



TEST REPORT

Reference No...... : WTU21N09102506L
Applicant..... : LUMATEK LTD.
Address..... : Ewropa Business centre Level 3 – 701, Dun Karm Street Birkirkara
BKR 9034 MALTA
Manufacturer : Same as applicant
Address..... : Same as applicant
Product Name..... : LED Luminaires
Model No..... : ZEUS 465W PRO 2.9
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
LED modules for general lighting - Safety specifications
EN 62471: 2008
Photobiological safety of lamps and lamp systems
EN 62493: 2015
Assessment Of Lighting Equipment Related To Human Exposure To
Electromagnetic Fields
Date of Receipt sample : 2021-09-17
Date of Test : 2021-09-20 to 2021-10-08
Date of Issue..... : 2021-10-12
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.

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Test item description: LED Luminaires

Trade Mark:

LUMATEK

Model/Type reference: ZEUS 465W PRO 2.9

Ratings: 220-240V~, 50/60Hz, 465W, IP65, Class I, ta 25°C

Copy of marking plate:

LUMATEK

LED Fixture

Model:ZEUS 465W PRO 2.9

Power:465W

Input Voltage:220-240Vac,50/60Hz

Input Current:3.4Amax

Light efficiency:2.9μmol/J



RoHS IP65 CE

Remark: 1, On the luminaries exterior surface.

2, Rating label for other models is identical, except for model No.

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.

Summary of testing:

1. 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 61347-2-13:2014+A1:2017 used in conjunction with EN 61347-1:2015 have been evaluated. See annex 6.

- EN IEC 62031:2020 has been evaluated. See annex 7.

- EN 62471:2008 has been evaluated. Classification group: ☒ Exempt ☐ Low risk ☐ Mod risk; See annex 8.

- 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.

2. Only the most unfavorable results are recorded in this report.

**Test items particulars:**

Classification of installation and use.....: Fixed luminaries and indoor use

Supply Connection.....: Supply cord and plug

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. 220-240V~, 50/60Hz, 465W, IP65, Class I

3. Only indoor use.

WALTEK



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

1.4 (2)	CLASSIFICATION		P
1.4 (2.2)	Type of protection (Class 0 excluded)	Class I	—
1.4 (2.3)	Degree of protection (Requirement: Ordinary).....	IP65	—
1.4 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces	Yes ☒ No ☐	—
1.4 (2.5)	Luminaire for normal use	Yes ☒ No ☐	—
	Luminaire for rough service	Yes ☐ No ☒	—

1.5 (3)	MARKING		P
1.5 (3.2)	Mandatory markings	See "Copy of marking plate"	P
	Position of the marking		P
	Format of symbols/text		P
1.5 (3.3)	Additional information		P
	Language of instructions	In English	P
1.5 (3.3.1)	Combination luminaires		N
1.5 (3.3.2)	Nominal frequency in Hz	50/60	P
1.5 (3.3.3)	Operating temperature		N
1.5 (3.3.4)	Symbol or warning notice		N
1.5 (3.3.5)	Wiring diagram		N
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		P
1.5 (3.3.11)	Luminaires with remote control		N
1.5 (3.3.12)	Clip-mounted luminaire – warning		N
1.5 (3.3.13)	Specifications of protective shields		N



IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
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	Type X	P
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 arms reach		N
1.5 (3.3.21)	Non replaceable and non-user replaceable light sources information provided	Non-user replaceable light sources	P
	Cautionary symbol		N
1.5 (3.3.22)	Controllable luminaires, insulation		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

1.6 (4)	CONSTRUCTION		P
1.6 (4.2)	Components replaceable without difficulty		P
1.6 (4.3)	Wireways smooth and free from sharp edges		P
1.6 (4.4)	Lampholders		N
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)	---	—
	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 (Nm)	---	—



IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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
1.6 (4.5)	Starter holders		N
	Starter holder in luminaires other than class II	No starter holder used	N
	Starter holder class II construction		N
1.6 (4.6)	Terminal blocks		N
	Tails		N
	Unsecured blocks		N
1.6 (4.7)	Terminals and supply connections		P
1.6 (4.7.1)	Contact to metal parts		N
1.6 (4.7.2)	Test 8 mm live conductor		N
	Test 8 mm earth conductor		N
1.6 (4.7.3)	Terminals for supply conductors		N
1.6 (4.7.3.1)	Welded connections:		P
	- stranded or solid conductor		P
	- spot welding		P
	- 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		P
1.6 (4.7.5)	Heat-resistant wiring/sleeves		P
1.6 (4.7.6)	Multi-pole plug		P
	- test at 30 N		P
1.6 (4.8)	Switches:		N
	- adequate rating		N
	- adequate fixing		N



IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- polarized supply		N
	- compliance with 61058-1 for electronic switches		N
1.6 (4.9)	Insulating lining and sleeves		N
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
1.6 (4.10)	Insulation of Class II luminaires		N
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:		N
	- fixed		N
	- unable to be replaced; luminaire inoperative		N
	- sleeves retained in position		N
	- lining in lampholder		N
1.6 (4.10.4)	Protective impedance device		P
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		P
	Y1 or Y2 capacitors comply with IEC 60384-14		P
	Resistors comply with test (a) in 14.1 of IEC 60065		N
1.6 (4.11)	Electrical connections and current-carrying parts		P
1.6 (4.11.1)	Contact pressure		P
1.6 (4.11.2)	Screws:		P
	- self-tapping screws		P
	- thread-cutting screws		N



IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.6 (4.11.3)	Screw locking:		P
	- spring washer		P
	- 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
1.6 (4.12)	Screws and connections (mechanical) and glands		P
1.6 (4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N
	Torque test: torque (Nm); part	Screw used for fixing lamp cover: 3,83mm, 1,2Nm	P
	Torque test: torque (Nm); part	Screw used for fixing LED driver: 3,82mm 1,2Nm	P
	Torque test: torque (Nm); part	Screw used for fixing enclosure: 2,85mm 0,5Nm	P
1.6 (4.12.2)	Screws with diameter < 3 mm screwed into metal		P
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
1.6 (4.13)	Mechanical strength		P
1.6 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm)		N
	- other parts; energy (Nm)	Metal enclosure, Lamp cover: 0,35 Nm	P
	1) live parts		P
	2) linings		N
	3) protection		P
	4) covers		P
1.6 (4.13.3)	Straight test finger	30 N	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



IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	d) for temporary installations and suitable for mounting on a stand		N
1.6 (4.13.6)	Tumbling barrel		N
1.6 (4.14)	Suspensions, fixings and means of adjusting		P
1.6 (4.14.1)	Mechanical load:		P
	A) four times the weight	9,839kg x 4 =39,356kg	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)	---	N
	Stress in conductors (N/mm ²)	---	N
	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
1.6 (4.15)	Flammable materials:		P
	- 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



IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	b) temperature sensing control		N
	c) surface temperature		N
1.6 (4.16)	Luminaires for mounting on normally flammable surfaces		P
	No lamp control gear..... (compliance with Section 12)		N
1.6 (4.16.1)	Lamp control gear spacing:		P
	- spacing 35 mm		N
	- spacing 10 mm		P
1.6 (4.16.2)	Thermal protection:		N
	- in lamp control gear		N
	- 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
1.6 (4.17)	Drain holes		N
	Clearance at least 5 mm		N
1.6 (4.18)	Resistance to corrosion:		P
1.6 (4.18.1)	- rust-resistance		P
1.6 (4.18.2)	- season cracking in copper		N
1.6 (4.18.3)	- corrosion of aluminium		P
1.6 (4.19)	Ignitors compatible with ballast		N
1.6 (4.20)	Rough service vibration		N
1.6 (4.21)	Protective shield:		N
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
1.6 (4.24)	Photobiological hazards		P
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



IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Class of risk group assessed according to IEC/TR 62778.....:	RG1 Unlimited	—
	Luminaires with E_{thr}		N
	a) Fixed luminaires		N
	- 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
1.6 (4.25)	Mechanical hazard		P
	No sharp point or edges		P
1.6 (4.26)	Short-circuit protection:		N
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 according to Figure 29		N
	Test sample not exceed values of Table 12.1 and 12.2		N
1.6 (4.27)	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N
	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
1.6 (4.28)	Fixing of thermal sensing control		N
	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 ($^{\circ}\text{C}$)		—
	100 cycles between t min and t max		N



IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Temperature sensing control still in position		N
1.6 (4.29)	Luminaires with non-replaceable light source		N
	Not possible to replace light source		N
	Live part not accessible after parts have been opened by hand or tools		N
1.6 (4.30)	Luminaires with non-user replaceable light source		P
	If protective cover provide protection against electric shock and marked with "caution, electric shock risk" symbol:		N
	Minimum two fixing means		N
1.6 (4.31)	Insulation between circuits		P
	Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3		P
	Controllable luminaires requiring same level of insulation for all components, the insulation between control terminals and LV supply fulfil requirements according 4.31.1 – 4.31.3		N
1.6 (4.31.1)	SELV circuits		P
	Used SELV source		P
	Voltage $\leq$ ELV		P
	Insulating of SELV circuits from LV supply		P
	Insulating of SELV circuits from other non SELV circuits		P
	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		P
	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
1.6 (4.31.2)	FELV circuits		N
	Used FELV source		N
	Voltage $\leq$ ELV		N
	Insulating of FELV circuits from LV supply		N
	FELV circuits insulated from accessible parts according Table X.1		N
	Plugs not able to enter socket-outlets of other voltage systems		N



IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Socket outlets does not admit plugs of other voltage systems		N
	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
1.6 (4.32)	Overvoltage protective devices		N
	Comply with IEC 61643-11		N
	External to control gear and connected to earth:		N
	- only in fixed luminaires		N
	- only connected to protective earth		N

1.7 (11)	CREEPAGE DISTANCES AND CLEARANCES		P
1.7 (11.2.1)	Impulse withstand category (Normal category II)	Category II ☒ Category III ☐	—
	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
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1.8 (7)	PROVISION FOR EARTHING		P
1.8 (7.2.1 + 7.2.3)	Accessible metal parts		P
	Metal parts in contact with supporting surface		P
	Resistance < 0,5 Ω	0,19Ω	P
	Self-tapping screws used		P
	Thread-forming screws		N
	Thread-forming screw used in a grove		N
	Earth makes contact first		P
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N
	Protective earthing of the luminaire not via built-in control gear		P
1.8 (7.2.2 + 7.2.3)	Earth continuity in joints etc.		P
1.8 (7.2.4)	Locking of clamping means		P
	Compliance with 4.7.3		P
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N
1.8 (7.2.5)	Earth terminal integral part of connector socket		P
1.8 (7.2.6)	Earth terminal adjacent to mains terminals		P
1.8 (7.2.7)	Electrolytic corrosion of the earth terminal		P
1.8 (7.2.8)	Material of earth terminal		P
	Contact surface bare metal		P
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		P
	Length of earth conductor		N

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

1.9 (15)	SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS		N
	Separately approved; component list	(see Annex 1)	N



IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Part of the luminaire	(see Annex 4)	N
1.10 (5)	EXTERNAL AND INTERNAL WIRING		P
1.10 (5.2)	Supply connection and external wiring		P
1.10 (5.2.1)	Means of connection	Supply cord and plug	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	(see Annex 1)	P
	Nominal cross-sectional area (mm ²)	(see Annex 1)	P
	Cables equal to IEC 60227 or IEC 60245		P
1.10 (5.2.3)	Type of attachment, X, Y or Z	Type X	P
1.10 (5.2.5)	Type Z not connected to screws		N
1.10 (5.2.6)	Cable entries:		N
	- suitable for introduction		N
	- adequate degree of protection		N
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:		P
	- covering protected from abrasion		P
	- clear how to be effective		P
	- no mechanical or thermal stress		P
	- no tying of cables into knots etc.		P
	- insulating material or lining		P
1.10 (5.2.10.1)	Cord anchorage for type X attachment:		P
	a) at least one part fixed		P
	b) types of cable		P
	c) no damaging of the cable		P
	d) whole cable can be mounted		P
	e) no touching of clamping screws		N



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Clause	Requirement + Test	Result - Remark	Verdict
	f) metal screw not directly on cable		P
	g) replacement without special tool		P
	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		P
	Wire ends tinned: no cold flow		N
1.10 (5.2.14)	Mains plug same protection		P
	Class III luminaire plug		N
	No unsafe compatibility		P
1.10 (5.2.16)	Appliance inlets (IEC 60320)		N
	Installation couplers (IEC 61535)		N
	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		P
	- IEC 60083		N
	- other standard	VDE 0620	P
1.10 (5.3)	Internal wiring		P
1.10 (5.3.1)	Internal wiring of suitable size and type	(see Annex 1)	P
	Through wiring		N
	- not delivered/ mounting instruction		N
	- factory assembled		N
	- socket outlet loaded (A)	---	N



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Clause	Requirement + Test	Result - Remark	Verdict
	- temperatures.....:	(see Annex 2)	N
	Green-yellow for earth only		P
1.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		N
	Cross-sectional area (mm ²).....:	(see Annex 1)	N
	Insulation thickness		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
	Adequate cross-sectional area and insulation thickness		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		P
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.		N
	Joints, raising/lowering devices		N
	Telescopic tubes etc.		N
	No twisting over 360°		P
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		N
	Wire ends tinned: no cold flow		P
1.10 (5.4)	Test to determine suitability of conductors having a reduced cross-sectional area		N
	Under test the temperature of the luminaire wiring insulation not exceed the limits stated in Table 12.2	(see Annex 2)	N



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Clause	Requirement + Test	Result - Remark	Verdict
	No damage to luminaire wiring after test		N
1.11 (8)	PROTECTION AGAINST ELECTRIC SHOCK		P
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
	Lampholder 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
	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:		N
	- basic insulated metal parts not accessible during starter or lamp replacement		N
	- basic insulation not accessible other than during starter or lamp replacement		N
	- 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
	Other than ordinary luminaire:		N
	- nominal voltage : ---		N



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Clause	Requirement + Test	Result - Remark	Verdict
	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 have 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 μ F not exceed 50 V 1 min after disconnection		N
	Portable luminaire with capacitor > 0,1 μ F (0.25) not exceed 34 V 1 s after disconnection		N
	Other luminaires with capacitor > 0,1 μ F (0.25) with plug and track adaptors not exceed 60 V 5 s after disconnection	3,1 μ F,24V	P

1.12 (12)	ENDURANCE TEST AND THERMAL TEST		P
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		—
1.12 (12.3)	Endurance test:		P
	- mounting-position	Acc. to user manual	—
	- test temperature (°C)	35°C	—
	- total duration (h)	168 h	—
	- supply voltage: Un factor; calculated voltage (V):	264V	—
	- lamp used	Integral LED module	—
1.12 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N
	- marking legible		P
	- no cracks, deformation etc.		P
1.12 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
1.12 (12.5)	Thermal test (abnormal operation)	(see Annex 2)	P
1.12 (12.6)	Thermal test (failed lamp control gear condition):		N
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		N



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Clause	Requirement + Test	Result - Remark	Verdict
	- measured winding temperature (°C): at 1,1 Un ..	---	—
	- measured mounting surface temperature (°C) at 1,1 Un	---	N
	- calculated mounting surface temperature (°C) ...	---	N
	- track-mounted luminaires		N
1.12 (12.6.2)	Temperature sensing control		N
	- case of abnormal conditions.....	---	—
	- thermal link		N
	- manual reset cut-out		N
	- auto reset cut-out		N
	- measured mounting surface temperature (°C)...	---	N
	- track-mounted luminaires		N
1.12 (12.7)	Thermal test (failed lamp control gear in plastic luminaires):		N
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 V	---	—
	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 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.....	---	—



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Clause	Requirement + Test	Result - Remark	Verdict
	- calculated temperature of fixing point/exposed part (°C)	---	—
	Ball-pressure test.....	See 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
1.12 (12.7.2)	Luminaire with temperature sensing control		N
	- thermal link	Yes ☐ No ☐	—
	- manual reset cut-out.....	Yes ☐ No ☐	—
	- auto reset cut-out.....	Yes ☐ No ☐	—
	- case of abnormal conditions.....		—
	- highest measured temperature of fixing point/exposed part (°C):.....	---	—
	Ball-pressure test:.....	See Table 1.15 (13.2.1)	N

1.13 (9)	RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE	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	IP65
	- mounting position during test	Acc. to user manual
	- fixing screws tightened; torque (Nm).....	---
	- tests according to clauses	Cl. 9.2.2 & 9.2.6
	- electric strength test afterwards	P
	a) no deposit in dust-proof luminaire	N
	b) no talcum in dust-tight luminaire	P
	c) no trace of water on current-carrying parts or SELV parts or 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



