

TEST REPORT IEC 60598-2-17 Luminaires Part 2: Particular requirements: Section Seventeen - - Luminaires for stage lighting, television and film studios (outdoor and indoor)	
Report Number	WST17060197-1SR
Date of issue	2017-06-27
Total number of pages.....	59
Applicant's name.....	GuangZhou STS Lighting Equipment Co.,Ltd.
Address	No.251 Tingshi North Road, Chaoyang, Shijing Town, Baiyun District, Guangzhou, China
Test specification:	
Standard	EN 60598-2-17:1989 + A2:1991 used in conjunction with EN 60598-1:2015
Test procedure	CE-LVD
Non-standard test method.....	N/A
Test Report Form No.....	IEC60598_2_17D
Test Report Form(s) Originator.....	Intertek Semko AB
Master TRF.....	2015-08
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Test item description	MOVING HEAD
Trade Mark	STSLITE
Manufacturer	GuangZhou STS Lighting Equipment Co.,Ltd. No.251 Tingshi North Road, Chaoyang, Shijing Town, Baiyun District, Guangzhou, China
Model/Type reference	M SPOT 200, M BEAM 200, SHARK 500
Ratings	100-240V~, 50/60HZ, 200W. Class I, IP20

Testing procedure and testing location:		
☒	Testing Laboratory:	Shenzhen WST Testing Co., Ltd.
Testing location/ address		87 Guangshen Road, Baocheng 11st Zone, Xin'an Street, Bao'an, Shenzhen, Guangdong
☐	Associated Laboratory:	
Testing location/ address		
Tested by (name + signature)		Mike Chen 
Approved by (name + signature)		Michael Ling 
☐	Testing procedure: TMP	N/A
Testing location/ address		
Tested by (name + signature)		
Approved by (name + signature)		
☐	Testing procedure: WMT	N/A
Testing location/ address		
Tested by (name + signature)		
Witnessed by (name + signature)		
Approved by (name + signature)		
☐	Testing procedure: SMT	N/A
Testing location/ address		
Tested by (name + signature)		
Approved by (name + signature)		
Supervised by (name + signature)		
☐	Testing procedure: RMT	N/A
Testing location/ address		
Tested by (name + signature)		
Approved by (name + signature)		
Supervised by (name + signature)		

List of Attachments (including a total number of pages in each attachment):

- Appendix 1: For requirement of European group national difference.
- Appendix 2: The LED control gear with applicable clauses of 10,11,12,14,16,17,18,20 of EN 61347-2-13:2014 used in conjunction with EN 61347-1:2008+A1:2011+A2:2013.
- Appendix 3: For requirement of EN 62031:2008+A1:2013+A2:2015.
- Appendix 4: For requirement of EN 62493:2015.
- Appendix 5: For requirement of EN 62471:2008
- Appendix 6: Photo documents.

Summary of testing:
Tests performed (name of test and test clause):

Clause 17.5: Marking
 Clause 17.6: Construction of luminaires
 Clause 17.7: Creepage distances and clearances
 Clause 17.8: provision for earthing
 Clause 17.9: Terminals
 Clause 17.10: External and internal wiring
 Clause 17.11: Protection against electric shock
 Clause 17.12: Endurance tests and thermal tests
 Clause 17.13: Resistance to dust and moisture
 Clause 17.14: Insulation resistance and electric strength
 Clause 17.15: Resistance to heat, fire and tracking

Testing location:

Shenzhen WST Testing Co., Ltd.
 87 Guangshen Road, Baocheng 11st Zone, Xin'an Street, Bao'an, Shenzhen, Guangdong

Summary of compliance with National Differences:

European group national difference.

☒ The product fulfils the requirements of EN 60598-2-17:1988 + A2:1991 used in conjunction with EN 60598-1:2015

Copy of marking plate



When steady state is achieved, the temperature of the surface is 35,5°C
 "Isolate electrically before re-lamping."

Test item particulars : MOVING HEAD

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Classification of installation and use	Protable luminaire and indoor use
Supply Connection	Appliance inlet
Possible test case verdicts:	
- test case does not apply to the test object.....	N/A
- test object does meet the requirement.....	P (Pass)
- test object does not meet the requirement.....	F (Fail)
Testing	
Date of receipt of test item	2017-05-19
Date (s) of performance of tests	2017-05-19 to 2017-06-26
General remarks:	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. Throughout this report a ☒ comma / ☐ point is used as the decimal separator. Clause numbers between brackets refer to clauses in IEC 60598-1 The related applicable OSM decisions have been considered and the requirements found fulfilled.	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60598-1:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....	☐ Yes ☒ Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies)	Same as applicant

General product information:

- 1, All products are identical, only different in the model name.
- 2, All tests are performed on the representative model M SPOT 200.

IEC 60598-2-17			
Clause	Requirement + Test	Result - Remark	Verdict
17.2 (0)	GENERAL TEST REQUIREMENTS		P
17.2 (0.1)	Information for luminaire design considered	Standard Yes ☒ No ☐	—
17.2 (0.3)	More sections applicable	Yes ☐ No ☒	—

17.4 (2)	CLASSIFICATION		P
17.4 (2.2)	Type of protection	Class I	—
17.4 (2.3)	Degree of protection	IP20	—
17.4 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces	Yes ☒ No ☐	—
17.4 (2.5)	Luminaire for normal use	Yes ☒ No ☐	—
	Luminaire for rough service	Yes ☐ No ☒	—

