by means of fixing to earthed metal of luminaire in compliance of 7.2 of IEC 60598-1		N
	Earthing terminal only for earthing the built-in controlgear		N
- (9.5)	Earthing via independent controlgear		N
- (9.5.1)	Earth connection to other equipment		N
	Looping or through connection, conductor min. 1,5 mm <sup>2</sup> and of copper or equivalent		N
	Protective earthing wires in line with 5.3.1.1 and clause 7 of IEC 60598-1		N



<b>EN 61347-2-13</b>			
Clause	Requirement + Test	Result - Remark	Verdict

- (9.5.2)	Earthing of the lamp compartments powered via the independent lamp controlgear		N
	Test with a current of 25 A between input and output earth terminals; measured resistance ( $\Omega$ ) between earthing terminal or earthing contact and each of the accessible metal parts at $\geq 10$ A according 7.2.3 of IEC 60598-1: $< 0,5 \Omega$ .....		N
	Output earthing terminal marked as in 7.1 t) of IEC 61347-1		N

<b>11 (11)</b>	<b>MOISTURE RESISTANCE AND INSULATION</b>		<b>P</b>
- (11)	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 $\Omega$ .....	$>100$ M $\Omega$	P
	For double or reinforced insulation $\geq 4$ M $\Omega$ .....		N
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		P

<b>12 (12)</b>	<b>ELECTRIC STRENGTH</b>		<b>P</b>
- (12)	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V		N
	Working voltage $\leq 50$ V, test voltage 500 V		N
	Working voltage $> 50$ V $\leq 1000$ V, test voltage (V):		P
	Basic insulation, 2U + 1000 V	1480 V	P
	Supplementary insulation, 2U + 1000 V		N
	Double or reinforced insulation, 4U + 2000 V		N
	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

<b>14 (14)</b>	<b>FAULT CONDITIONS</b>		<b>P</b>
- (14.1)	When operated under fault conditions the controlgear:		P
	- does not emit flames or molten material		P
	- does not produce flammable gases		P
	- protection against accidental contact not impaired		P



EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Thermally protected controlgear does not exceed the marked temperature value		N
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected	(see appended table)	P
- (14.2)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (after any reduction in 14.2 - 14.5)	(see appended table)	N
- (14.3)	Short-circuit or interruption of semiconductor devices	(see appended table)	P
- (14.4)	Short-circuit across insulation consisting of lacquer, enamel or textile	(see appended table)	N
- (14.5)	Short-circuit across electrolytic capacitors	(see appended table)	P
	Short-circuit or interruption of SPDs	(see appended table)	N
14 (-)	Reversed voltage polarity if d.c. supplied control gear	(see appended table)	N
- (14.6)	After the tests has been carried out on three samples:		P
	The insulation resistance $\geq 1 \text{ M}\Omega$ ..... :	$>100 \text{ M}\Omega$	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
- (14.7)	Relevant fault condition tests with high-power a.c. supply and in turn to a d.c. supply		—
14 (-)	Temperature declared thermally protected lamp controlgear fulfil requirements in Annex C		N

<b>15 (-)</b>	<b>TRANSFORMER HEATING</b>		<b>P</b>
15.1	General		P
	Transformer comply with clause L.6 and L.7 of IEC 61347-1		P
	Output voltage of SELV controlgear not exceed limits in 10.4 of IEC 61347-1 during the test of 15.1 and 15.2		N
15.2 (-)	Normal operation		P
	Comply with clause L.6 of IEC 61347-1		P
15.3 (-)	Abnormal operation		P
	Comply with clause L.7 of IEC 61347-1		N



EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Double LED modules or equivalent load connected in parallel to the output terminals of constant voltage type		N
	Double LED modules or equivalent load connected in series to the output terminals of constant current type		N
15 (-)	During and at the end of the tests no defect impairing safety, nor any smoke or flammable gases produced		P

16 (15)	CONSTRUCTION	P
- (15.1)	Wood, cotton, silk, paper and similar fibrous material	P
	Wood, cotton, silk, paper and similar fibrous material not used as insulation	P
- (15.2)	Printed circuits	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
	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
	Plugs and socket-outlets for SELV comply with IEC 60906-3 and IEC 60884-2-4	N
	Plugs and socket-outlets for SELV $\leq 3$ A, $\leq 25$ V r.m.s. or $\leq 60$ V d.c. and $\leq 72$ W comply with IEC 60906-3 and IEC 60884-2-4 or:	N
	- plugs not able to enter socket-outlets of other standardised system	N
	- socket-outlets not admit plugs of other standardised system	N
	- socket-outlets without protective earth	N
- (15.4)	Insulation between circuits and accessible parts	P
- (15.4.2)	SELV circuits	N
	Source used to supply SELV circuits:	N
	- safety isolating transformer in accordance with relevant part 2 of IEC 61558	N
	- controlgear providing SELV in accordance with relevant part 2 of IEC 61347	N
	- another source	N
	Voltage in the circuit not higher than ELV	N



EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	SELV circuits insulated from LV by double or reinforced insulation		N
	SELV circuits insulated from non SELV circuits by double or reinforced insulation		N
	SELV circuits insulated from FELV circuits by supplementary insulation		N
	SELV circuits insulated from other SELV circuits by basic insulation		N
	SELV circuits insulated from accessible conductive parts according Table 6 in 15.4.5		N
- (15.4.3)	FELV circuits		P
	Source used to supply FELV circuits:		P
	- separating transformer in accordance with relevant part 2 of IEC 61558		N
	- separating controlgear providing basic insulation between input and output circuits in accordance with relevant part 2 of IEC 61347		P
	- another source		N
	- source in circuits separated by the LV supply by basic insulation		P
	Voltage in the circuit not higher than ELV		P
	FELV circuits insulated from LV supply by at least basic insulation		P
	FELV circuits insulated from other FELV circuits if functional purpose		N
	FELV circuits insulated from accessible conductive parts according Table 6 in 15.4.5		P
	Plugs and socket-outlets for FELV system comply with:		N
	- plugs not able to enter socket-outlets of other voltage systems		N
	- socket-outlets not admit plugs of other voltage systems		N
	- socket-outlets have a protective conductor contact		N
- (15.4.4)	Other circuits		N
	Insulation between circuits other than SELV or FELV and accessible conductive parts in according Table 6 in 15.4.5.		N
- (15.4.5)	Insulation between circuits and accessible conductive parts		N
	Accessible conductive parts insulated from active parts of electric circuits by insulating according Table 6		N



EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Requirements for Class II construction with equipotential bonding for protection against indirect contact with live parts:		N
	- all conductive parts are connected together		N
	- conductive parts are reliably connected together according test of IEC 60598-1- cl. 7.2.3		N
	- conductive parts comply with requirements of Annex A in case of insulation fault		N

<b>17 (16)</b>	<b>CREEPAGE DISTANCES AND CLEARANCES</b>		<b>P</b>
- (16.1)	General		<b>P</b>
	Creepage distances and clearances according to 16.2 and 16.3		P
	Controlgears providing SELV comply with additional requirements in Annex L		N
	Insulating lining of metallic enclosures		N
	Controlgear protected against pollution comply with Annex P	(see Annex P)	N
- (16.2)	Creepage distances		P
- (16.2.2)	Minimum creepage distances for working voltages		P
	Creepage distances according to Table 7	(see appended table)	P
- (16.2.3)	Creepage distances for working voltages with frequencies above 30 kHz		N
	Creepage distances according to Table 8	(see appended table)	N
- (16.3)	Clearances		P
- (16.3.2)	Clearances for working voltages		P
	Clearances distances according to Table 9	(see appended table)	P
- (16.3.3)	Clearances for ignition voltages and working voltages with higher frequencies		N
	Clearances distances for basic or supplementary insulation according to Table 10	(see appended table)	N
	Clearances distances for reinforced insulation according to Table 11	(see appended table)	N

<b>18 (17)</b>	<b>SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS</b>		<b>P</b>
	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		P
(4.11.2)	Screws:		N
	- self-tapping screws		N
	- thread-cutting screws		N



EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

(4.11.3)	Screw locking:		N
	- spring washer		N
	- rivets		N
(4.11.4)	Material of current-carrying parts	> 50% Copper	P
(4.11.5)	No contact to wood or mounting surface		P
(4.11.6)	Electro-mechanical contact systems		N
(4.12)	Mechanical connections and glands		P
(4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N
	Torque test: torque (Nm); part .....	Plastic enclosure: $\Phi 2,98\text{mm}$ , 0,5Nm	P
	Torque test: torque (Nm); part .....		N
(4.12.2)	Screws with diameter < 3 mm screwed into metal		N
(4.12.4)	Locked connections:		N
	- fixed arms; torque (Nm) .....		N
	- lampholder; torque (Nm) .....		N
	- push-button switches; torque 0,8 Nm .....		N
(4.12.5)	Screwed glands; force (Nm) .....		N

<b>19 (18)</b>	<b>RESISTANCE TO HEAT, FIRE AND TRACKING</b>		<b>P</b>
- (18.1)	Ball-pressure test .....	See Test Table 19 (18.1)	P
- (18.2)	Test of printed boards .....	See Test Table 19 (18.2)	P
- (18.3)	Glow-wire test .....	See Test Table 19 (18.3)	P
- (18.4)	Needle flame test .....	See Test Table 19 (18.4)	P
- (18.5)	Tracking test .....	See Test Table 19 (18.5)	N

<b>20 (19)</b>	<b>RESISTANCE TO CORROSION</b>		<b>N</b>
	- test according 4.18.1 of IEC 60598-1		N
	- adequate varnish on the outer surface		N