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Clause	Requirement + Test	Result - Remark	Verdict
	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		N
	g) no damage of protective shield or glass envelope		N
1.13 (9.3)	Humidity test 48 h	25 °C, 93%RH	P
1.14 (10)	INSULATION RESISTANCE AND ELECTRIC STRENGTH		P
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	—
	SELV:		P
	- between current-carrying parts of different polarity	---	N
	- between current-carrying parts and mounting surface	100 MΩ	P
	- between current-carrying parts and metal parts of the luminaire	100 MΩ	P
	- 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	100 MΩ	P
	- between live parts and mounting surface	100 MΩ	P
	- between live parts and metal parts	100 MΩ	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 (10.2.2)	Electric strength test		P
	Dummy lamp		N
	Luminaires with ignitors after 24 h test		N
	Luminaires with manual ignitors		N
	Test voltage (V):	See below	P
	SELV:		P



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Clause	Requirement + Test	Result - Remark	Verdict
	- between current-carrying parts of different polarity	---	N
	- between current-carrying parts and mounting surface	500V	P
	- between current-carrying parts and metal parts of the luminaire	500V	P
	- 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	1480V	P
	- between live parts and metal parts	1480V	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)	Protective conductor current Max. 0,932mA < 3,5mA	P
1.15 (13)	RESISTANCE TO HEAT, FIRE AND TRACKING		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 (13.4.1)	Proof tracking test (IEC 60112)	See Test Table 1.15 (13.4)	N



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Clause	Requirement + Test				Result - Remark		Verdict
1.7 (11.2)	TABLE: Creepage distances and clearances						P
	Minimum distances (mm) for a.c. (50/60 Hz) sinusoidal voltages						—
	Applicable part of IEC 60598-1 Table 11.1* and 11.2*						—
	Insulation type **	Measured clearance	Required		Measured creepage	Required	
			clearance	*Table		creepage	*Table
Distance 1:	B	6,1	1,5	11.1	6,1	2,5	11.1
Working voltage (V).....:					240V~		—
PTI.....:					< 600 ☒ ≥ 600 ☐		—
Pulse voltage if applicable (kV)					---		—
Supplementary information: Different polarities							
Distance 2:	B	>6,1	1,5	11.1	>6,1	2,5	11.1
Working voltage (V).....:					240V~		—
PTI.....:					< 600 ☒ ≥ 600 ☐		—
Pulse voltage if applicable (kV)					---		—
Supplementary information: Live part and the outer accessible part							
Distance 3:	B	>6,1	1,5	11.1	>6,1	2,5	11.1
Working voltage (V).....:					240V~		—
PTI.....:					< 600 ☒ ≥ 600 ☐		—
Pulse voltage 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

1.15 (13.2.1)	TABLE: Ball Pressure Test of Thermoplastics				P
Allowed impression diameter (mm)		≤2mm			—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)		Impression diameter (mm)	
Lamp cover	See annex 1	77		1,5	
End plastic of lamp cover		75		1,4	
Main PCB		125		0,9	
Bobbin of T1		125		1,6	
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	



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Clause	Requirement + Test		Result - Remark		Verdict
Main PCB	See annex 1	10s	No	0	P
Bobbin of T1		10s	No	1	P
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
Lamp cover	See annex 1		No	0	P
insulation paper			No	0	P
End plastic of lamp cover			No	0	P
K1			No	0	P
Any flame or glowing of the sample extinguished within 30 s of withdrawing the glow-wire, and any burning or molten drop did not ignite the underlying parts (Yes/No).....					Yes
Supplementary information:					

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:					



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Clause	Requirement + Test	Result - Remark	Verdict
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ANNEX 1	TABLE: Critical components information					P
Object / part No.	Code	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
Plug	B	Chau's Electrical Co., Ltd.	CE-501S	250 V 16A	VDE 0620-2-1	VDE 40006607
Alt.	B	NINGBO XUANHUA ELECTRIC CO. LTD.	XH-03B	250 V 16A	VDE 0620-2-1	VDE 40019692
Alt.	B	NINGBO XUANHUA ELECTRIC CO. LTD.	XH-03	250 V 16A	VDE 0620-2-1	VDE 40019691
Alt.	B	New Square Company Ltd.	NS-20	250 V 16A	VDE 0620-2-1	VDE 40012985
Supply cord	B	Chau's Electrical Co., Ltd.	H05VV-F	3×1,0mm ²	EN 50525-2-11	VDE 40022055
Alt.	B	Ningbo Xuanhua Electric Co., Ltd.	H05VV-F	3×1,0mm ²	EN 50525-2-11	VDE 40047946
Alt.	B	NINGBO XUANHUA ELECTRIC CO. LTD.	H05VV-F	3×1,0mm ²	EN 50525-2-11	VDE 40038850
Alt.	B	Dong Guan Ever United	H05VV-F	3×1,0mm ²	EN 50525-2-21	VDE 098629
Alt.	B	Shenzhen Lilutong Technology	H05VV-F	3×1,0mm ²	EN 50525-2-11	VDE 40043199
Alt.	B	New Square Company Ltd.	H05VV-F	3×1,0mm ²	EN 50525-2-11	VDE 116006
Lamp cover	C	Jiangyin jiuhe plastics	--	V2	EN 60598-1 EN 60598-2-1	Tested with appliance
Output wire to LED board	B	Shenzhen Lilutong Technology	H05VV-F	2×1,5mm ²	EN 50525-2-11	VDE 40043199
Alt.	B	Chau's Electrical Co., Ltd.	H05VV-F	2×1,5mm ²	EN 50525-2-11	VDE 40022055
Alt.	B	Ningbo Xuanhua Electric Co., Ltd.	H05VV-F	2×1,5mm ²	EN 50525-2-11	VDE 40047946



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Clause	Requirement + Test			Result - Remark		Verdict
Alt.	B	NINGBO XUANHUA ELECTRIC CO. LTD.	H05VV-F	2×1,5mm ²	EN 50525-2-11	VDE 40038850
Alt.	B	Dong Guan Ever United	H05VV-F	2×1,5mm ²	EN 50525-2-21	VDE 098629
Alt.	B	New Square Company Ltd.	H05VV-F	2×1,5mm ²	EN 50525-2-11	VDE 116006
X capacitor (CX1,CX2,CX3)	B	XIAMEN FARATRONIC	MKP62	1uF, 305V,T110	IEC60384-14	VDE 40000358
Alt.	B	Nistrionics (Jiangxi) Co., Ltd.	MPR	1uF, 310V T110	IEC60384-14	VDE 40032056
Alt.	B	Tenta Electric Industrial Co. Ltd.	MEX	1uF, 310V T110	IEC60384-14	VDE400359 83
Alt.	B	Yangzhou Nissei Electronics	MP1	1uF, 310V T110	IEC60384-14	VDE 40041628
Alt.	B	ZHUHAI SUNG HO ELECTRONICS CO LTD	CMPP	1uF, 310V T110	IEC60384-14	VDE 40026078
Y capacitor (CY2,CY3,CY11)	B	MURATA MFG CO LTD	KY	1000pF 250VAC,T125	IEC 60384-14	VDE 40006273
Alt.	B	SUCCESS ELECTRONICS CO LTD	SF	1000pF 250VAC,T125	IEC 60384-14	VDE 40016621
Alt.	B	Samwha Capacitor Co., Ltd.	SD	1000pF 250VAC,T125	IEC 60384-14	VDE 40015804
Alt.	B	JYH HSU (JEC) ELECTRONICS LTD	JD	1000pF 250VAC,T125	IEC 60384-14	VDE 40038642
Alt.	B	TDK Corporation Honjo Factory	CD	1000pF 250VAC,T125	IEC 60384-14	VDE 40017931
Y capacitor(CY4)	B	MURATA MFG CO LTD	KY	2200pF 400VAC,T125	IEC 60384-14	VDE 40006273
Alt.	B	SUCCESS ELECTRONICS CO LTD	SF	2200pF 400VAC,T125	IEC 60384-14	VDE 40016621
Alt.	B	Samwha Capacitor Co., Ltd.	SD	2200pF 400VAC,T125	IEC 60384-14	VDE 40015804