17.5 (3)	MARKING		P
17.5 (3.2)	Mandatory markings		P
	Position of the marking	On the enclosure surface	P
	Format of symbols/text	See attached rating label	P
17.5 (3.3)	Additional information		P
	Language of instructions	English	P
17.5 (3.3.1)	Combination luminaires		N/A
17.5 (3.3.2)	Nominal frequency in Hz	50/60Hz	P
17.5 (3.3.3)	Operating temperature		N/A
17.5 (3.3.4)	Symbol or warning notice		N/A
17.5 (3.3.5)	Wiring diagram		N/A
17.5 (3.3.6)	Special conditions		N/A
17.5 (3.3.7)	Metal halide lamp luminaire – warning		N/A
17.5 (3.3.8)	Limitation for semi-luminaires		N/A
17.5 (3.3.9)	Power factor and supply current		N/A
17.5 (3.3.10)	Suitability for use indoors		P
17.5 (3.3.11)	Luminaires with remote control		N/A
17.5 (3.3.12)	Clip-mounted luminaire – warning		N/A
17.5 (3.3.13)	Specifications of protective shields		N/A
17.5 (3.3.14)	Symbol for nature of supply	~	P
17.5 (3.3.15)	Rated current of socket outlet		N/A
17.5 (3.3.16)	Rough service luminaire		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
17.5 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments		N/A
17.5 (3.3.18)	Non-ordinary luminaires with PVC cable		N/A
17.5 (3.3.19)	Protective conductor current in instruction if applicable		N/A
17.5 (3.3.20)	Provided with information if not intended to be mounted within arm's reach		N/A
17.5 (3.3.21)	Non replaceable and non-user replaceable light sources information provided	Non-user replaceable light sources	P
	Cautionary symbol		N/A
17.5 (3.3.22)	Controllable luminaires, classification of insulation provided		N/A
17.5 (3.4)	Test with water	15s	P
	Test with hexane	15s	P
	Legible after test		P
	Label attached		P
17.5.1 (-)	If luminaire design imposes restriction of use the luminaire is marked with		N/A
	Indication of the "top"		N/A
	Designed position or range of angle		N/A
	Mounting arrangements		N/A
17.5.2 (-)	Warning if lamp $\leq 250W$		N/A
17.5.3 (-)	Maximum ambient temperature t_a		N/A
17.5.4 (-)	Minimum distances from flammable materials		N/A
17.5.5 (-)	Warning if applicable		N/A
17.5.6 (-)	Value of exterior surface temperature		P
	a) after 5 min	25,6°C	P
	b) when steady state	35,5°C	P
17.5.7 (-)	Instruction leaflet contain warnings		P
	Visibly damaged shields shall be changed		P
	Damaged or thermally deformed lamp shall be changed		P
17.6 (4)	CONSTRUCTION		P
17.6 (4.2)	Components replaceable without difficulty		P
17.6 (4.3)	Wireways smooth and free from sharp edges		P
17.6 (4.4)	Lampholders		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
17.6 (4.4.1)	Integral lampholder		N/A
17.6 (4.4.2)	Wiring connection		N/A
17.6 (4.4.3)	Lampholder for end-to-end mounting		N/A
17.6 (4.4.4)	Positioning		N/A
	- pressure test (N)		N/A
	After test the lampholder comply with relevant standard sheets and show no damage		N/A
	After test on single-capped lampholder the lampholder have not moved from its position and show no permanent deformation		N/A
	- bending test (N)		N/A
	After test the lampholder have not moved from its position and show no permanent deformation		N/A
17.6 (4.4.5)	Peak pulse voltage		N/A
17.6 (4.4.6)	Centre contact		N/A
17.6 (4.4.7)	Parts in rough service luminaires resistant to tracking		N/A
17.6 (4.4.8)	Lamp connectors		N/A
17.6 (4.4.9)	Caps and bases correctly used		N/A
17.6 (4.5)	Starter holders		N/A
	Starter holder in luminaires other than class II		N/A
	Starter holder class II construction		N/A
17.6 (4.6)	Terminal blocks		N/A
	Tails		N/A
	Unsecured blocks		N/A
17.6 (4.7)	Terminals and supply connections		P
17.6 (4.7.1)	Contact to metal parts		P
17.6 (4.7.2)	Test 8 mm live conductor		P
	Test 8 mm earth conductor		N/A
17.6 (4.7.3)	Terminals for supply conductors		P
17.6 (4.7.3.1)	Welded connections:		N/A
	- stranded or solid conductor		N/A
	- spot welding		N/A
	- welding between wires		N/A
	- Type Z attachment		N/A
	- mechanical test according to 15.8.2		N/A
	- electrical test according to 15.9		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- heat test according to 15.9.2.3 and 15.9.2.4		N/A
17.6 (4.7.4)	Terminals other than supply connection		P
17.6 (4.7.5)	Heat-resistant wiring/sleeves		N/A
17.6 (4.7.6)	Multi-pole plug		N/A
	- test at 30 N		N/A
17.6 (4.8)	Switches:		P
	- adequate rating		P
	- adequate fixing		P
	- polarized supply		P
	- compliance with 61058-1 for electronic switches		N/A
17.6 (4.9)	Insulating lining and sleeves		P
17.6 (4.9.1)	Retainment		N/A
	Method of fixing		N/A
17.6 (4.9.2)	Insulated linings and sleeves		N/A
	Resistant to a temperature > 20 °C to the wire temperature or		N/A
	a) & c) Insulation resistance and electric strength		N/A
	b) Ageing test. Temperature (°C)		N/A
17.6 (4.10)	Insulation of Class II luminaires		N/A
17.6 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		N/A
	Safe installation fixed luminaires		N/A
	Capacitors and switches		N/A
	Interference suppression capacitors according to IEC 60384-14		N/A
17.6 (4.10.2)	Assembly gaps:		N/A
	- not coincidental		N/A
	- no straight access with test probe		N/A
17.6 (4.10.3)	Retainment of insulation:		N/A
	- fixed		N/A
	- unable to be replaced; luminaire inoperative		N/A
	- sleeves retained in position		N/A
	- lining in lampholder		N/A
17.6 (4.11)	Electrical connections		P
17.6 (4.11.1)	Contact pressure		P
17.6 (4.11.2)	Screws:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
17.6 (4.11.3)	Screw locking:		N/A
	- spring washer		N/A
	- rivets		N/A
17.6 (4.11.4)	Material of current-carrying parts		P
17.6 (4.11.5)	No contact to wood or mounting surface		P
17.6 (4.11.6)	Electro-mechanical contact systems		N/A
17.6 (4.12)	Mechanical connections and glands		N/A
17.6 (4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N/A
	Torque test: torque (Nm); part	Screw of enclosure: 1,2 Nm	P
	Torque test: torque (Nm); part	Screw of PCB: 0,5Nm	P
	Torque test: torque (Nm); part	Screw of earthing: 0,8 Nm	P
17.6 (4.12.2)	Screws with diameter < 3 mm screwed into metal		P
17.6 (4.12.4)	Locked connections:		N/A
	- fixed arms; torque (Nm).....		N/A
	- lampholder; torque (Nm).....		N/A
	- push-button switches; torque 0,8 Nm		N/A
17.6 (4.12.5)	Screwed glands; force (Nm)		N/A
17.6 (4.13)	Mechanical strength		P
17.6 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm).....		N/A
	- other parts; energy (Nm)	Enclosure, Lampshade: 0.5Nm	P
	1) live parts		P
	2) linings		N/A
	3) protection		P
	4) covers		P
17.6 (4.13.3)	Straight test finger		P
17.6 (4.13.4)	Rough service luminaires		N/A
	- IP54 or higher		N/A
	a) fixed		N/A
	b) hand-held		N/A
	c) delivered with a stand		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	d) for temporary installations and suitable for mounting on a stand		N/A
17.6 (4.13.6)	Tumbling barrel		N/A
17.6 (4.14)	Suspensions and adjusting devices		N/A
17.6 (4.14.1)	Mechanical load:		N/A
	A) four times the weight		N/A
	B) torque 2,5 Nm		N/A
	C) bracket arm; bending moment (Nm)		N/A
	D) load track-mounted luminaires		N/A
	E) clip-mounted luminaires, glass-shelve. Thickness (mm)		N/A
	Metal rod. diameter (mm)		N/A
	Fixed luminaire or independent control gear without fixing devices		N/A
17.6 (4.14.2)	Load to flexible cables		N/A
	Mass (kg)		N/A
	Stress in conductors (N/mm ²)		N/A
	Mass (kg) of semi-luminaire		N/A
	Bending moment (Nm) of semi-luminaire		N/A
17.6 (4.14.3)	Adjusting devices:		N/A
	- flexing test; number of cycles		N/A
	- strands broken		N/A
	- electric strength test afterwards		N/A
17.6 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N/A
17.6 (4.14.5)	Guide pulleys		N/A
17.6 (4.14.6)	Strain on socket-outlets		N/A
17.6 (4.15)	Flammable materials:		P
	- glow-wire test 650 °C	Lampshade	P
	- spacing ≥ 30 mm		N/A
	- screen withstanding test of 13.3.1		N/A
	- screen dimensions		N/A
	- no fiercely burning material		P
	- thermal protection		N/A
	- electronic circuits exempted		N/A
17.6 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	a) construction		N/A
	b) temperature sensing control		N/A
	c) surface temperature		N/A
17.6 (4.16)	Luminaires for mounting on normally flammable surfaces		N/A
	No lamp control gear		N/A
17.6 (4.16.1)	Lamp control gear spacing:		N/A
	- spacing 35 mm		N/A
	- spacing 10 mm		N/A
17.6 (4.16.2)	Thermal protection:		N/A
	- in lamp control gear		N/A
	- external		N/A
	- fixed position		N/A
	- temperature marked lamp control gear		N/A
17.6 (4.16.3)	Design to satisfy the test of 12.6	(see 12.6)	N/A
17.6 (4.17)	Drain holes		N/A
	Clearance at least 5 mm		N/A
17.6 (4.18)	Resistance to corrosion:		N/A
17.6 (4.18.1)	- rust-resistance		N/A
17.6 (4.18.2)	- season cracking in copper		N/A
17.6 (4.18.3)	- corrosion of aluminium		N/A
17.6 (4.19)	Ignitors compatible with ballast		N/A
17.6 (4.20)	Rough service vibration		N/A
17.6 (4.21)	Protective shield:		N/A
17.6 (4.21.1)	Shield fitted		N/A
	Shield of glass if tungsten halogen lamps		N/A
17.6 (4.21.2)	Particles from a shattering lamp not impair safety		N/A
17.6 (4.21.3)	No direct path		N/A
17.6 (4.21.4)	Impact test on shield		N/A
	Glow-wire test on lamp compartment		N/A
17.6 (4.22)	Attachments to lamps		N/A
17.6 (4.23)	Semi-luminaires comply Class II		N/A
17.6 (4.24)	UV radiation for tungsten halogen lamps and metal halide lamps (Annex P)		N/A
17.6 (4.25)	No sharp point or edges		P
17.6 (4.26)	Short-circuit protection:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
17.6 (4.26.1)	Uninsulated accessible SELV parts		N/A
17.6 (4.26.2)	Short-circuit test		N/A
17.6 (4.26.3)	Test chain according to Figure 29		N/A
17.6 (4.27)	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
	Pull test of terminal fixing (20 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Pull test of mechanical connection (50 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Voltage drop test, resistance < 0,05 Ω		N/A
17.6 (4.28)	Fixing of thermal sensing control		N/A
	Not plug-in or easily replaceable type		N/A
	Reliably kept in position		N/A
	No adhesive fixing if UV radiations from a lamp can degrade the fixing		N/A
	Not outside the luminaire enclosure		N/A
	Test of adhesive fixing:		N/A
	Max. temperature on adhesive material ($^{\circ}\text{C}$).....		—
	100 cycles between t min and t max		N/A
	Temperature sensing control still in position		N/A
17.6 (4.29)	Luminaires with non-replaceable light source		N/A
	Not possible to replace light source		N/A
	Live part not accessible after parts have been opened by hand or tools		N/A
17.6 (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/A
	Minimum two fixing means		P
17.6 (4.31)	Insulation between circuits		P
	Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3		N/A
	Controllable luminaires requiring same level of insulation for all components, the insulation between control terminals and LV supply fulfil requirements according 4.31.1 – 4.31.3		N/A
17.6 (4.31.1)	SELV circuits		P
	Used SELV source		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Voltage $\leq$ ELV		N/A
	Insulating of SELV circuits from LV supply		N/A
	Insulating of SELV circuits from other non SELV circuits		P
	Insulating of SELV circuits from FELV		N/A
	Insulating of SELV circuits from other SELV circuits		P
	SELV circuits insulated from accessible parts according Table X.1		P
	Plugs not able to enter socket-outlets of other voltage systems		N/A
	Socket outlets does not admit plugs of other voltage systems		N/A
	Plugs and socket-outlets does not have protective conductor contact		N/A
17.6 (4.31.2)	FELV circuits		N/A
	Used FELV source		N/A
	Voltage $\leq$ ELV		N/A
	Insulating of FELV circuits from LV supply		N/A
	FELV circuits insulated from accessible parts according Table X.1		N/A
	Plugs not able to enter socket-outlets of other voltage systems		N/A
	Socket outlets does not admit plugs of other voltage systems		N/A
	Socket-outlets does not have protective conductor contact		N/A
17.6 (4.31.3)	Other circuits		P
	Other circuits insulated from accessible parts according Table X.1		P
	Class II construction with equipotential bonding for protection against indirect contacts with live parts:		N/A
	- conductive parts are connected together		N/A
	- test according 7.2.3		N/A
	- conductive part not cause an electric shock in case of an insulation fault		N/A
	- equipotential bonding in master/slave applications		N/A
	- master luminaire provided with terminal for accessible conductive parts of slave luminaires		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- slave luminaire constructed as class I		N/A
17.6 (4.32)	Overvoltage protective devices		N/A
	Comply with IEC 61643-11		N/A
	External to controlgear and connected to earth:		N/A
	- only in fixed luminaires		N/A
	- only connected to protective earth		N/A
17.6.1 (-)	Not possible to insert a lamp into a "live" lampholder (for some luminaires)		N/A
17.6.2 (-)	Prevent immediate access to the lamp or marked according 17.5.5 if applicable		N/A
17.6.3 (-)	Fitted with a protective shield or marked only for lamps comply with Sheet 357-IEC-3155		N/A
17.6.4 (-)	Bearing parts of hanger are capable to support ten time the weight of the luminaire		N/A
	Non-combustible materials		N/A
	Parts of hanger carrying a proportion of the weight of the luminaire are capable to support ten time the proportion of weight		N/A
	Connection between hanger and luminaire locked		N/A
17.6.5 (-)	Removable accessories cannot fall out of the luminaire from any position		P
17.6.6 (-)	If applicable a secondary suspension provided and passed the test		N/A