<b>21 (-)</b>	<b>MAXIMUM WORKING VOLTAGE (<math>U_{out}</math>) IN ANY LOAD CONDITION</b>		<b>P</b>
	Not exceed declared maximum working voltage $U_{out}$ in any load condition		P

<b>14</b>	<b>TABLE: tests of fault conditions</b>		<b>P</b>
Part	Simulated fault		Hazard



EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
Varistor	SC; 240V, 0A, 0W. Fuse opened.		YES/NO
DB1	SC; 240V, 0A, 0W. Fuse opened.		YES/NO
C2	SC; 240V, 0A, 0W. Fuse opened.		YES/NO
D1	SC; 240V, 0,126A, 17,6W. Normal working.		YES/NO
U1 <sub>1-2</sub>	SC; 240V, 0,035A, 4,1W. Normal working.		YES/NO
U1 <sub>2-3</sub>	SC; 240V, 0,05A, 0,1W. No working.		YES/NO
U1 <sub>3-4</sub>	SC; 240V, 0,05A, 0,1W. No working.		YES/NO
C3	SC; 240V, 0,05A, 0,1W. No working.		YES/NO
C4	SC; 240V, 0,24A, 2,7W. No working.		YES/NO
C6	SC; 240V, 0,112A, 15,5W. Normal working. Fault of sensor function.		YES/NO
Output	SC; 240V, 0,24A, 2,7W. No working.		YES/NO

17 (16)		TABLE: clearance and creepage distance measurements (mm)						P
Applicable part of IEC 61347-1 Table 7 – 11*								
Distances	Insulation type **	Measured clearance	Required		Measured creepage	Required		
			clearance	*Table		creepage	*Table	
Distance 1:	B	3,06	1,5	9	3,06	2,4	7	
Working voltage (V).....					240	—		
Frequency if applicable (kHz).....					---	—		
PTI.....					< 600 <input checked="" type="checkbox"/> > 600 <input type="checkbox"/>	—		
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) .....					---	—		
Pulse voltage if applicable (kV) .....					---	—		
Supplementary information: Different polarities								
Distance 2:	B	3,15	1,5	9	3,15	2,4	7	
Working voltage (V).....					240	—		
Frequency if applicable (kHz).....					---	—		
PTI.....					< 600 <input checked="" type="checkbox"/> > 600 <input type="checkbox"/>	—		
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) .....					---	—		
Pulse voltage if applicable (kV) .....					---	—		
Supplementary information: Fuse								
Distance 3:	B	4,4	1,5	9	4,4	2,4	7	
Working voltage (V).....					240	—		
Frequency if applicable (kHz).....					---	—		
PTI.....					< 600 <input checked="" type="checkbox"/> > 600 <input type="checkbox"/>	—		



EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) .....		---	—
Pulse voltage if applicable (kV) .....		---	—
Supplementary information: Live part and accessible part			

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

19 (18.1)	TABLE: Ball Pressure Test			P
Allowed impression diameter (mm).....		2.0		—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)	
Supplementary information: See Test Table 1.15 (13.2.1) of IEC 60598-2-1				

19 (18.2)	TABLE: Test of printed boards				P
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (s)	Ignition of specified layer Yes/No	Duration of burning (s)	Verdict
PCB	See Annex 1	30	No	0	P
Supplementary information:					

19 (18.3)	TABLE: Glow-wire test				P
Glow wire temperature.....		650°C		—	
Object/ Part No./ Material	Manufacturer/ trademark	Ignition of specified layer Yes/No	Duration of burning (s)	Verdict	
Supplementary information: See Test Table 1.15 (13.3.2) of IEC 60598-2-1					

19 (18.4)	TABLE: Needle-flame test				P
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (s)	Ignition of specified layer Yes/No	Duration of burning (s)	Verdict
Supplementary information: See Test Table 1.15 (13.3.1) of IEC 60598-2-1					



EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
<b>19 (18.5)</b>	<b>TABLE: Proof tracking test</b>		<b>N</b>
<b>Test voltage PTI .....</b>		<b>175 V</b>	<b>—</b>
Object/ Part No./ Material	Manufacturer/ trademark	Withstand 50 drops without failure on three places or on three specimens	Verdict
Supplementary information: See Test Table 1.15 (13.4) of IEC 60598-2-1			

(A)	<b>ANNEX A - TEST TO ESTABLISH WHETHER A CONDUCTIVE PART IS A LIVE PART WHICH MAY CAUSE AN ELECTRIC SHOCK</b>		<b>P</b>
(A.1)	Comply with A.2 or A.3		N
(A.2)	Voltage $\leq 35$ V peak or $\leq 60$ V d.c .....	3,38 VAC; 46 VDC	P
(A.3)	If voltage $> 35$ V peak or $> 60$ V d.c. or protective impedance device; touch current does not exceed 0,7 mA (peak) or 2 mA d.c. ....		N
	Comply with Annex G of IEC 60598-1		N