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Clause	Requirement + Test			Result - Remark		Verdict
Alt.	B	JYH HSU (JEC) ELECTRONICS LTD	JD	2200pF 400VAC,T125	IEC 60384-14	VDE 40038642
Alt.	B	TDK Corporation Honjo Factory	CD	2200pF 400VAC,T125	IEC 60384-14	VDE 40017931
Y capacitor(CY6 /CY7/CY8/CY9)	B	MURATA MFG CO LTD	KX	1000pF 250VAC,T125	IEC 60384-14	VDE 40002831
Alt.	B	SUCCESS ELECTRONICS CO LTD	SF	1000pF 250VAC,T125	IEC 60384-14	VDE 40016621
Alt.	B	Samwha Capacitor Co., Ltd.	SD	1000pF 250VAC,T125	IEC 60384-14	VDE 40015804
Alt.	B	JYH HSU (JEC) ELECTRONICS LTD	JD	1000pF 250VAC,T125	IEC 60384-14	VDE 40038642
Alt.	B	TDK Corporation Honjo Factory	CD	1000pF 250VAC,T125	IEC 60384-14	VDE 40017931
K1	B	Xiamen Hongfa Electroacoustic Co.,Ltd	HF32F-G Series(s)	250V,10A,T85	EN 61810-1	VDE 40012204
Alt.	B	Xiamen Hongfa Electroacoustic Co.,Ltd .	HF14FW	250V,16A,T85	EN 61810-1	VDE 40023508
Alt.	B	SONG CHUAN PRECISION CO.,LTD.	793-P-1A	250V,16A,T85	EN 61810-1	TUV R50056914
VR(ZNR1, ZNR3, ZNR4)	B	THINKING ELECTRONIC INDUSTRIAL CO., LTD.	TVR14511	510V,D14,T85	IEC 61051	VDE 005944
Alt.	B	Xiamen Wanming Electronics CO.,LTD	14D511K	510V,D14,T85	IEC 61051	VDE 40043176
Alt.	B	BRIGHTKING INC	511KD14	510V,D14,T85	IEC 61051	VDE 40027827
Alt.	B	Guangdong Fenghua Advanced Technology Holding CO.,LTD.	FNR-14K511	510V,D14,T85	IEC 61051	VDE 40008242
Optocoupler (OP1/OP2)	B	Everlight Electronics Co., Ltd.	EL357N	SOP-4, T110	IEC 60747-5-5	VDE 13224 9



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Clause	Requirement + Test			Result - Remark		Verdict
PCB board	C	KUNSHAN JINPENG ELECTRONICS CO LTD	JP-2 ,JP-1	V-0, 130°C	IEC 60127	UL E306084 and Tested with appliance
Alt.	C	Kunshan SuyuanElectronic Group Co., Ltd.	MSY	V-0, 130°C	IEC 60127	UL E233870 and Tested with appliance
Alt.	C	SUZHOU XINKE ELECTRONICS CO LTD	XK-2, XK-3	V-0, 130°C	IEC 60127	UL E231590 and Tested with appliance
Alt.	C	ANHUI HONGXIN ELECTRONIC TECHNOLOGY CO LTD	HX-03,HX-02	V-0, 130°C	IEC 60127	UL E468758 and Tested with appliance
Alt.	C	GLOBAL SUCCESS CIRCUITS CO LTD	T-1	V-0, 130°C	IEC 60127	UL E324220 and Tested with appliance
Transformer	C	Suzhou Wolici Electronic Technology Company Limited	M-5-01-000228	Class F	EN 61347-1 EN 61347-2-13	Tested with appliance
- Pri. winding of T1	C	HANGZHOU WEIFENG ELECTRONIC CO LTD	UEWF-LITZ	155°C	EN 61347-1 EN 61347-2-13	E229341 and Tested with appliance
- Sec. winding of T1	C	HANGZHOU WEIFENG ELECTRONIC CO LTD	UEWF-LITZ	155°C	EN 61347-1 EN 61347-2-13	E229341 and Tested with appliance
- Bobbin of T1	C	CHANG CHUN PLASTICS CO.,LTD	T375J	V-0,150°C	EN 61347-1 EN 61347-2-13	UL E59481 and Tested with appliance
Alt.	C	SUMITOMO BAKELITE CO LTD	PM-9820	V-0,150°C	EN 61347-1 EN 61347-2-13	UL E41429 and Tested with appliance
- Insulation tape	D	CHANGYUAN ELECTRONICS GROUP CO LTD	CB-TT-L	200°C ,	EN 61347-1 EN 61347-2-13	UL E180908 and Tested with appliance



IEC 60598-2-1						
Clause	Requirement + Test			Result - Remark		Verdict
Alt.	D	GREAT HOLDING INDUSTRIAL CO LTD	TFL	200°C,	EN 61347-1 EN 61347-2-13	UL E156256 and Tested with appliance
Transformer of T301	C	Suzhou Wolici Electronic Technology Company Limited	10-053	Class F	EN 61347-1 EN 61347-2-13	Tested with appliance
-Pri.winding of T301	C	NINGBO JINTIAN NEW MATERIAL CO LTD	QA-X/155	155°C	EN 61347-1 EN 61347-2-13	UL E227047 and Tested with appliance
-Sec.winding of T301	C	SUZHOU YUSHENG ELECTRONIC CO LTD	FIW-F	155°C	EN 61347-1 EN 61347-2-13	UL E332529 and Tested with appliance
-Bobbin of T301	C	CHANG CHUN PLASTICS CO.,LTD	T375J	V-0,150°C	EN 61347-1 EN 61347-2-13	UL E59481 and Tested with appliance
Alt.	C	SUMITOMO BAKELITE CO LTD	PM-9820	V-0,150°C	EN 61347-1 EN 61347-2-13	UL E41429 and Tested with appliance
- Teflon tube	C	CHANGYUAN ELECTRONICS GROUP CO LTD	CB-TT-L	200°C,	EN 61347-1 EN 61347-2-13	UL E180908 Tested with appliance
Alt.	C	CHANGYUAN ELECTRONICS GROUP CO LTD	CB-TT-L	200°C,	EN 61347-1 EN 61347-2-13	UL E180908 Tested with appliance
LED package(White)	C	LUMILEDS MALAYSIA SDNBHD	L130-4080003000X21	4000K	EN 62471 IEC TR 62778	Tested with appliance
Alt.	C	LEDSTAR INC	LDR-3030TTB4080	IF:300mA; VF:2,7V; CCT:4000K	IEC 62471 IEC/TR 62778	Tested with appliance
Alt.	C	LUMILEDS	L130-4080HA30000B1	IF: 480mA VF:2,71V CCT: 4000K	IEC 62471 IEC/TR 62778	Tested with appliance
LED package(Red)	C	OSRAM	GHCSSRM3.24	700mA;2,1V	EN 62471 IEC TR 62778	Tested with appliance
Alt.	C	OSRAM	GH CSSRM4.24	IF: 700mA VF:2,0V	EN 62471 IEC TR 62778	Tested with appliance



IEC 60598-2-1						
Clause	Requirement + Test			Result - Remark		Verdict
Insulation paper	C	SICHUAN DONGFANG INSULATING MATERIAL CO LTD	DF6025	V-0, 105°C	EN 60598-1 EN 60598-2-1	UL E199019 and Tested with appliance
Alt.	C	SKC CO LTD	SG82	V-2, 105°C	EN 60598-1 EN 60598-2-1	UL E74359 and Tested with appliance
Alt.	C	SICHUAN DONGFANG INSULATING MATERIAL CO LTD	DF6025	V-2, 105°C	EN 60598-1 EN 60598-2-1	UL E199019 and Tested with appliance
Alt.	C	JIANGSU YUXING FILM TECHNOLOGY CO LTD	6027D	V-0, 105°C	EN 60598-1 EN 60598-2-1	UL E212271 and Tested with appliance
Supplementary information: ¹⁾ Provided evidence ensures the agreed level of compliance. See OD-CB2039. The codes above have the following meaning: A - The component is replaceable with another one, also certified, with equivalent characteristics B - The component is replaceable if authorised by the test house C - Integrated component tested together with the appliance D - Alternative component						



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

ANNEX 2	TABLE: Thermal tests of Section 12		P
	Type reference	ZEUS 465W PRO 2.9	—
	Lamp used.....	Integral LED module	—
	Lamp control gear used	Integral control	—
	Mounting position of luminaire	Acc. to user manual	—
	Supply wattage (W).....	489	—
	Supply current (A)	1,971	—
	Temperatures in test 1 - 4 below are corrected for t_a (°C)	25	—
	- abnormal operating mode	---	—
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	1,06x240V=254,4V	—
	- 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.....	1,1x240V=264V	—

Temperature measurements (°C)