17.7 (11)	CREEPAGE DISTANCES AND CLEARANCES		P
	Working voltage (V)	240VAC	—
	Voltage form	Sinusoidal ☒ Non-sinusoidal ☐	—
	PTI	< 600 ☒ ≥ 600 ☐	—
	Impulse withstand category (Normal category II) (Category III Annex U)	Category II ☒ Category III ☐	—
	Rated pulse voltage (kV)	--	—
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm)	Cr.>3,2mm, Cl.>3,2mm	P
	(2) Current-carrying parts and accessible parts: cr (mm); cl (mm)	Cr.>6,5mm, Cl.>6,5mm	P
	(3) Parts becoming live due to breakdown of basic insulation and metal parts: cr (mm); cl (mm)	Cr.>6,5mm, Cl.>6,5mm	P

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Clause	Requirement + Test	Result - Remark	Verdict
	(4) Outer surface of cable where it is clamped and metal parts: cr (mm); cl (mm)..... :		N/A
	(6) Current-carrying parts and supporting surface: cr (mm); cl (mm)	Cr.>6.5mm, Cl.>6.5mm	P

17.8 (7)	PROVISION FOR EARTHING		P
17.8 (7.2.1 + 7.2.3)	Accessible metal parts		P
	Metal parts in contact with supporting surface		P
	Resistance < 0,5 Ω	0,07 Ω	P
	Self-tapping screws used		P
	Thread-forming screws		N/A
	Thread-forming screw used in a groove		N/A
	Earth makes contact first		N/A
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
17.8 (7.2.2 + 7.2.3)	Earth continuity in joints etc.		P
17.8 (7.2.4)	Locking of clamping means		P
	Compliance with 4.7.3		N/A
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
17.8 (7.2.5)	Earth terminal integral part of connector socket		N/A
17.8 (7.2.6)	Earth terminal adjacent to mains terminals		N/A
17.8 (7.2.7)	Electrolytic corrosion of the earth terminal		N/A
17.8 (7.2.8)	Material of earth terminal		P
	Contact surface bare metal		P
17.8 (7.2.10)	Class II luminaire for looping-in		N/A
	Double or reinforced insulation to functional earth		N/A
17.8 (7.2.11)	Earthing core coloured green-yellow		P
	Length of earth conductor		P

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

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Clause	Requirement + Test	Result - Remark	Verdict
17.9 (15)	SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS		N/A
	Separately approved; component list	(see Annex 1)	N/A
	Part of the luminaire	(see Annex 4)	N/A
17.10 (5)	EXTERNAL AND INTERNAL WIRING		P
17.10 (5.2)	Supply connection and external wiring		P
17.10 (5.2.1)	Means of connection.....	Appliance inlet	P
17.10 (5.2.2)	Type of cable		N/A
	Nominal cross-sectional area (mm ²).....		N/A
	Cables equal to IEC 60227 or IEC 60245		N/A
17.10 (5.2.3)	Type of attachment, X, Y or Z		N/A
17.10 (5.2.5)	Type Z not connected to screws		N/A
17.10 (5.2.6)	Cable entries:		N/A
	- suitable for introduction		N/A
	- adequate degree of protection		N/A
17.10 (5.2.7)	Cable entries through rigid material have rounded edges		N/A
17.10 (5.2.8)	Insulating bushings:		N/A
	- suitably fixed		N/A
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- tubes or guards made of insulating material		N/A
17.10 (5.2.9)	Locking of screwed bushings		N/A
17.10 (5.2.10)	Cord anchorage:		N/A
	- covering protected from abrasion		N/A
	- clear how to be effective		N/A
	- no mechanical or thermal stress		N/A
	- no tying of cables into knots etc.		N/A
	- insulating material or lining		N/A
17.10 (5.2.10.1)	Cord anchorage for type X attachment:		N/A
	a) at least one part fixed		N/A
	b) types of cable		N/A
	c) no damaging of the cable		N/A
	d) whole cable can be mounted		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	e) no touching of clamping screws		N/A
	f) metal screw not directly on cable		N/A
	g) replacement without special tool		N/A
	Glands not used as anchorage		N/A
	Labyrinth type anchorages		N/A
17.10 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment		N/A
17.10 (5.2.10.3)	Tests:		N/A
	- impossible to push cable; unsafe		N/A
	- pull test: 25 times; pull (N)		N/A
	- torque test: torque (Nm)		N/A
	- displacement ≤ 2 mm		N/A
	- no movement of conductors		N/A
	- no damage of cable or cord		N/A
17.10 (5.2.11)	External wiring passing into luminaire		N/A
17.10 (5.2.12)	Looping-in terminals		N/A
17.10 (5.2.13)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		N/A
17.10 (5.2.14)	Mains plug same protection		N/A
	Class III luminaire plug		N/A
17.10 (5.2.16)	Appliance inlets (IEC 60320)		N/A
	Appliance couplers of class II type		N/A
17.10 (5.2.17)	No standardized interconnecting cables properly assembled		N/A
17.10 (5.2.18)	Used plug in accordance with		N/A
	- IEC 60083		N/A
	- other standard		N/A
17.10 (5.3)	Internal wiring		P
17.10 (5.3.1)	Internal wiring of suitable size and type	1672 18AWG	P
	Through wiring		N/A
	- not delivered/ mounting instruction		N/A
	- factory assembled		N/A
	- socket outlet loaded (A).....		N/A
	- temperatures	(see Annex 2)	N/A
	Green-yellow for earth only		P