(C)	<b>ANNEX C – PARTICULAR REQUIREMENTS FOR ELECTRONIC LAMP CONTROLGEAR WITH MEANS OF PROTECTION AGAINST OVERHEATING</b>		<b>N</b>
(C3)	GENERAL REQUIREMENTS		N
(C3.1)	Thermal protection means integral with the controlgear, protected against mechanical damage		N
	Renewable only by means of a tool		N
	If function depending on polarity, for cord-connected equipment protection means in both leads		N
	Thermal links comply with IEC 60691		N
	Electrical controls comply with IEC 60730-2-3		N
(C3.2)	No risk of fire by breaking (clause C7)		N
(C5)	CLASSIFICATION		N
	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:		—



EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
(C6)	MARKING		N
(C6.1)	Symbol for temperature declared thermally protected ballasts		N
(C6.2)	Declaration of the type of protection provided		N
(C7)	LIMITATION OF HEATING		N
(C7.1)	Preselection test		N
	Test sample placed for at least 12 h in an oven having temperature ( $t_c - 5$ ) K		N
	No operation of the protection device		N
(C7.2)	Functioning of protection means		N
	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
	No operation of the protection device		N
	Introducing of the most onerous test condition determined during test of clause 14.2 to 14.5		N
	Output of windings connected to the mains supply short-circuited, and other part of the controlgear operated under normal conditions		N
	Increasing of the current through the windings continuously until operation of the protection means		N
	Continuous measuring of the highest surface temperature		N
	Controlgear according to C5 a) or C5 e) operated until stable conditions are achieved		N
	Automatic-resetting thermal protectors working 3 times		N
	Controlgear according to C5 b) working 6 times		N
	Controlgear according to C5 c) and C5 d) working once		N
	Highest temperature does not exceed the marked value		N
	Any overshoot of 10% over the marked value within 15 min		N
	After 15 min value not exceed marked value		N
(D)	<b>ANNEX D – REQUIREMENTS FOR CARRY OUT THE HEATING TESTS OF THERMALLY PROTECTED LAMP CONTROLGEAR</b>		<b>N</b>
	Tests in C7 performed in accordance with Annex D, if applicable		N



EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict

<b>(F)</b>	<b>ANNEX F - DRAUGHT-PROOF ENCLOSURE</b>		<b>P</b>
	Draught-proof enclosure in accordance with the description		P
	Dimensions of the enclosure		P
	Other design; description		N

<b>(H)</b>	<b>ANNEX H - TESTS</b>		<b>P</b>
	All tests performed in accordance with the advice given in Annex H, if applicable		P

<b>I (L)</b>	<b>ANNEX I IN THIS PART 2 – PARTICULAR ADDITIONAL REQUIREMENTS FOR SELV D.C. OR A.C. SUPPLIED ELECTRONIC CONTROLGEARS FOR LED MODULES</b>		<b>N</b>
<b>(L.3)</b>	Classification		<b>N</b>
	Class I	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	Class II	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	Class III	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	non-inherently short circuit proof controlgear	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	inherently short circuit proof controlgear	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	fail safe controlgear	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	non-short-circuit proof controlgear	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
<b>(L.4)</b>	Marking		<b>N</b>
	Adequate symbols are used		N
<b>(L.5)</b>	Protection against electric shock		<b>N</b>
	Comply with clause 9.2 of IEC 61558-1		N
<b>(L.6)</b>	Heating		<b>N</b>
	No excessive temperatures in normal use		N
	Value if capacitor $t_c$ marked .....	See Annex 2	—
	Winding insulation classified as Class .....	See Annex 1	—
	Comply with tests of clause 14 of IEC 61558-1 with adjustments		N
<b>(L.7)</b>	Short-circuit and overload protection		<b>N</b>
	Comply with tests of clause 15 of IEC 61558-1 with adjustments		N
<b>(L.8)</b>	Insulation resistance and electric strength		<b>N</b>
<b>(L.8.1)</b>	Conditioned 48 h between 91 % and 95 %		<b>N</b>
<b>(L.8.2)</b>	Insulation resistance		<b>N</b>