Part	Ambient	Cl. 12.4 – normal				Cl. 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Plug	25	--	28,1	---	90	--	--
Supply cord	25	--	32,0	---	90	--	--
Lamp cover	25	--	52,0	---	Cl.13	--	--
End plastic of lamp cover	25	--	44,2	---	Cl.13	--	--
Lead wire of LED board	25	--	52,6	---	105	--	--
Output wire to LED board	25	--	38,1	---	150	--	--
Output wire of diming	25	--	31,4	---	90	--	--
CX1	25	--	56,2	---	110	--	--
CX2	25	--	53,4	---	110	--	--



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Clause	Requirement + Test			Result - Remark			Verdict
CX3	25	--	52,9	---	110	--	--
CY2	25	--	50,7	---	125	---	---
CY3	25	--	48,4	---	125	---	---
CY4	25	--	52,4	---	125	---	---
CY6	25	--	50,1	---	125	---	---
CY7	25	--	51,1	---	125	---	---
CY8	25	--	48,7	---	125	---	---
CY9	25	--	49,2	---	125	---	---
K1	25	--	53,7	---	85	---	---
ZNR1	25	--	53,0	---	85	---	---
ZNR3	25	--	50,7	---	85	---	---
ZNR4	25	--	52,1	---	85	---	---
C18	25	--	54,6	---	105	---	---
C4	25	--	56,1	---	105	---	---
C307	25	--	54,4	---	105	---	---
C309	25	--	54,5	---	105	---	---
C313	25	--	56,4	---	105	---	---
C8	25	--	48,5	---	105	---	---
C9	25	--	52,2	---	105	---	---
C10	25	--	49,7	---	105	---	---
C11	25	--	51,6	---	105	---	---
C12	25	--	49,2	---	105	---	---
C13	25	--	54,2	---	105	---	---
C14	25	--	56,6	---	105	---	---
C155	25	--	27,9	---	105	---	---
Optocoupler(U8)	25	--	50,5	---	110	---	---
Optocoupler(U9)	25	--	50,2	---	110	---	---
Optocoupler(U11)	25	--	50,8	---	110	---	---



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Clause	Requirement + Test			Result - Remark			Verdict
Main PCB	25	--	54,5	---	Cl.13	---	---
Pri.winding of T1	25	--	75,3	---	130	76,6	180
Sec.winding of T1	25	--	72,7	---	130	75,4	180
Bobbin of T1	25	--	71,2	---	Cl.13	---	---
Insulation paper	25	--	52,6	---	Ref.	---	---
Mounting surface (flammable surface)	25	--	32,0	---	90	32,0	130
Surface illuminated by lamp(0.1m)	25	--	29,9	---	90	---	---
Supplementary information:							

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
ANNEX 3	Screw terminals (part of the luminaire)		N
(14)	SCREW TERMINALS		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 ²)		—
(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



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Clause	Requirement + Test	Result - Remark	Verdict
ANNEX 4	Screwless terminals (part of the luminaire)		N
(15)	SCREWLESS TERMINALS		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
15.6.2	Mechanical tests		N



IEC 60598-2-1											
Clause	Requirement + Test					Result - Remark					Verdict
(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
(15.6.3.1) (15.6.3.2)	TABLE: Contact resistance test / Heating tests										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					---					N
	Voltage drop after 10th alt. 25th cycle										N
	Max. allowed voltage drop (mV) :					---					—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)	---	---	---	---	---	---	---	---	---	---	
	Voltage drop after 50th alt. 100th cycle										N
	Max. allowed voltage drop (mV) :					---					—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)	---	---	---	---	---	---	---	---	---	---	
	Continued ageing: voltage drop after 10th alt. 25th cycle										N
	Max. allowed voltage drop (mV) :					---					—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)	---	---	---	---	---	---	---	---	---	---	
	Continued ageing: voltage drop after 50th alt. 100th cycle										N
	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
ANNEX 5	EU Group Differences (EN 60598-1:2015+A1:2018 and EN 60598-2-1:1989)		P
1.5 (3)	MARKING		N
1.5 (3.3.101)	For luminaires not supplied with terminal block: Adequate warning on the package		N
1.6 (4)	CONSTRUCTION		N
1.6 (4.11.6)	Electro-mechanical contact systems		N
1.10 (5)	EXTERNAL AND INTERNAL WIRING		P
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		P
	Replace table 5.1 – Supply cord		P
1.12 (12)	ENDURANCE TESTS AND THERMAL TESTS		P
1.12 (12.4.2c)	Thermal test (normal operation) see footnote c to table 12.2 relating to unsleeved fixed wiring		P
ZB	ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)		N
(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
ZC	ANNEX ZC, NATIONAL DEVIATIONS (EN)		N
(4 & 5)	FR: Shuttered socket-outlets 10/16A		N
	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

**EU Group Differences**

Clause	Requirement + Test	Result - Remark	Verdict
	- 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

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Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 6	Lamp controlgear - Particular requirements for d.c. or a.c. supplied electronic controlgear for LED modules according to EN 61347-2-13:2014+A1:2019 used in conjunction with EN 61347-1:2015		P
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4 (4)	GENERAL REQUIREMENTS		P
- (4)	Insulation materials according requirements in Annex N of IEC 61347-1	(see Annex N)	P
- (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)	P
4 (-)	Transformer comply with IEC 61558		P
	Dielectric strength test of insulated winding wires is limited to 3 kV if input voltage ≤ 300 V		N

6 (6)	CLASSIFICATION			P
	Built-in controlgear	Yes ☐	No ☒	—
	Independent controlgear	Yes ☐	No ☒	—
	Integral controlgear	Yes ☒	No ☐	—
6 (-)	Auto-wound controlgear	Yes ☐	No ☒	—
	Separating controlgear	Yes ☐	No ☒	—
	Isolating controlgear	Yes ☒	No ☐	—
	SELV controlgear	Yes ☒	No ☐	—

7 (7)	MARKING		N
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
	f) earthing symbol		N



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Clause	Requirement + Test	Result - Remark	Verdict
	k) wiring diagram		N
	l) value of t_c		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)		N
	- output terminals and earth (V)		N
7.1 (-)	Constant voltage type:	Yes ☐ No ☐	—
	- rated output power P_{rated} (W)		N
	- rated output voltage U_{rated} (V)		N
	Constant current type:	Yes ☐ No ☐	—
	- 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 ²)		N
	j) number, type and wattage of lamp(s)		N
	s) SELV symbol		N
7.2 (-)	- declaration of mains connected windings		N

8 (10)	PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS		P
- (10.1)	Controlgear protected against accidental contact with live parts		P
- (A2)	Voltage measured with 50 k Ω	(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
- (10.2)	Capacitors > 0,5 μ F: voltage after 1 min (V): < 50 V	3,1 μ F, 24V	P



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Clause	Requirement + Test	Result - Remark	Verdict
- (10.3)	Controlgear providing SELV		P
	Accessible conductive parts are insulated from live parts by double or reinforced insulation in SELV controlgear		P
	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		P
	SELV outputs separated by at least basic insulation		P
	ELV conductive parts insulated as live parts		N
	Tests according Annex L of IEC 61347-1		P
- (10.4)	Accessible conductive parts in SELV circuits		N
	Output voltage under load ≤ 25 V r.m.s. or ≤ 60 V d.c.		N
	If output voltage > 25 V r.m.s. or > 60 V d.c.; No load output ≤ 35 V peak or ≤ 60 V d.c and touch current does not exceed 0,7 mA (peak) or 2 mA d.c.		N
	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

9 (8)	TERMINALS		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

10 (9)	PROVISION FOR PROTECTIVE EARTHING		P
- (9.1)	Provisions for protective earthing		P



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Clause	Requirement + Test	Result - Remark	Verdict
	Terminal complying with clause 8		N
	Locked against loosening and not possible to loosen by hand		P
	Not possible to loosen clamping means unintentionally on screwless terminals		P
	Earthing terminal only used for the earthing of the control gear		P
	All parts of material minimizing the danger of electrolytic corrosion		N
	Made of brass or equivalent material		N
	Contact surface bare metal		P
- (9.2)	Provision for functional earthing		N
	Comply with clause 8 and 9.1		N
- (9.3)	Earth contact via the track on the printed board		P
	Test with a current of 25 A between earthing terminal and each of the accessible metal parts; measured resistance (Ω) at ≥ 10 A according 7.2.3 of IEC 60598-1: $< 0,5 \Omega$	0,19 Ω	P
- (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 ² 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 (Ω) between earthing terminal and each of the accessible metal parts at ≥ 10 A according 7.2.3 of IEC 60598-1: $< 0,5 \Omega$		N
	Output earthing terminal marked as in 7.1 t) of IEC 61347-1		N
11 (11)	MOISTURE RESISTANCE AND INSULATION		P
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (M Ω):		P