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Clause	Requirement + Test	Result - Remark	Verdict
17.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		N/A
	Cross-sectional area (mm ²)		N/A
	Insulation thickness		N/A
	Extra insulation added where necessary		N/A
17.10 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		N/A
	Adequate cross-sectional area and insulation thickness		N/A
17.10 (5.3.1.3)	Double or reinforced insulation for class II		N/A
17.10 (5.3.1.4)	Conductors without insulation		N/A
17.10 (5.3.1.5)	SELV current-carrying parts		P
17.10 (5.3.1.6)	Insulation thickness other than PVC or rubber		N/A
17.10 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		N/A
	Joints, raising/lowering devices		N/A
	Telescopic tubes etc.		N/A
	No twisting over 360°		P
17.10 (5.3.3)	Insulating bushings:		N/A
	- suitable fixed		N/A
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- cables with protective sheath		N/A
17.10 (5.3.4)	Joints and junctions effectively insulated		P
17.10 (5.3.5)	Strain on internal wiring		N/A
17.10 (5.3.6)	Wire carriers		N/A
17.10 (5.3.7)	Wire ends not tinned		N/A
	Wire ends tinned: no cold flow		P
17.10.1 (-)	Cross-sectional area (mm ²) ≥ 0,75 for current ≤ 3A and ≥ 1,5 for current > 3A	for current ≤ 3A	P
17.10.2 (-)	Plugs and sockets not interchangeable		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
17.11 (8)	PROTECTION AGAINST ELECTRIC SHOCK		P
17.11 (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 and adjustable luminaires		N/A
	Basic insulated parts not accessible with Ø 50 mm probe from outside, within arm's reach, on wall-mounted luminaires		P
	Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N/A
	Basic insulation only accessible under lamp or starter replacement		N/A
	Protection in any position		P
	Double-ended tungsten filament lamp		N/A
	Insulation lacquer not reliable		P
	Double-ended high pressure discharge lamp		N/A
	Relevant warning according to 3.2.18 fitted to the luminaire		N/A
17.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N/A
17.11 (8.2.3.a)	Class II luminaire:		N/A
	- basic insulated metal parts not accessible during starter or lamp replacement		N/A
	- basic insulation not accessible other than during starter or lamp replacement		N/A
17.11 (8.2.3.b)	- glass protective shields not used as supplementary insulation		N/A
	BC lampholder of metal in class I luminaires shall be earthed		N/A
17.11 (8.2.3.c)	Class III luminaires with exposed SELV parts:		N/A
	Ordinary luminaire:		N/A
	- touch current		N/A
	- no-load voltage		N/A
	Other than ordinary luminaire:		N/A
	- nominal voltage		N/A
17.11 (8.2.4)	Portable luminaire have protection independent of supporting surface		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
17.11 (8.2.5)	Compliance with the standard test finger or relevant probe		P
17.11 (8.2.6)	Covers reliably secured		P
17.11 (8.2.7)	Discharging of capacitors $\geq 0,5 \mu\text{F}$		P
	Portable plug connected luminaire with capacitor		N/A
	Other plug connected luminaire with capacitor		N/A
	Discharge device on or within capacitor		N/A
	Discharge device mounted separately		N/A

17.12 (12)	ENDURANCE TEST AND THERMAL TEST		P
17.12 (-)	If IP > IP 20 relevant test of (12.4), (12.5) and (12.6) after (9.2) before (9.3) specified in 17.13		—
17.12 (12.3)	Endurance test:		P
	- mounting-position	Mounted at the test corner as normal used	—
	- test temperature (°C)	35	—
	- total duration (h)	168	—
	- supply voltage: Un factor; calculated voltage (V):	264V	—
	- lamp used	LED lamp	—
17.12 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N/A
	- marking legible		P
	- no cracks, deformation etc.		P
17.12 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
17.12 (12.5)	Thermal test (abnormal operation)	(see Annex 2)	P
17.12 (12.6)	Thermal test (failed lamp control gear condition):		N/A
17.12 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A)		—
	- case of abnormal conditions.....		—
	- electronic lamp control gear		N/A
	- measured winding temperature (°C): at 1,1 Un ..		—
	- measured mounting surface temperature (°C) at 1,1 Un		N/A
	- calculated mounting surface temperature (°C) ..		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- track-mounted luminaires		N/A
17.12 (12.6.2)	Temperature sensing control		N/A
	- case of abnormal conditions..... :		—
	- thermal link		N/A
	- manual reset cut-out		N/A
	- auto reset cut-out		N/A
	- measured mounting surface temperature (°C).... :		N/A
	- track-mounted luminaires		N/A
17.12 (12.7)	Thermal test (failed lamp control gear in plastic luminaires):		N/A
17.12 (12.7.1)	Luminaire without temperature sensing control		N/A
17.12 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		N/A
	Test method 12.7.1.1 or Annex W :		—
	Test according to 12.7.1.1:		N/A
	- case of abnormal conditions		—
	- Ballast failure at supply voltage (V) :		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
	Test according to Annex W:		N/A
	- case of abnormal conditions		—
	- measured winding temperature (°C): at 1,1 Un.. :		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un..... :		—
	- calculated temperature of fixing point/exposed part (°C) :		—
	Ball-pressure test:		N/A
	- part tested; temperature (°C)..... :		N/A
	- part tested; temperature (°C)..... :		N/A
17.12 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		N/A
	- case of abnormal conditions		—
	- measured winding temperature (°C): at 1,1 Un.. :		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un..... :		—
	- calculated temperature of fixing point/exposed part (°C) :		—

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Clause	Requirement + Test	Result - Remark	Verdict
	Ball-pressure test:		N/A
	- part tested; temperature (°C).....:		N/A
	- part tested; temperature (°C).....:		N/A
17.12 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N/A
	- case of abnormal conditions		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
17.12 (12.7.2)	Luminaire with temperature sensing control		N/A
	- thermal link	Yes ☐ No ☐	—
	- manual reset cut-out	Yes ☐ No ☐	—
	- auto reset cut-out	Yes ☐ No ☐	—
	- case of abnormal conditions		—
	- highest measured temperature of fixing point/exposed part (°C):.....:		—
	Ball-pressure test:		N/A
	- part tested; temperature (°C).....:		N/A
	- part tested; temperature (°C).....:		N/A
17.12.1 (-)	Exterior surface temperature	(see Annex 2)	P

17.13 (9)	RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE		P
17.13 (-)	If IP > IP 20 the order of the test specified in clause 17.12		—
17.13 (9.2)	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP	IP 20	—
	- mounting position during test	As in normal use	—
	- fixing screws tightened; torque (Nm).....	--	—
	- tests according to clauses	Clause 9.2.0	—
	- electric strength test afterwards		N/A
	a) no deposit in dust-proof luminaire		N/A
	b) no talcum in dust-tight luminaire		N/A
	c) no trace of water on current-carrying parts or SELV parts or where it could become a hazard		N/A
	d) i) For luminaires without drain holes – no water entry		N/A
	d) ii) For luminaires with drain holes – no hazardous water entry		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	e) no water in watertight luminaire		N/A
	f) no contact with live parts (IP 2X)		P
	f) no entry into enclosure (IP 3X and IP 4X)		N/A
	f) no contact with live parts (IP3X and IP4X)		N/A
	g) no trace of water on part of lamp requiring protection from splashing water		N/A
	h) no damage of protective shield or glass envelope		N/A
17.13 (9.3)	Humidity test 48 h		P

17.14 (10)	INSULATION RESISTANCE AND ELECTRIC STRENGTH		P
17.14 (10.2.1)	Insulation resistance test		P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø		—
	Insulation resistance (MΩ)		—
	SELV:		N/A
	- between current-carrying parts of different polarity	>1,3MΩ	P
	- between current-carrying parts and mounting surface	>1,3MΩ	P
	- between current-carrying parts and metal parts of the luminaire	>1,3MΩ	P
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts		N/A
	- Insulation bushings as described in Section 5 ..		N/A
	Other than SELV:		P
	- between live parts of different polarity	>2,6MΩ	P
	- between live parts and mounting surface	>2,6MΩ	P
	- between live parts and metal parts	>2,6MΩ	P
	- between live parts of different polarity through action of a switch		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts		N/A
	- Insulation bushings as described in Section 5 ..		N/A
17.14 (10.2.2)	Electric strength test		P
	Dummy lamp		N/A
	Luminaires with ignitors after 24 h test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Luminaires with manual ignitors		N/A
	Test voltage (V):		N/A
	SELV:		P
	- between current-carrying parts of different polarity	500V	P
	- 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/A
	- Insulation bushings as described in Section 5 ..		N/A
	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/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts		N/A
	- Insulation bushings as described in Section 5 ..		N/A
17.14 (10.3)	Touch current or protective conductor current (mA)	0,09	P