<b>EN 61347-2-13</b>			
Clause	Requirement + Test	Result - Remark	Verdict
	Between input- and output circuits not less than 5 MΩ .....	>100 MΩ	N
	Between metal parts of class II converters which are separated from live parts by basic insulation only and the body not less than 5 MΩ .....		N
	Between metal foil in contact with the inner and outer surfaces of enclosures of insulating material not less than 2 MΩ .....	>100 MΩ	N
(L.8.3)	Electric strength		N
	1) Between live parts of input circuits and live parts of output circuits .....	3750V	N
	2) Over basic or supplementary insulation between:		N
	a) live parts having different polarity .....	1875V	N
	b) live parts and body if intended to be connected to protective earth .....		N
	c) accessible metal parts and a metal rod of the same diameter as the flexible cable or cord .....		N
	d) live parts and an intermediate metal part .....		N
	e) intermediate metal parts and the body .....		N
	f) each input circuit and all other input circuits .....		N
	3) Over reinforced insulation between the body and live parts .....	3750V	N
(L.9)	Construction		N
(L.9.1)	Transformer comply with 19.12 of IEC 61558-1 and 19 of IEC 61558-2-6		N
	HF transformer comply with 19 of IEC 61558-2-16		N
(L.10)	Components		N
	Protective devices comply with 20.6 – 20.11 of IEC 61558-1		N
(L.11)	Creepage distances, clearances and distances through insulation		N
	Creepage distances and clearances not less than in Clause 16		N
	Distance through insulation according Table L.5 in IEC 61347-1		N
	1) Basic distance through insulation		N
	Required distance (mm) .....		—
	Measured (mm) .....		N
	Supplementary information		—
	2) Supplementary distance through insulation		N
	Required distance (mm) .....		—



EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Measured (mm) .....		N
	Supplementary information		—
	3) Reinforced distance through insulation		N
	Required distance (mm) .....		—
	Measured (mm) .....		N
	Supplementary information		—

<b>J (-)</b>	<b>ANNEX J IN THIS PART 2 – PARTICULAR ADDITIONAL SAFETY REQUIREMENTS FOR A.C., A.C./D.C. OR D.C. SUPPLIED ELECTRONIC CONTROLGEAR FOR EMERGENCY LIGHTING</b>		<b>N</b>
J.1	General		N
	Intended for centralized emergency power supply	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
J.2	Marking		N
J.2.1	Mandatory markings		N
	a) symbol EL		N
	b) rated emergency supply voltage (V)		N
J.2.2	Information to be provided if applicable		N
	a) Limits of ambient temperature		N
	b) Emergency output factor (EOFX)		N
	c) Information if intended for use in luminaires for high-risk task area lighting		N
J.3	General notes on tests		N
	Length of output cable in tests .....		N
	Load instead of LED lamps/modules .....		N
J.4	Starting conditions		N
	Start rated load in emergency mode without adversely affecting the performance		N
J.5	Operating condition		N
	Comply with the requirements of 7.2 of IEC 62384 at 90% and 110% of rated emergency supply voltage		N
J.6	Emergency supply current		N
	Emergency supply current not differ more than ±15 %		N
	Supply of low impedance and low inductance		N
J.7	EMC immunity		N
	Comply with the requirements of IEC 61547		N



EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
J.8	Pulse voltage from central battery systems		N
	Withstand pulses according Table J.1		N
J.9	Tests for abnormal conditions		N
	Comply with the requirements of 12 of IEC 62384		N
J.10	Comply with the requirements of 13 of IEC 62384		N
J.11	Functional safety (EOFx)		N
	Declared emergency output factor (EOFx) achieved during emergency operation		N

<b>(N)</b>	<b>ANNEX N: REQUIREMENTS FOR INSULATION MATERIALS USED FOR DOUBLE OR REINFORCED INSULATION (IEC 61347-1)</b>		<b>N</b>
(N.4)	General requirements		N
(N.4.1)	Material comply with IEC 60085 and IEC 60216 series		N
(N.4.2)	Solid insulation		N
	Electric strength test at least 5 kV or 1,35 x test voltage in Table N.1		N
	If not classified according IEC 60085 and IEC 60216 series: Electric strength test increased 10 % of 5,5 kV or 1,5 x test voltage in Table N.1		N
(N.4.3)	Thin sheet insulation		N
(N.4.3.1)	Thickness and composition of thin sheet insulation		N
	- Inside the ballast and not subjected to handling or abrasion during the production and during maintenance		N
	- Non-separated layers: Min. 3 layers and fulfil mandrel test of 150N		N
	- Separated layers: Min. 2 layers and each layer fulfil mandrel test of 50N		N
	- Separated layers (alternative): Min. 3 layers and 2/3 of the layers fulfil mandrel test of 100N		N
(N.4.3.2)	Mandrel test (electric strength test during mechanical stress)		N
	Electric strength test after mandrel test:		N
	- Non-separated layers: min. 5 kV or 1,35 x test voltage in Table N.1		N
	- 2/3 of min. 3 separated layers: min. 5 kV or 1,25 x test voltage in Table N.1		N
	- one of 2 separated layers: min. 5 kV or 1,25 x test voltage in Table N.1		N
	No flashover or breakdown occurred		N

**EN 61347-2-13**

Clause	Requirement + Test	Result - Remark	Verdict
--------	--------------------	-----------------	---------