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Clause	Requirement + Test	Result - Remark	Verdict
	For basic insulation $\geq 2 \text{ M}\Omega$	100M Ω	P
	For double or reinforced insulation $\geq 4 \text{ M}\Omega$	100M Ω	P
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		N

12 (12)	ELECTRIC STRENGTH		P
	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V		N
	Working voltage $\leq 50 \text{ V}$, test voltage 500 V		N
	Working voltage $> 50 \text{ V} \leq 1000 \text{ V}$, test voltage (V):		P
	Basic insulation, $2U + 1000 \text{ V}$	1480V	P
	Supplementary insulation, $2U + 1000 \text{ V}$	1480V	P
	Double or reinforced insulation, $4U + 2000 \text{ V}$	2960V	P
	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		P

14 (14)	FAULT CONDITIONS		P
- (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)	P
- (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		P
14 (-)	Reversed voltage polarity if d.c. supplied control gear	(see appended table)	N



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Clause	Requirement + Test	Result - Remark	Verdict
- (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		—
14 (-)	Temperature declared thermally protected lamp controlgear fulfil requirements in Annex C		N

15 (-)	TRANSFORMER HEATING		P
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		P
	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



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Clause	Requirement + Test	Result - Remark	Verdict
	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 $\leq 3 \text{ A}$, $\leq 25 \text{ V r.m.s.}$ or $\leq 60 \text{ V d.c.}$ and $\leq 72 \text{ W}$ 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		P
	Source used to supply SELV circuits:		P
	- safety isolating transformer in accordance with relevant part 2 of IEC 61558		P
	- controlgear providing SELV in accordance with relevant part 2 of IEC 61347		P
	- another source		P
	Voltage in the circuit not higher than ELV		N
	SELV circuits insulated from LV by double or reinforced insulation		N
	SELV circuits insulated from non SELV circuits by double or reinforced insulation		P
	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		P
- (15.4.3)	FELV circuits		N
	Source used to supply FELV circuits:		N
	- 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		N
	- another source		N
	- source in circuits separated by the LV supply by basic insulation		N
	Voltage in the circuit not higher than ELV		N

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Clause	Requirement + Test	Result - Remark	Verdict
	FELV circuits insulated from LV supply by at least basic insulation		N
	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		N
	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
	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

17 (16)	CREEPAGE DISTANCES AND CLEARANCES		P
- (16)	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



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Clause	Requirement + Test	Result - Remark	Verdict
	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

18 (17)	SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS		P
	Screws, current-carrying parts and connections in compliance with IEC 60598-1 (clause numbers between parentheses refer to IEC 60598-1)		P
(4.11)	Electrical connections		P
(4.11.1)	Contact pressure		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
(4.12)	Mechanical connections and glands		N
(4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N
	Torque test: torque (Nm); part.....	Fix LED driver:3,82mm,1,2Nm	P
	Torque test: torque (Nm); part.....	Fix earthing:2,90mm,0,5Nm	P
	Torque test: torque (Nm); part.....		N
(4.12.2)	Screws with diameter < 3 mm screwed into metal		P
(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

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Clause	Requirement + Test	Result - Remark	Verdict
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19 (18)	RESISTANCE TO HEAT, FIRE AND TRACKING		P
- (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

20 (19)	RESISTANCE TO CORROSION		P
	- test according 4.18.1 of IEC 60598-1		P
	- adequate varnish on the outer surface		P

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

14	TABLE: tests of fault conditions		P
Part	Simulated fault		Hazard
BD1	SC; 0A, 0W. Fuse open.		Yes/No
C18	SC; 0A, 0W. Fuse open.		Yes/No
C307	SC; 0,218A, 0,8W. No working.		Yes/No
C309	SC; 0,218A, 0,8W. No working.		Yes/No
C313	SC; 0,218A, 0,8W. No working.		Yes/No
C4	SC; 0A, 0W. Fuse open.		Yes/No
C8	SC; 0,218A, 0,8W. No working.		Yes/No
C9	SC; 0,218A, 0,8W. No working.		Yes/No
C10	SC; 0,218A, 0,8W. No working.		Yes/No
C11	SC; 0,218A, 0,8W. No working.		Yes/No
C12	SC; 0,218A, 0,8W. No working.		Yes/No
C13	SC; 0,218A, 0,8W. No working.		Yes/No
C14	SC; 0,218A, 0,8W. No working.		Yes/No
C155	SC; 0,218A, 0,8W. No working.		Yes/No
ZNR1	SC; 0A, 0W. Fuse open.		Yes/No
ZNR3	SC; 0A, 0W. Fuse open.		Yes/No
ZNR4	SC; 0A, 0W. Fuse open.		Yes/No
D8	SC; 1,241A, 306,7W. Light flash.		Yes/No
D9	SC; 1,241A, 306,7W. Light flash.		Yes/No



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Clause	Requirement + Test	Result - Remark	Verdict
D1	SC; 1,968A, 480,2W. Normal work.		Yes/No
D2	SC; 1,968A, 480,2W. Normal work.		Yes/No
D14	SC; 0A, 0W. Fuse open.		Yes/No
D13	SC; 1,968A, 480,2W. Normal work.		Yes/No
D22	SC; 1,968A, 480,2W. Normal work.		Yes/No
D33	SC; 0,156A, 1,3W. No working.		Yes/No
Q17 _{B-C}	SC; 0,137A, 1,5W. No working.		Yes/No
Q5 _{B-C}	SC; 0,186A, 2,7W. No working.		Yes/No
Q21 _{B-C}	SC; 0,136A, 1,5W. No working.		Yes/No
Output	SC; 0,217A, 0,8W. No working.		Yes/No
Remark: SC: short-circuited, OC: open-circuited			

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	6,1	1,5	9	6,1	2,5	7
Working voltage (V)					240V~		—
Frequency if applicable (kHz)					--		—
PTI					< 600 ☒ > 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV)					--		—
Pulse voltage if applicable (kV)					--		—
Supplementary information: Different polarities							
Distances	Insulation type **	Measured clearance	Required		Measured creepage	Required	
			clearance	*Table		creepage	*Table
Distance 2:	B	>6,1	1,5	9	>6,1	3,0	7
Working voltage (V)					240V~		—
Frequency if applicable (kHz)					--		—
PTI					< 600 ☒ > 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV)					--		—
Pulse voltage if applicable (kV)					--		—
Supplementary information: Live parts between input circuit and output circuit							

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



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Clause	Requirement + Test		Result - Remark	Verdict
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 on 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	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 on 13.2.1 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 on 13.2.1 of IEC 60598-2-1					

19 (18.5)	TABLE: Proof tracking test				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
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Supplementary information:					

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Clause	Requirement + Test	Result - Remark	Verdict
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A)	ANNEX A - TEST TO ESTABLISH WHETHER A CONDUCTIVE PART IS A LIVE PART WHICH MAY CAUSE AN ELECTRIC SHOCK		P
(A.1)	Comply with A.2 or A.3		P
(A.2)	Voltage ≤ 35 V peak or ≤ 60 V d.c. :	50,6Vdc	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		P

(C)	ANNEX C – PARTICULAR REQUIREMENTS FOR ELECTRONIC LAMP CONTROLGEAR WITH MEANS OF PROTECTION AGAINST OVERHEATING		N
(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:		—
(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

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Clause	Requirement + Test	Result - Remark	Verdict
	Normal operation of the sample in a test enclosure according to Annex D at an ambient temperature such that ($t_a + 0; -5$) °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)	ANNEX D – REQUIREMENTS FOR CARRY OUT THE HEATING TESTS OF THERMALLY PROTECTED LAMP CONTROLGEAR		N
	Tests in C7 performed in accordance with Annex D, if applicable		N