17.15 (13)	RESISTANCE TO HEAT, FIRE AND TRACKING		P
17.15 (13.2.1)	Ball-pressure test:		P
	- part tested; temperature (°C).....	Bobbin of transformer: 125°C 0.6mm	P
	- part tested; temperature (°C).....	PCB: 125°C 0.4mm	P
	- part tested; temperature (°C).....	Connector: 125°C 1,1mm	P
	- part tested; temperature (°C).....	Lampshade: 75°C 0,5mm	P
17.15 (13.3.1)	Needle flame test (10 s):		P
	- part tested	Bobbin of transformer	P
	- part tested	PCB of controlgear	P
	- part tested	Connector	P
17.15 (13.3.2)	Glow-wire test (650°C):		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- part tested.....:	Lampshade	P
	- part tested.....:		N/A
17.15 (13.4.1)	Tracking test:		N/A
	- part tested.....:		N/A
	- part tested.....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX 1: components	P
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object/part No.	code	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity
Plug	B	Ningbo Qiaopu Electric Co., Ltd.	D03	250VAC, 16A	VDE 0620-1	VDE 40002872
Supply cord	B	Ningbo Qiaopu Electric Co., Ltd	H05VV-F	3G0.75mm ²	VDE 0281-5	VDE 40035976
Connector	B	Guangzhou Sinojoint Electronics Co., Ltd.	--	PC	EN 60598-1 EN 60598-2-17	Tested with appliance
Internal wire	C	DONGGUAN WENCHANG ELECTRONIC CO LTD	1612	300VAC, 18AWG,105 °C	EN 60598-1 EN 60598-2-17	UL/ E214500 and tested with appliance
PCB	C	NANTONG RODA ELECTRON CO LTD	RD140	130°C,V-0	EN 60598-1 EN 60598-2-17	UL/E320689 and tested with appliance
LED	C	GUANGHAO ELECTRONICS	--	60W	EN 60598-1 EN 60598-2-17	Tested with appliance
Fuse	B	Shenzhen Lanson Electronics Co. LTD	3JFxxx250V	250VAC, 2A	VDE 0820-1 VDE 0820 Teil 3	VDE 40009301
Varistor	B	Cerglass MFG Inc	10D471K	2500VAC, 500A,85 °C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 40028836
Transformer	C	GuangZhou STS Lighting Equipment Co., Ltd.	HK-U100W	Class B	EN 60598-1 EN 60598-2-17	Tested with appliance
-Bobbin	C	GuangZhou STS Lighting Equipment Co., Ltd.	EFD20 4+4	PHENOLICS T373J 94V0, Class B	EN 60598-1 EN 60598-2-17	Tested with appliance
-Tape	C	JINGJIANG FUWEI ADHESIVE PRODUCT CO LTD	FW	130°C	EN 60598-1 EN 60598-2-17	UL /E302608 and tested with appliance

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Clause	Requirement + Test			Result - Remark		Verdict
-Triple insulated winding	B	E&B Technology Co., Ltd	E&B- XXXB	Triple insulation (reinforced), 130℃	EN 60598-1 EN 60598-2-17	VDE 40023473
-Primary wire	C	SHANTOU SHENGANG ELECTRICAL INDUSTRIAL CO., LTD	MW 75-C	130[#]	EN 60598-1 EN 60598-2-17	UL /E239508 and tested with appliance
Lampshade	C	GuangZhou STS Lighting Equipment Co., Ltd.	--	PC	EN 60598-1 EN 60598-2-17	Tested with appliance
Earth wire	B	Wuxi Huacheng Cable Co., Ltd.	H05S-K	450/750V, 1 x 0.75mm ²	DIN VDE 0281-5	VDE 124381
X capacitor	B	Tenda Electric Industrial Co. Ltd.	MEX	275VAC, 0.1uF, 100 ℃	DIN VDE 0565 Teil 1-1	VDE 119119
Y capacitor	B	Shantou High-New Technology Dev. Zone Songtian Enterprise Co., Ltd.	CD-Series	400VAC, 2200pF, 125 ℃	DIN VDE 0565 Teil 1-1	VDE 40025754
Winding of L1	C	SHANTOU SHENGANG ELECTRICAL INDUSTRIAL CO., LTD	MW 75-C	130[#]	EN 60598-1 EN 60598-2-17	UL /E239508 and tested with appliance
Appliance inlet	B	Rong Feng Industrial Co., Ltd.	SS-120	250VAC, 10A	DIN EN 60320-1	VDE 40028101
Heat shrinkable tube	C	DONGGUAN SALIPT CO LTD	SALIPT S-901-600	600 V, 125℃	IEC 60968	UL/E209436 and tested with appliance
Appliance connector	B	Ningbo Qiaopu Electric Co., Ltd.	QT3	AC 250V 10A	DIN EN 60320-1	VDE 40005934
Switch	C	GuangZhou STS Lighting Equipment Co., Ltd.	--	PC	EN 60598-1 EN 60598-2-17	Tested with appliance

The codes above have the following meaning:

A - The component is replaceable with another one, also certified, with equivalent characteristics

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Clause	Requirement + Test	Result - Remark	Verdict

- B - The component is replaceable if authorised by the test house
C - Integrated component tested together with the appliance
D - Alternative component

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Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX 2: temperature measurements, thermal tests of Section 12	P
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Type reference	M SPOT 200	—
Lamp used.....	LED lamp	—
Lamp control gear used	Integral LED controlgear	—
Mounting position of luminaire	As in normal use	—
Supply wattage (W).....	198,8	—
Supply current (A)	0,832	—
Calculated power factor	--	—
Table: measured temperatures corrected for $t_a = 25\text{ }^{\circ}\text{C}$:		P
- abnormal operating mode	Shut-circuit output of LED control gear	—
- test 1: rated voltage	N/A	—
- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....	1,06x240=254,4V	—
- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage	N/A	—
- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....	1,1x240V=264V	—
Through wiring or looping-in wiring loaded by a current of A during the test	N/A	—

temperature ($^{\circ}\text{C}$) of part	Clause 12.4 – normal				Clause 12.5 – abnormal	
	test 1	test 2	test 3	limit	test 4	limit
Winding of L1	--	112,6	--	130	--	--
connector	--	45,4	--	Cl. 13.1	--	--
Internal wire	--	54,2	--	105	--	--
PCB	--	78,6	--	130	--	--
X capacitor	--	83,5	--	100	--	--
Transformer	--	106,1	--	130	--	--
Transformer bobbin	--	100,1		Cl. 13.1	--	--
Y capacitor	--	88,3	--	125	--	--
Switch	--	39,1	--	55	--	--
Metal enclosure	--	44,5	--	60	--	--
Lampshade	--	41,2	--	Cl. 13.1	--	--

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Clause	Requirement + Test			Result - Remark		Verdict
Lighted Objected(0.1m)	--	35.3	--	90	--	--
Mounting Surface	--	36,2	--	90	30,6	130

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Clause	Requirement + Test	Result - Remark	Verdict

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

IEC 60598-2-17			
Clause	Requirement + Test	Result - Remark	Verdict

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

IEC 60598-2-17											
Clause	Requirement + Test								Result - Remark		Verdict
	Terminal size and rating										N/A
(15.8.1)	Pull test spring-type terminals or welded connections (4 samples); pull (N)										N/A
	Pull test pin or tab terminals (4 samples); pull (N)										N/A
(15.9)	Contact resistance test										N/A
	Voltage drop (mV) after 1 h										N/A
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Voltage drop of two inseparable joints										
	Voltage drop after 10th alt. 25th cycle										
	Max. allowed voltage drop (mV)										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Voltage drop after 50th alt. 100th cycle										
	Max. allowed voltage drop (mV)										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Continued ageing: voltage drop after 10th alt. 25th cycle										
	Max. allowed voltage drop (mV)										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Continued ageing: voltage drop after 50th alt. 100th cycle										
	Max. allowed voltage drop (mV)										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											

EN 60598-2-17			
Clause	Requirement + Test	Result - Remark	Verdict

	Appendix 1: European Group National Differences	P
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ATTACHMENT TO TEST REPORT IEC 60598-2-17 EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES Luminaires Part 2: Particular requirements: Section Seventeen - Luminaires for stage lighting, television and film studios (outdoor and indoor)	
Differences according	EN 60598-2-17:1988 + A2:1991 used in conjunction with EN 60598-1:2015
Annex Form No.	EU_GD_IEC60598_2_17C
Annex Form Originator	IMQ S.p.A.
Master Annex Form	2010-08
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	CENELEC COMMON MODIFICATIONS (EN)	P
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17.5 (3)	MARKING	P
17.5 (3.3.101)	Adequate warning on the package	N/A

17.6 (4)	CONSTRUCTION	P
17.6 (4.11.6)	Electro-mechanical contact systems	N/A

17.10 (5)	EXTERNAL AND INTERNAL WIRING	P
17.10 (5.2.1)	Connecting leads	N/A
	- without a means for connection to the supply	N/A
	- terminal block specified	N/A
	- relevant information provided	N/A
	- compliance with 4.6, 4.7.1, 4.7.2, 4.10.1, 11.2, 12 and 13.2 of Part 1	N/A
17.10 (5.2.2)	Cables equal to HD21 S2 or HD22 S2	N/A

17.12 (12)	ENDURANCE TEST AND THERMAL TEST	P
17.12 (12.4.2c)	Thermal test (normal operation)	P

EN 60598-2-17			
Clause	Requirement + Test	Result - Remark	Verdict
ZB	ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)		P
(3.3)	DK: power supply cord with label		N/A
	IT: warning label on Class 0 luminaire		N/A
(4.5.1)	DK: socket-outlets		N/A
(5.2.1)	CY, DK, FI, SE, GB: type of plug		N/A
ZC	ANNEX ZC, NATIONAL DEVIATIONS (EN)		P
(4 & 5)	FR: Shuttered socket-outlets 10/16A		N/A
(13.3)	FR: Glow-wire test 850°C alt. 750°C for luminaires in premises open to public or 960°C for luminaires in emergency exits		N/A
(13.3)	GB: Requirements according to United Kingdom Building Regulation		N/A