(O)	<b>ANNEX O: ADDITIONAL REQUIREMENTS FOR BUILT-IN ELECTRONIC CONTROLGEAR WITH DOUBLE OR REINFORCED INSULATION</b>		<b>N</b>
(O.6)	Marking		N
	Marking according clause 7 (7)	See clause 7	N
	Special symbol		N
	Meaning of the special symbol explained in catalogue		N
(O.7)	Protection against accidental contact with live parts		N
	Requirements of clause 8 (10)	See clause 8	N
	Test finger not possible to make contact with basic insulated metal parts		N
(O.8)	Terminals		N
	Clause 9 (8)	See clause 9	N
(O.9)	Provision for earthing		N
	Functional earthing terminals comply with clause 9 of part 1		N
	No protective earthing terminal		N
(O.10)	Moisture resistance and insulation		N
	Clause 11 (11)	See clause 11	N
(O.11)	Electric strength		N
	Clause 12 (12)	See clause 12	N
(O.13)	Fault conditions		N
	Clause 14 (14)	See clause 14	N
	End of test, between live part and accessible metal parts or external parts of insulating material in contact with the supporting surface comply with dielectric strength test reduced to 35 % of values according Table 1 in part 1		N
	Insulation resistance according to O.10 between live part and accessible metal parts or external parts of insulating material in contact with the supporting surface not less than 4 MΩ		N
(O.14)	Construction		N
	Clause 17 (15)	See clause 17	N
	Accessible metal parts insulated from live parts by double or reinforced insulation		N
	Live part insulated from supporting surface in contact with external faces by double or reinforced insulation		N



EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
(O.15)	Creepage distances and clearances		N
	Clause 18 (16)	See clause 18	N
	Comply with corresponding values for luminaries in IEC 60598-1		N
(O.16)	Screws, current-carrying parts and connections		N
	Clause 19 (17)	See clause 19	N
(O.17)	Resistance to heat and fire		N
	Clause 20 (18)	See clause 20	N
(O.18)	Resistance to corrosion		N
	Clause 21 (19)	See clause 21	N

<b>(P)</b>	<b>Creepage distances and clearances and distance through isolation (DTI) for lamp controlgear which are protected against pollution by the use of coating or potting</b>		<b>N</b>
(P.1)	General		N
	P.2 applies if creepage distances less than the minimum in Table 7 and 8		N
	P.3 applies if clearance less than the minimum in Table 9, 10 and 11		N
(P.2)	Creepage distances		N
(P.2.2)	Minimum creepage distances for working voltages and rated voltages with frequencies up to 30 kHz (Table P.1)		N
	Basic or supplementary insulation:		N
	Required creepage.....:		—
	Measured.....:		N
	Supplementary information		—
	Reinforced insulation:		N
	Required creepage.....:		—
	Measured.....:		N
	Supplementary information		—
(P.2.3)	Creepage distances for working voltages with frequencies above 30 kHz (Table P.2)		N
	Voltage $\hat{U}_{out}$ kV .....		—
	Frequency.....:		—
	Required distance .....		—
	Measured.....:		N
	Supplementary information		—



EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
(P.2.4)	Compliance with the required creepage distances		N
(P.2.4.1)	Compliance in accordance with 16.3.3 and test according P.2.4.2		N
(P.2.4.3)	Electrical tests after conditioning		N
(P.2.4.3.1)	Insulation resistance and electric strength according Clause 11 and 12		N
(P.3)	Distance through isolation		N
(P.3.4)	Electrical tests after conditioning		N
(P.3.4.1)	Insulation resistance and electric strength according Clause 11 and 12		N
(P.3.4.2)	Impulse voltage dielectrical test		N
	Basic or supplementary insulation:		N
	Working/rated voltage .....		—
	Impulse voltage .....		N
	Supplementary information		—
	Reinforced insulation:		N
	Working/rated voltage .....		—
	Impulse voltage .....		N
	Supplementary information		—

===== End of Report =====



### Photo Documentation

**Model:** ST71A, ST71B, ST71AE, ST71BE, ST71AP, ST71BP.

Photo 1

Description: Over view.