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

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



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Clause	Requirement + Test	Result - Remark	Verdict
I (L)	ANNEX I IN THIS PART 2 – PARTICULAR ADDITIONAL REQUIREMENTS FOR SELV D.C. OR A.C. SUPPLIED ELECTRONIC CONTROLGEARS FOR LED MODULES		P
(L.3)	Classification		P
	Class I	Yes ☒ No ☐	—
	Class II	Yes ☐ No ☒	—
	Class III	Yes ☐ No ☒	—
	non-inherently short circuit proof controlgear	Yes ☒ No ☐	—
	inherently short circuit proof controlgear	Yes ☐ No ☒	—
	fail safe controlgear	Yes ☐ No ☒	—
	non-short-circuit proof controlgear	Yes ☐ No ☒	—
(L.4)	Marking		N
	Adequate symbols are used		N
(L.5)	Protection against electric shock		P
	Comply with clause 9.2 of IEC 61558-1		P
(L.6)	Heating		P
	No excessive temperatures in normal use		P
	Value if capacitor t_c marked	See Annex 2	—
	Winding insulation classified as Class	Class F	—
	Comply with tests of clause 14 of IEC 61558-1 with adjustments		P
(L.7)	Short-circuit and overload protection		P
	Comply with tests of clause 15 of IEC 61558-1 with adjustments		P
(L.8)	Insulation resistance and electric strength		P
(L.8.1)	Conditioned 48 h between 91 % and 95 %	93 % R.H., 25°C	P
(L.8.2)	Insulation resistance		P
	Between input- and output circuits not less than 5 MΩ	100 MΩ	P
	Between metal parts of class II convertors 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	P
(L.8.3)	Electric strength		P
	1) Between live parts of input circuits and live parts of output circuits	3750V	P
	2) Over basic or supplementary insulation between:		N



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Clause	Requirement + Test	Result - Remark	Verdict
	a) live parts having different polarity	1875V	P
	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	P
(L.9)	Construction		P
(L.9.1)	Transformer comply with 19.12 of IEC 61558-1 and 19 of IEC 61558-2-6		P
	HF transformer comply with 19 of IEC 61558-2-16		N
(L.10)	Components		P
	Protective devices comply with 20.6 – 20.11 of IEC 61558-1		P
(L.11)	Creepage distances, clearances and distances through insulation		P
	Creepage distances and clearances not less than in Clause 16		P
	Distance through insulation according Table L.5 in IEC 61347-1		P
	1) Basic distance through insulation		P
	Required distance (mm)	2,5	—
	Measured (mm)	6,1	P
	Supplementary information		—
	2) Supplementary distance through insulation		N
	Required distance (mm)		—
	Measured (mm)		N
	Supplementary information		—
	3) Reinforced distance through insulation		P
	Required distance (mm)	5,0	—
	Measured (mm)	6,1	P
	Supplementary information		—
J (-)	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		N
J.1	General		N



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Clause	Requirement + Test	Result - Remark	Verdict
	Intended for centralized emergency power supply	Yes ☐ No ☐	—
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 $\pm 15\%$		N
	Supply of low impedance and low inductance		N
J.7	EMC immunity		N
	Comply with the requirements of IEC 61547		N
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
(N)	ANNEX N: REQUIREMENTS FOR INSULATION MATERIALS USED FOR DOUBLE OR REINFORCED INSULATION (IEC 61347-1)		P
(N.4)	General requirements		P

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Clause	Requirement + Test	Result - Remark	Verdict
(N.4.1)	Material comply with IEC 60085 and IEC 60216 series		P
(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		P
(N.4.3.1)	Thickness and composition of thin sheet insulation		P
	- 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	100N	P
	- 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)		P
	Electric strength test after mandrel test:		P
	- 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	5 kV	P
	- 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

(O)	ANNEX O: ADDITIONAL REQUIREMENTS FOR BUILT-IN ELECTRONIC CONTROLGEAR WITH DOUBLE OR REINFORCED INSULATION		N
(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



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Clause	Requirement + Test	Result - Remark	Verdict
(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
(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



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Clause	Requirement + Test	Result - Remark	Verdict
(P)	Creepage distances and clearances and distance through isolation (DTI) for lamp controlgear which are protected against pollution by the use of coating or potting		N
(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		—
(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

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Clause	Requirement + Test	Result - Remark	Verdict
	Working/rated voltage		—
	Impulse voltage.....		N
	Supplementary information		—
	Reinforced insulation:		N
	Working/rated voltage		—
	Impulse voltage.....		N
	Supplementary information		—

WALTEK



EN IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 7	LED modules for general lighting – Safety specifications EN IEC 62031:2020	P
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4	GENERAL REQUIREMENTS	P
4.2	Classification	P
	Built-in module: Yes ☐ No ☐	—
	Independent module: Yes ☐ No ☐	—
	Integral module: Yes ☒ No ☐	—
4.6	Independent modules comply with requirements in IEC 60598-1:2014/AMD1:2017	N
4.8	Modules with integrated controlgear providing SELV comply with requirements according to IEC 61347-1:2015/AMD1:2017 clause L.5 to L.11.	(see Annex 1) N

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



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Clause	Requirement + Test	Result - Remark	Verdict
6.5	Marking of integral LED modules		P
	- information in 6.2 a) to g) in data sheet, leaflet or website		P
6.6	Durable and legibility of marking		P
	- marking on the LED module legible after test with water		P
	- marking not on the LED module legible		N
7	TERMINALS		N
7.1	Integral terminals		N
	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
7.2	Terminals other than integral terminals		N
	Separately approved; component list	(see Annex 2)	N
	Ratings suit the conditions		N
	Satisfy additional relevant requirements of this standard		N
8 (9)	EARTHING		N
- (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
	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
- (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



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Clause	Requirement + Test	Result - Remark	Verdict
- (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 and each of the accessible metal parts; measured resistance (Ω) at ≥ 10 A according 7.2.3 of IEC 60598-1: $< 0,5 \Omega$		N
- (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 ² 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 (Ω) between earthing terminal and each of the accessible metal parts at ≥ 10 A according 7.2.3 of IEC 60598-1: $< 0,5 \Omega$		N
	Output earthing terminal marked as in 7.1 t) of IEC 61347-1		N
9 (10)	PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS		N
- (10.1)	Controlgear protected against accidental contact with live parts		N
- (A2)	Voltage measured with 50 k Ω	(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
	Accessible conductive parts are insulated from live parts by double or reinforced insulation in SELV controlgear		N



EN IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	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 ≤ 25 V r.m.s. or ≤ 60 V d.c.		N
	If output voltage > 25 V r.m.s. or > 60 V d.c.; No load output ≤ 35 V peak or ≤ 60 V d.c and touch current does not exceed 0,7 mA (peak) or 2 mA d.c.		N
	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

10 (11)	MOISTURE RESISTANCE AND INSULATION		P
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (M Ω):		P
	For basic insulation ≥ 2 M Ω	$>100\text{M}\Omega$	P
	For double or reinforced insulation ≥ 4 M Ω		N
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		N

11 (12)	ELECTRIC STRENGTH		P
	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V		N
	Working voltage ≤ 50 V, test voltage 500 V	500V	P
	Working voltage > 50 V ≤ 1000 V, test voltage (V):		N
	Basic insulation, 2U + 1000 V		N



EN IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	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
12 (14)	FAULT CONDITIONS		P
- (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	LED	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 $\geq 1 \text{ M}\Omega$	>100M Ω	P
	No flammable gases		P
	No accessible parts have become live		P
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
- (14.7)	Relevant fault condition tests with high-power a.c. supply and in turn to a d.c. supply		—
12.2	Overpower condition		P
	Module withstands overpower condition >15 min.		P
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		N
	No fire, smoke or flammable gas is produced		P



EN IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	Molten material does not ignite tissue paper, spread below the module		P
14 (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 (16)	CREEPAGE DISTANCES AND CLEARANCES		P
- (16.1)	General		P
	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
- (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		N
	Clearances distances for reinforced insulation according to Table 11		N
16 (17)	SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS		P
	Screws, current-carrying parts and connections in compliance with IEC 60598-1 (clause numbers between parentheses refer to IEC 60598-1)		—
(4.11)	Electrical connections		P
(4.11.1)	Contact pressure		P
(4.11.2)	Screws:		P



EN IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	- self-tapping screws		P
	- thread-cutting screws		N
(4.11.3)	Screw locking:		P
	- spring washer		P
	- 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		N
	Screws of insulating material		N
	Torque test: torque (Nm); part	Screw used for fixing lamp cover: 3,83mm, 1,2Nm	P
	Torque test: torque (Nm); part	Screw used for fixing LED driver: 3,82mm 1,2Nm	P
	Torque test: torque (Nm); part	Screw used for fixing enclosure: 2,85mm 0,5Nm	P
(4.12.2)	Screws with diameter < 3 mm screwed into metal		P
(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
17 (18)	RESISTANCE TO HEAT, FIRE AND TRACKING		N
- (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
18	RESISTANCE TO CORROSION		N
	Comply with requirements according 4.18 of IEC 60598-1		N
20	HEAT MANAGEMENT		N
20.1	General		N



EN IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	Fulfil clause 20 if replaceable LED module and when heat conducting thermal interface is needed.		N
20.2	Thermal interface material		N
	Thermal interface material delivered with the module if necessary		N
20.3	Heat protection		N
	Not impair safety when operated under poor heat-conduction conditions according Annex D		N
22	PHOTOBIOLOGICAL SAFETY		P
22.1	UV radiation		N
	Luminous radiation not exceed 2mW/klm		N
22.2	Blue light hazard		P
	Assessed according to IEC TR 62778	RG1 Unlimited	P
22.3	Infrared radiation		N
	Requirements for infrared radiation when required		N
A	ANNEX A - TESTS		P
	All tests performed in accordance with the advice given in Annex H of IEC 61347-1, if applicable		P
13 (14)	TABLE: tests of fault conditions		P
Part	Simulated fault		Hazard
One LED	SC:2,015A, 473,8W. Ten LED packages are no working.		YES/NO
One LED	OC:2,048A, 480,2W. One LED package is no working.		YES/NO
SC: Short-circuit; OP: open circuit.			