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

-Appendix 2: The Integrated LED driver tested with EN 61347-2-13:2014 and EN 61347-1:2008+ A1:2011 + A2:2011+A2:2013

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		P
- (A3)	Voltage > 35 V peak or > 60 V d.c. or protective impedance device		P
- (10.1)	Lacquer or enamel not used for protection or insulation		N/A
	Adequate mechanical strength on parts providing protection		P
- (10.2)	Capacitors > 0,5 μ F: voltage after 1 min (V): < 50 V :	1V	P
- (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		P
	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/A
	Tests according Annex L of IEC 61347-1		P
- (10.4)	Accessible conductive parts in SELV circuits		P
	Output voltage under load $\leq$ 25 V r.m.s. or $\leq$ 60 V d.c.		P
	If output voltage > 25 V r.m.s. or > 60 V d.c.; No load output $\leq$ 35 V peak or $\leq$ 60 V d.c and touch current does not exceed 0,7 mA (peak) or 2 mA d.c. :		N/A
	One conductive part is insulated if output voltage or current exceeding the values above and withstand test voltage 500 V		N/A
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		P
	Y1 or Y2 capacitors comply with IEC 60384-14		P

EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Resistors comply with test (a) in 14.1 of IEC 60065		N/A
8.1	SELV-equivalent controlgear accessible parts are insulated from live parts by double or reinforced insulation according 8.6 and 13.1 in IEC 60065		N/A
8.2	Exposed terminals of SELV or SELV-equivalent controlgear if: - the rated or maximum rated output voltages ≤ 25 V r.m.s. - the no-load output voltage ≤ 30 V r.m.s. or $33\sqrt{2}$ V peak	No such terminal used	N/A
	Insulated terminals if convertor with rated output voltage > 25 V		N/A
	One capacitor Y1 or two capacitors Y2 complying with IEC 60384-14 of the same values used in series between SELV or SELV-equivalent output and primary circuits		N/A
	Other components bridging the separating transformer complying with IEC 60065, clause 14		N/A

11 (11)	MOISTURE RESISTANCE AND INSULATION		P
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (M Ω):		P
	For basic insulation ≥ 2 M Ω :	>2.6 M Ω	P
	For double or reinforced insulation ≥ 4 M Ω :	>5.2 M Ω	P
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		N/A
11 (-)	Adequate insulation between input and output terminals not bounded together in SELV-equivalent controlgear		N/A

12 (12)	ELECTRIC STRENGTH		P
	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V		P
	Working voltage ≤ 50 V, test voltage 500 V		P
	Working voltage > 50 V ≤ 1000 V, test voltage (V):		P
	Basic insulation, $2U + 1000$ V	1480	P
	Supplementary insulation, $2U + 1000$ V	1480	P
	Double or reinforced insulation, $4U + 2000$ V	2960	P
	No flashover or breakdown		P

EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Solid or thin sheet insulation for double or reinforced insulation fulfil the requirements in Annex N in IEC 61347-1		N/A
12 (-)	Windings in separating transformers in SELV-equivalent convertors according to 14.3.2 of IEC 60065		N/A
14 (14)	FAULT CONDITIONS		P
- (14)	When operated under fault conditions the controlgear:		P
	- does not emit flames or molten material		P
	- does not produce flammable gases		P
	- protection against accidental contact not impaired		P
	Thermally protected controlgear does not exceed the marked temperature value		N/A
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected	(see appended table)	P
- (14.1)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (except between live parts and accessible metal parts)	(see appended table)	P
	Creepage distances on printed boards less than specified in clause 16 in Part 1 provided with coating according to IEC 60664-3		P
- (14.2)	Short-circuit or interruption of semiconductor devices	(see appended table)	P
- (14.3)	Short-circuit across insulation consisting of lacquer, enamel or textile	(see appended table)	P
- (14.4)	Short-circuit across electrolytic capacitors	(see appended table)	P
- (14.5)	After the tests has been carried out on three samples:		P
	The insulation resistance $\geq 1 \text{ M}\Omega$:	>1,3 M Ω	P
	No flammable gases		P
	No accessible parts have become live		P
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
- (14.6)	Relevant fault condition tests with high-power supply		—
14 (-)	Temperature declared thermally protected lamp controlgear fulfil requirements in Annex C		N/A

EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
16 (-)	ABNORMAL CONDITIONS		P
16.1 (-)	Control gear which are of the constant voltage output type:		N/A
	a) No LED module inserted		N/A
	b) Double LED modules or equivalent load connected to the output terminals		N/A
	c) Output terminal short-circuited (20 cm and 200 cm or declared length)		N/A
	During and at the end of the tests no defect impairing safety, nor any smoke or flammable gases produced		N/A
16.2 (-)	Control gear which are of the constant current output type		P
	a) No LED module connected	Low output	P
	b) Double the LED modules or equivalent load connected in series to the output terminals		P
	c) Output terminal short-circuited (20 cm and 200 cm or declared length)	Low output	P
	Maximum output voltage not exceeded		P
	During and at the end of the tests no defect impairing safety, nor any smoke or flammable gases produced		P

17 (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/A
	No dangerous compatibility between output socket-outlet and a plug for socket-outlets for input circuit in relation to installation rules, voltages and frequencies		N/A
	Plugs and socket-outlets for SELV comply with IEC 60906-3 and IEC 60884-2-4		N/A
	Plugs and socket-outlets for SELV ≤ 3 A, ≤ 25 V r.m.s. or ≤ 60 V d.c. and ≤ 72 W comply with IEC 60906-3 and IEC 60884-2-4 or:		N/A
	- plugs not able to enter socket-outlets of other standardised system		N/A

EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	- socket-outlets not admit plugs of other standardised system		N/A
	- socket-outlets without protective earth		N/A
17 (-)	Socket-outlet in the output circuit does not accept plugs complying with IEC 60083 and IEC 60906		N/A
	Not possible to engage plugs accepted by socket-outlet in the output circuit with socket-outlets complying with IEC 60083 and IEC 60906		N/A

18 (16)	CREEPAGE DISTANCES AND CLEARANCES		P
- (16)	Creepage distances and clearances according to Table 3 and 4, as appropriate	(see appended table)	P
	Controlgears providing SELV comply with L.1 in Annex L		N/A
	Insulating lining of metallic enclosures		N/A
	Basic insulation on printed boards tested according to clause 14		P
	Distances subjected to both sinusoidal voltage as non-sinusoidal pulses not less than value in either Table 3 or 4		P
	Creepage distances not less than minimum clearance		P

14	TABLE: tests of fault conditions		P
Part	Simulated fault		Hazard
C3	Short-circuit, Fuse opened instantly, the appliance not working		NO
D2	Short-circuit, Fuse opened instantly, the appliance not working		NO
Q1(c-e)	Short-circuit, Fuse opened instantly, the appliance not working		NO
C7	Short-circuit, Output shut down, no hazard		NO
C6	Short-circuit, Output shut down, no hazard		NO
Output	Short-circuit, Output shut down, no hazard		NO

18 (16)	TABLES: Creepage distances and clearances (All LED controlgear are encapsulated by epoxy resin)						P
Table 3	Minimum distances (mm) for a.c. (50/60 Hz) sinusoidal voltages						N/A
RMS working voltage (V) not exceeding	50	150	250	500	750	1000	
Creepage distances							

EN 61347-2-13							
Clause	Requirement + Test			Result - Remark			Verdict
Required basic insulation, PTI $\geq$ 600	0,6	0,8	1,5	3	4	5,5	
Measured			--				
Required basic insulation, PTI $<$ 600	1,2	1,6	2,5	5	8	10	
Measured			>3,2				
Required supplementary insulation PTI $\geq$ 600	-	0,8	1,5	3	4	5,5	
Measured			--				
Required supplementary insulation PTI $<$ 600	-	1,6	2,5	5	8	10	
Measured			>3,2				
Required reinforced insulation	-	3,2	5	6	8	11	
Measured			>6,5				
Clearances							
Required basic insulation	0,2	0,8	1,5	3	4	5,5	
Measured							
Required supplementary insulation	-	0,8	1,5	3	4	5,5	
Measured							
Required reinforced insulation	-	1,6	3	6	8	11	
Measured			>3,9				
Table 4	Minimum distances (mm) for non-sinusoidal pulse voltages						N/A
Rated pulse voltage (peak kV)	2,0	2,5	3,0	4,0	5,0	6,0	8,0
Required clearances	1,0	1,5	2	3	4	5,5	8
Measured							
Rated pulse voltage (peak kV)	10	12	15	20	25	30	40
Required clearances	11	14	18	25	33	40	60
Measured							
Rated pulse voltage (peak kV)	50	60	80	100	-	-	-
Required clearances	75	90	130	170	-	-	-
Measured							