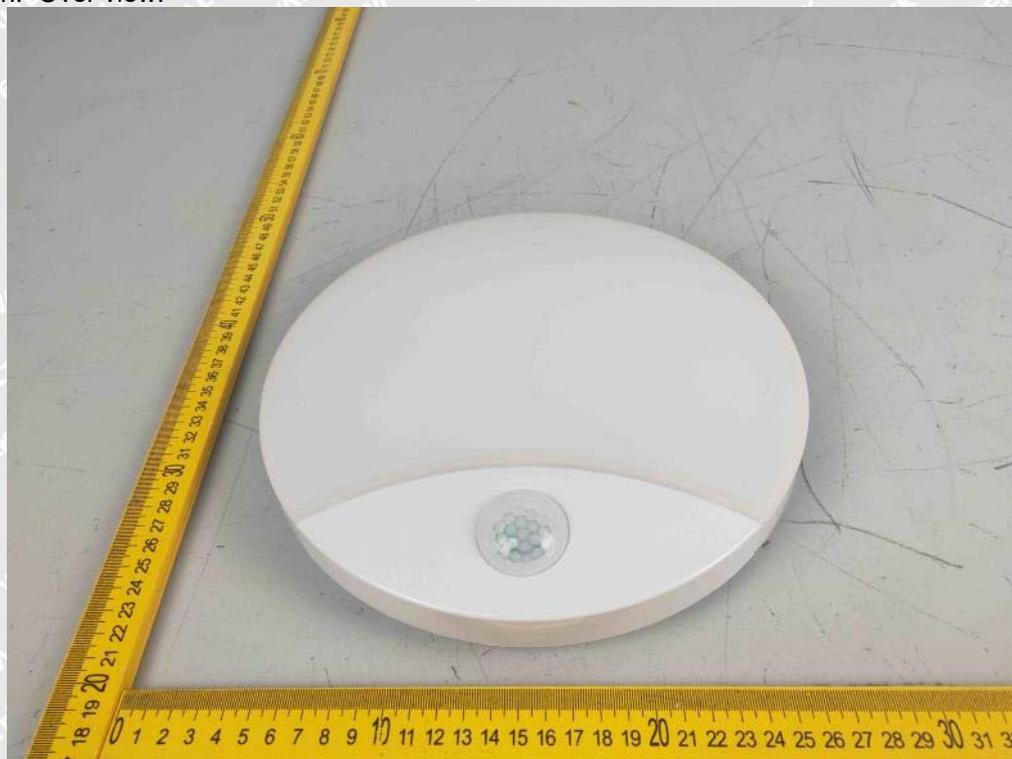


Photo 2

Description: Rear view.





### Photo Documentation

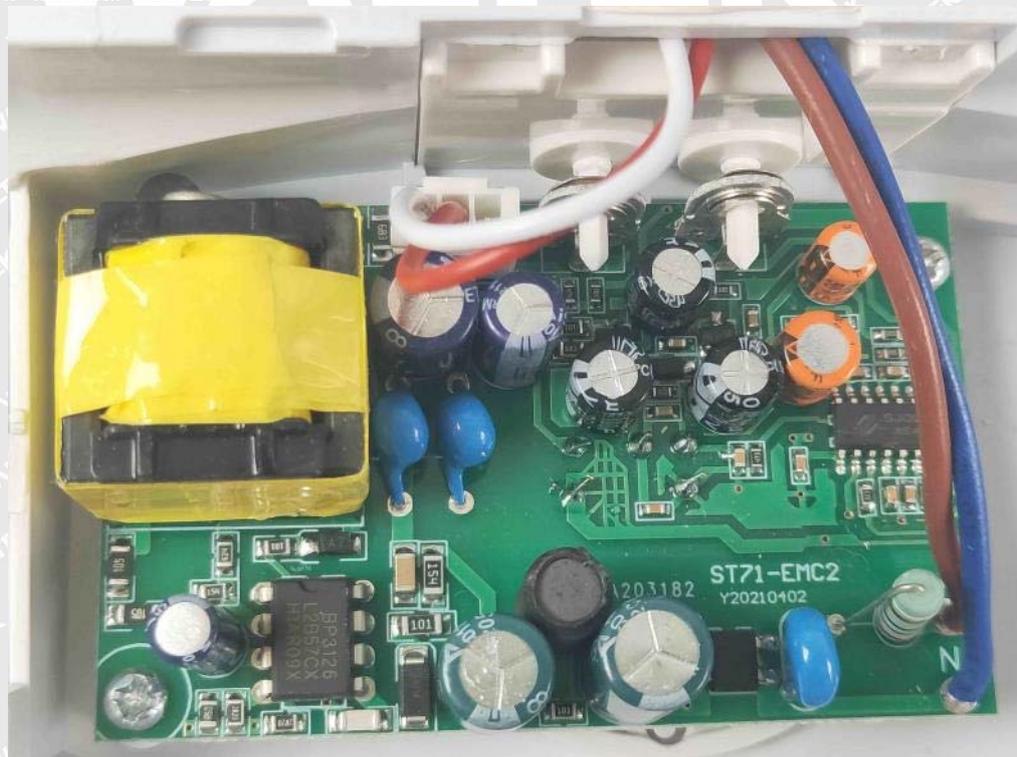
Photo 3

Description: Internal view 1.



Photo 4

Description: Internal view 2.





### Photo Documentation

Photo 5

Description: Internal view 3.