EN 62471			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 8	Photobiological safety evaluated according to standard EN 62471:2008	P
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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	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	---	---	---	---	---
Near UV	---	E_{UVA}	$W \cdot m^{-2}$	0,33	---	---	---	---	---
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	1,087e0	10000	---	4000000	---
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	0,01*	---	1,0	---	400	---
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	$28000/\alpha$	1,568e1	$28000/\alpha$	---	$71000/\alpha$	---
Retinal thermal, weak visual stimulus*	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 $0,0017 \leq \alpha \leq 0,011$	---				
				$6000/\alpha$ $0,011 \leq \alpha \leq 0,1$	---				
IR radiation, eye	---	E_{IR}	$W \cdot m^{-2}$	100	1,282e-3	570	---	3200	---

* Small source defined as one with $\alpha < 0,011$ 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 62471			
Clause	Requirement + Test	Result - Remark	Verdict

Emission limits for risk groups of continuous wave lamps (LDR-3030TTB4080)									P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	---	---	---	---	---
Near UV	---	E_{UVA}	$W \cdot m^{-2}$	0,33	---	---	---	---	---
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	2,286e1	10000	---	4000000	---
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	0,01*	---	1,0	---	400	---
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	$28000/\alpha$	3,734e2	$28000/\alpha$	---	$71000/\alpha$	---
Retinal thermal, weak visual stimulus*	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 $0,0017 \leq \alpha \leq 0,011$	---				
				$6000/\alpha$ $0,011 \leq \alpha \leq 0,1$	---				
IR radiation, eye	---	E_{IR}	$W \cdot m^{-2}$	100	5,128e-4	570	---	3200	---
* Small source defined as one with $\alpha < 0,011$ 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									

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



Photo Documentation

Model: ZEUS 465W PRO 2.9

Photo 1

Description: Over view



Photo 2

Description: Rear view





Photo Documentation

Photo 3

Description: LED board



Photo 4

Description: LED board





Photo Documentation

Photo 5

Description: LED board



Photo 6

Description: Alternative LED board

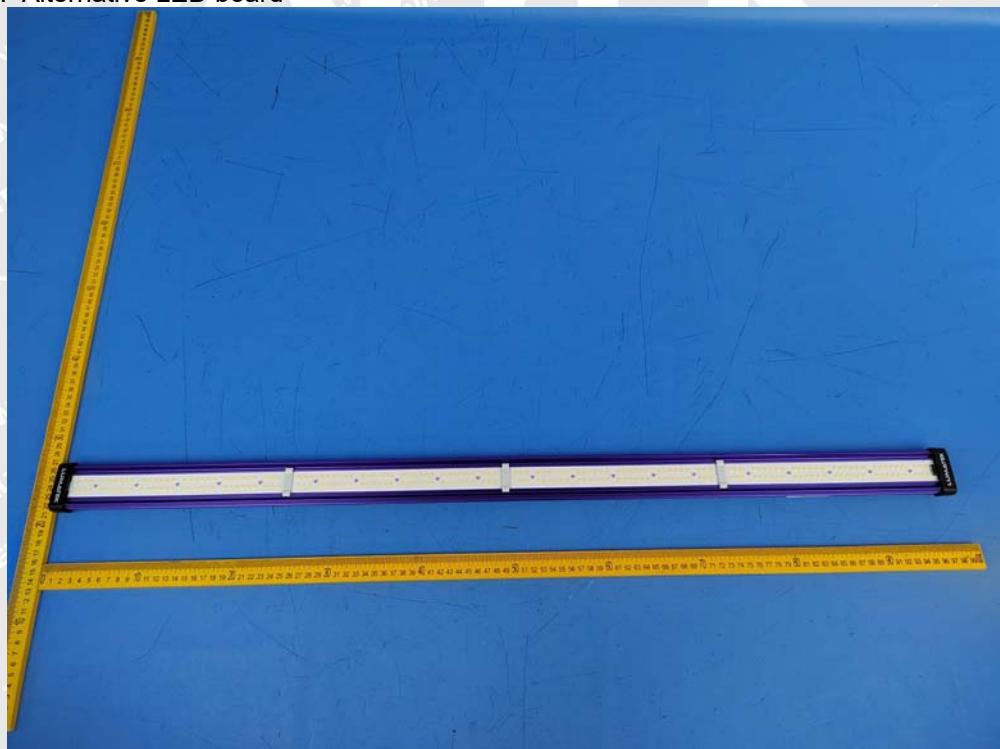




Photo Documentation

Photo 7

Description: Alternative LED board



Photo 8

Description: Alternative LED board





Photo Documentation

Photo 9

Description: LED driver



Photo 10

Description: LED driver





Photo Documentation

Photo 11

Description: LED driver



Photo 12

Description: LED driver





Photo Documentation

Photo 13

Description: LED driver

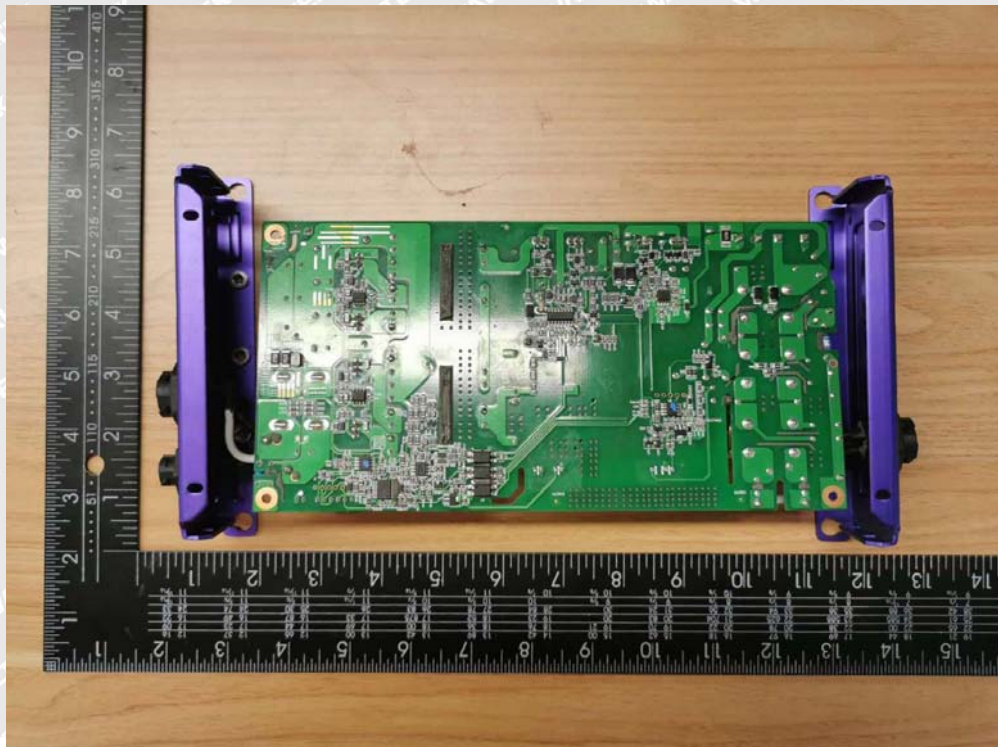


Photo 14

Description: Plug





Photo Documentation

Photo 15

Description: The other connection type



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