EN 62031			
Clause	Requirement + Test	Result - Remark	Verdict

Appendix 3: LED modules tested with EN 62031:2008+A1:2013+A2:2015

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 (MΩ):		P
	For basic insulation $\geq 2 \text{ M}\Omega$	>2,6 MΩ	P
	For double or reinforced insulation $\geq 4 \text{ M}\Omega$	>5,2 MΩ	P
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		P

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/A
	Working voltage $\leq 50 \text{ V}$, test voltage 500 V		N/A
	Working voltage $> 50 \text{ V} \leq 1000 \text{ V}$, test voltage (V):		P
	Basic insulation, $2U + 1000 \text{ V}$		P
	Supplementary insulation, $2U + 1000 \text{ V}$		P
	Double or reinforced insulation, $4U + 2000 \text{ V}$		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		N/A

13 (14)	FAULT CONDITIONS		P
- (14)	When operated under fault conditions the controlgear:		P
	- does not emit flames or molten material		P
	- does not produce flammable gases		P
	- protection against accidental contact not impaired		P
	Thermally protected controlgear does not exceed the marked temperature value		N/A
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected	(see appended table)	N/A
- (14.1)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (except between live parts and accessible metal parts)	(see appended table)	P

EN 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	Creepage distances on printed boards less than specified in clause 16 in Part 1 provided with coating according to IEC 60664-3		N/A
- (14.2)	Short-circuit or interruption of semiconductor devices	(see appended table)	P
- (14.3)	Short-circuit across insulation consisting of lacquer, enamel or textile	(see appended table)	P
- (14.4)	Short-circuit across electrolytic capacitors	(see appended table)	N/A
- (14.5)	After the tests has been carried out on three samples:		P
	The insulation resistance $\geq 1 \text{ M}\Omega$: $>1,3 \text{ M}\Omega$		P
	No flammable gases		P
	No accessible parts have become live		P
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
- (14.6)	Relevant fault condition tests with high-power supply		--
13.2	Overpower condition		P
	Module withstands overpower condition $>15 \text{ min.}$		P
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		P
	No fire, smoke or flammable gas is produced		P
	Molten material does not ignite tissue paper, spread below the module		P
15	CONSTRUCTION		P
	Wood, cotton, silk, paper and similar fibrous material not used as insulation		P
14	TABLE: tests of fault conditions		P
Part	Simulated fault		Hazard
LED	Short -circuit, the appliance not working		NO

IEC 60598-2-17			
Clause	Requirement + Test	Result - Remark	Verdict

-Appendix 4: For requirement of EN 62493:2015

4.2	Unintentional radiating part of lighting equipment		P
4.2.1	General		P
	This subclause 4.2 applies for lighting equipment, excluding the intentional radiating part (as far as applicable).		P
4.2.2	Lighting equipment deemed to comply with the Van der Hoofden test without testing		N/A
	1) it contains no electronic controlgear;		N/A
	2) it is incandescent-lamp technology, including halogen;		N/A
	3) it is a LED-light-source technology;		N/A
	4) it is an OLED light-source technology;		N/A
	5) it is high-pressure discharge lamp technologies;		N/A
	6) it is based on low-pressure discharge lamp technologies with an exposure distance larger than or equal to 50 cm (according to Table A.1);		N/A
	7) it is an independent auxiliary.		N/A
4.2.3	Application of limits		P
	Induced current density		P
	Induced current density 20 kHz – 10 MHz	See measurement results below	P

4.2.3	INDUCED CURRENT DENSITY	P
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	Power supply system utilised:		—
	Voltage	230 V	—
	Frequency.....	50 Hz	—
	Environmental conditions:		—
	Temperature	25 °C	—
	Humidity.....	56 %	—
	EuT operation mode:		—
	☒ Normal operation		—
	☐ Other operation:		—
			—

4.2.3	MEASUREMENT RESULTS	P
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TRF No. IEC60598_2_17D

IEC 60598-2-17				
Clause	Requirement + Test		Result - Remark	Verdict
	Measuring with "Van der Hoofden" test head			P
Location of EuT	Measuring distance	Result (F)	Limit (F)	Verdict
On the table	15 cm	0,025	0,85	P

4.2.3	EQUIPMENT USED DURING TEST		
Equipment	Manufacturer	Type	Id. No.
EMI test receiver	R&S	ESCI 30	WST
Test Head	SCHWARZBECK	VDHH9502	WST

IEC 60598-2-17			
Clause	Requirement + Test	Result - Remark	Verdict

-Appendix 5: For requirement of EN 62471:2008

4	EXPOSURE LIMITS		P
4.1	General		P
	The exposure limits in this standard is not less than 0,01 ms and not more than any 8-hour period and should be used as guides in the control of exposure		P
	Detailed spectral data of a light source are generally required only if the luminance of the source exceeds 10^4 cd m^{-2}		P
4.3	Hazard exposure limits		P
4.3.1	Actinic UV hazard exposure limit for the skin and eye		P
	The exposure limit for effective radiant exposure is 30 J m^{-2} within any 8-hour period		P
	To protect against injury of the eye or skin from ultraviolet radiation exposure produced by a broadband source, the effective integrated spectral irradiance, E_s , of the light source shall not exceed the levels defined by:		P
	$E_s \cdot t = \sum_{200}^{400} E_{\lambda}(\lambda, t) \cdot S_{UV}(\lambda) \cdot \Delta t \cdot \Delta \lambda \leq 30 \quad \text{J m}^{-2}$		P
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye or skin shall be computed by:		P
	$t_{\max} = \frac{30}{E_s} \quad \text{s}$		P
4.3.2	Near-UV hazard exposure limit for eye		P
	For the spectral region 315 nm to 400 nm (UV-A) the total radiant exposure to the eye shall not exceed 10000 J m^{-2} for exposure times less than 1000 s. For exposure times greater than 1000 s (approximately 16 minutes) the UV-A irradiance for the unprotected eye, E_{UVA} , shall not exceed 10 W m^{-2} .		P
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye for time less than 1000 s, shall be computed by:		P
	$t_{\max} \leq \frac{10\,000}{E_{UVA}} \quad \text{s}$		P
4.3.3	Retinal blue light hazard exposure limit		P

IEC 60598-2-17			
Clause	Requirement + Test	Result - Remark	Verdict
	To protect against retinal photochemical injury from chronic blue-light exposure, the integrated spectral radiance of the light source weighted against the blue-light hazard function, $B(\lambda)$, i.e., the blue-light weighted radiance, L_B , shall not exceed the levels defined by:		P
	$L_B \cdot t = \sum_{300}^{700} L_{\lambda}(\lambda, t) \cdot B(\lambda) \cdot \Delta\lambda \leq 10^6 \quad \text{J} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$	fort $\leq 10^4$ s $t_{\max} = \frac{10^6}{L_B}$	P
	$L_B = \sum_{300}^{700} L_{\lambda} \cdot B(\lambda) \cdot \Delta\lambda \leq 100 \quad \text{W} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$	fort $> 10^4$ s	P
4.3.4	Retinal blue light hazard exposure limit - small source		N/A
	Thus the spectral irradiance at the eye E_{λ} , weighted against the blue-light hazard function $B(\lambda)$ shall not exceed the levels defined by:		N/A
	$E_B \cdot t = \sum_{300}^{700} E_{\lambda}(\lambda, t) \cdot B(\lambda) \cdot \Delta\lambda \leq 100 \quad \text{J} \cdot \text{m}^{-2}$		N/A
	$E_B = \sum_{300}^{700} E_{\lambda} \cdot B(\lambda) \cdot \Delta\lambda \leq 1 \quad \text{W} \cdot \text{m}^{-2}$		N/A
4.3.5	Retinal thermal hazard exposure limit		P
	To protect against retinal thermal injury, the integrated spectral radiance of the light source, L_{λ} , weighted by the burn hazard weighting function $R(\lambda)$ (from Figure 4.2 and Table 4.2), i.e., the burn hazard weighted radiance, shall not exceed the levels defined by:		P
	$I_R = \sum_{380}^{1400} L_{\lambda} \cdot R(\lambda) \cdot \Delta\lambda \leq \frac{50\,000}{\alpha \cdot t^{0.25}} \quad \text{W} \cdot \text{m}^{-2} \cdot \text{sr}^{-1} \quad (10 \mu\text{s} \leq t \leq 10 \text{ s})$		P
4.3.6	Retinal thermal hazard exposure limit – weak visual stimulus		P
	For an infrared heat lamp or any near-infrared source where a weak visual stimulus is inadequate to activate the aversion response, the near infrared (780 nm to 1400 nm) radiance, L_{IR} , as viewed by the eye for exposure times greater than 10 s shall be limited to:		P
	$L_{\text{IR}} = \sum_{780}^{1400} L_{\lambda} \cdot R(\lambda) \cdot \Delta\lambda \leq \frac{6\,000}{\alpha} \quad \text{W} \cdot \text{m}^{-2} \cdot \text{sr}^{-1} \quad t > 10 \text{ s}$		P
4.3.7	Infrared radiation hazard exposure limits for the eye		P