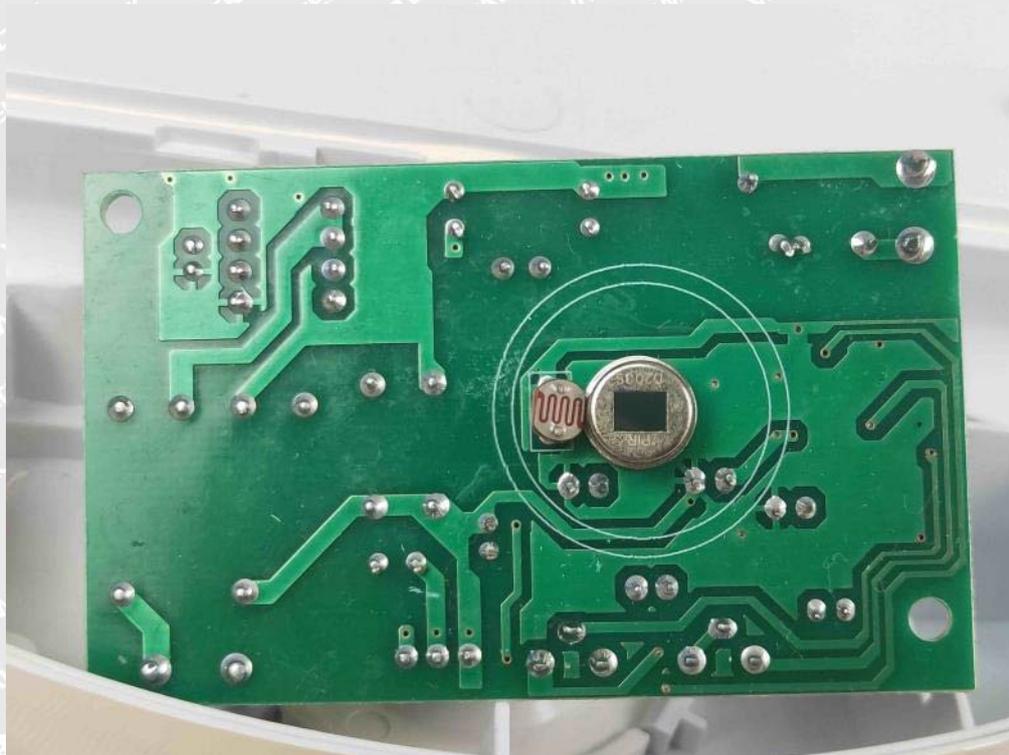


Photo 6

Description: Internal view 4.





### Photo Documentation

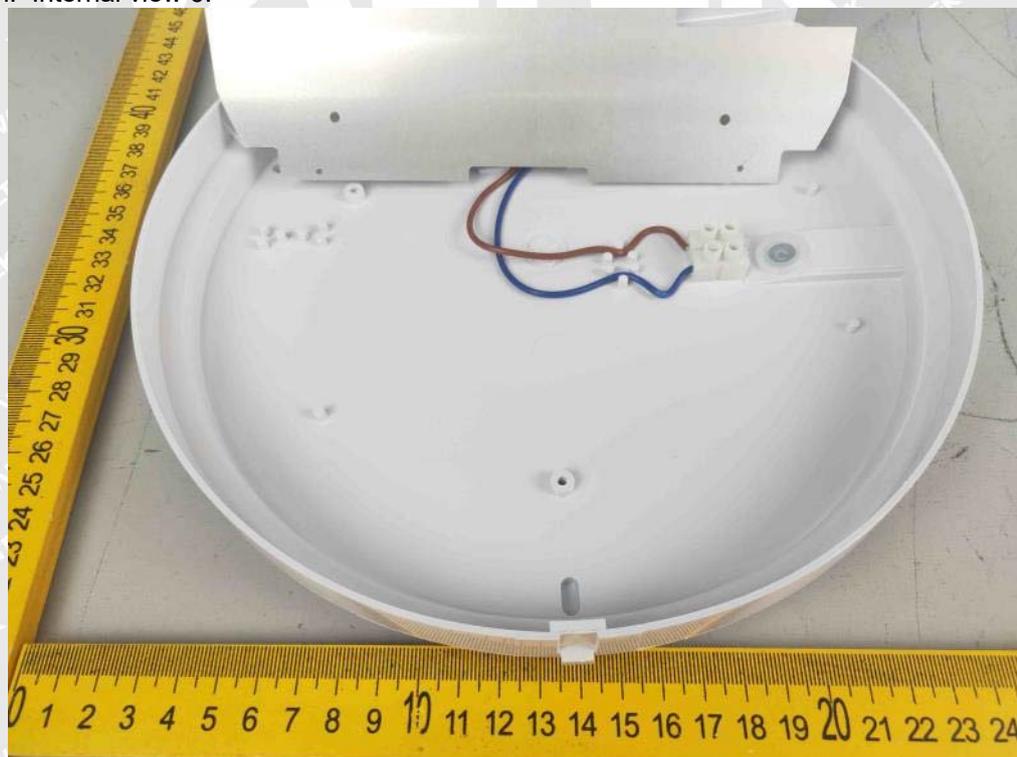
Photo 7

Description: Internal view 5.



Photo 8

Description: Internal view 6.



===== End of Photo =====