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	The avoid thermal injury of the cornea and possible delayed effects upon the lens of the eye (cataractogenesis), ocular exposure to infrared radiation, E_{IR} , over the wavelength range 780 nm to 3000 nm, for times less than 1000 s, shall not exceed:		P
	$E_{IR} = \sum_{780}^{3000} E_{\lambda} \cdot \Delta\lambda \leq 18\,000 \cdot t^{-0,75} \quad W \cdot m^{-2} \quad t \leq 1000 \text{ s}$		P
	For times greater than 1000 s the limit becomes:		P
	$E_{IR} = \sum_{780}^{3000} E_{\lambda} \cdot \Delta\lambda \leq 100 \quad W \cdot m^{-2} \quad t > 1000 \text{ s}$		P
4.3.8	Thermal hazard exposure limit for the skin		P
	Visible and infrared radiant exposure (380 nm to 3000 nm) of the skin shall be limited to:		P
	$E_H \cdot t = \sum_{380}^{3000} \sum_t E_{\lambda}(\lambda, t) \cdot \Delta\lambda \cdot \Delta t \leq 20\,000 \cdot t^{0,25} \quad J \cdot m^{-2}$		P
5	MEASUREMENT OF LAMPS AND LAMP SYSTEMS		P
5.1	Measurement conditions		P
	Measurement conditions shall be reported as part of the evaluation against the exposure limits and the assignment of risk classification.		P
5.1.1	Lamp ageing (seasoning)		N/A
	Seasoning of lamps shall be done as stated in the appropriate IEC lamp standard.		N/A
5.1.2	Test environment		P
	For specific test conditions, see the appropriate IEC lamp standard or in absence of such standards, the appropriate national standards or manufacturer's recommendations.	Temperature maintained at $25 \pm 1^{\circ}C$, Relative humidity shall be maintained to less than 65%; Airflow shall be minimized when measuring	P
5.1.3	Extraneous radiation		P
	Careful checks should be made to ensure that extraneous sources of radiation and reflections do not add significantly to the measurement results.		P
5.1.4	Lamp operation		N/A
	Operation of the test lamp shall be provided in accordance with:		N/A
	– the appropriate IEC lamp standard, or		N/A

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	– the manufacturer's recommendation		N/A
5.1.5	Lamp system operation		P
	The power source for operation of the test lamp shall be provided in accordance with:		P
	– the appropriate IEC standard, or		N/A
	– the manufacturer's recommendation		P
5.2	Measurement procedure		P
5.2.1	Irradiance measurements		P
	Minimum aperture diameter 7mm.		P
	Maximum aperture diameter 50 mm.		P
	The measurement shall be made in that position of the beam giving the maximum reading.		P
	The measurement instrument is adequate calibrated.		P
5.2.2	Radiance measurements		P
5.2.2.1	Standard method		P
	The measurements made with an optical system.		P
	The instrument shall be calibrated to read in absolute radiant power per unit receiving area and per unit solid angle to acceptance averaged over the field of view of the instrument.		P
5.2.2.2	Alternative method		N/A
	Alternatively to an imaging radiance set-up, an irradiance measurement set-up with a circular field stop placed at the source can be used to perform radiance measurements.		N/A
5.2.3	Measurement of source size		P
	The determination of α , the angle subtended by a source, requires the determination of the 50% emission points of the source.		P
5.2.4	Pulse width measurement for pulsed sources	Continuous wave lamps	N/A
	The determination of Δt , the nominal pulse duration of a source, requires the determination of the time during which the emission is > 50% of its peak value.		N/A
5.3	Analysis methods		P
5.3.1	Weighting curve interpolations		P
	To standardize interpolated values, use linear interpolation on the log of given values to obtain intermediate points at the wavelength intervals desired.		P

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5.3.2	Calculations		P
	The calculation of source hazard values shall be performed by weighting the spectral scan by the appropriate function and calculating the total weighted energy.		P
5.3.3	Measurement uncertainty		P
	The quality of all measurement results must be quantified by an analysis of the uncertainty.		P

6	LAMP CLASSIFICATION		P
	For the purposes of this standard it was decided that the values shall be reported as follows:	see table 6.1	P
	– for lamps intended for general lighting service, the hazard values shall be reported as either irradiance or radiance values at a distance which produces an illuminance of 500 lux, but not at a distance less than 200 mm	at a distance which produces an illuminance of 500 lux	P
	– for all other light sources, including pulsed lamp sources, the hazard values shall be reported at a distance of 200 mm		N/A
6.1	Continuous wave lamps		P
6.1.1	Exempt Group		P
	In the exempt group are lamps, which does not pose any photobiological hazard. The requirement is met by any lamp that does not pose:		P
	– an actinic ultraviolet hazard (E_S) within 8-hours exposure (30000 s), nor		P
	– a near-UV hazard (E_{UVA}) within 1000 s, (about 16 min), nor		P
	– a retinal blue-light hazard (L_B) within 10000 s (about 2,8 h), nor		P
	– a retinal thermal hazard (L_R) within 10 s, nor		P
	– an infrared radiation hazard for the eye (E_{IR}) within 1000 s		P
6.1.2	Risk Group 1 (Low-Risk)		N/A
	In this group are lamps, which exceeds the limits for the exempt group but that does not pose:		N/A
	– an actinic ultraviolet hazard (E_S) within 10000 s, nor		N/A
	– a near ultraviolet hazard (E_{UVA}) within 300 s, nor		N/A
	– a retinal blue-light hazard (L_B) within 100 s, nor		N/A

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	– a retinal thermal hazard (L_R) within 10 s, nor		N/A
	– an infrared radiation hazard for the eye (E_{IR}) within 100 s		N/A
	Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared retinal hazard (L_{IR}), within 100 s are in Risk Group 1.		N/A
6.1.3	Risk Group 2 (Moderate-Risk)		N/A
	This requirement is met by any lamp that exceeds the limits for Risk Group 1, but that does not pose:		N/A
	– an actinic ultraviolet hazard (E_S) within 1000 s exposure, nor		N/A
	– a near ultraviolet hazard (E_{UVA}) within 100 s, nor		N/A
	– a retinal blue-light hazard (L_B) within 0,25 s (aversion response), nor		N/A
	– a retinal thermal hazard (L_R) within 0,25 s (aversion response), nor		N/A
	– an infrared radiation hazard for the eye (E_{IR}) within 10 s		N/A
	Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared retinal hazard (L_{IR}), within 10 s are in Risk Group 2.		N/A
6.1.4	Risk Group 3 (High-Risk)		N/A
	Lamps which exceed the limits for Risk Group 2 are in Group 3.		N/A
6.2	Pulsed lamps		N/A
	Pulse lamp criteria shall apply to a single pulse and to any group of pulses within 0,25 s.	Continuous wave lamps	N/A
	A pulsed lamp shall be evaluated at the highest nominal energy loading as specified by the manufacturer.		N/A
	The risk group determination of the lamp being tested shall be made as follows:		N/A
	– a lamp that exceeds the exposure limit shall be classified as belonging to Risk Group 3 (High-Risk)		N/A
	– for single pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance does is below the EL shall be classified as belonging to the Exempt Group		N/A

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	– for repetitively pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance dose is below the EL, shall be evaluated using the continuous wave risk criteria discussed in clause 6.1, using time averaged values of the pulsed emission		N/A

Table 4.1 Spectral weighting function for assessing ultraviolet hazards for skin and eye		--	
Wavelength λ , nm	UV hazard function $S_{uv}(\lambda)$	Wavelength λ , nm	UV hazard function $S_{uv}(\lambda)$
200	0,030	313*	0,006
205	0,051	315	0,003
210	0,075	316	0,0024
215	0,095	317	0,0020
220	0,120	318	0,0016
225	0,150	319	0,0012
230	0,190	320	0,0010
235	0,240	322	0,00067
240	0,300	323	0,00054
245	0,360	325	0,00050
250	0,430	328	0,00044
254*	0,500	330	0,00041
255	0,520	333*	0,00037
260	0,650	335	0,00034
265	0,810	340	0,00028
270	1,000	345	0,00024
275	0,960	350	0,00020
280*	0,880	355	0,00016
285	0,770	360	0,00013
290	0,640	365*	0,00011
295	0,540	370	0,000093
297*	0,460	375	0,000077
300	0,300	380	0,000064
303*	0,120	385	0,000053
305	0,060	390	0,000044
308	0,026	395	0,000036
310	0,015	400	0,000030

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Clause	Requirement + Test	Result - Remark	Verdict

Table 4.1	Spectral weighting function for assessing ultraviolet hazards for skin and eye	--
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¹ Wavelengths chosen are representative; other values should be obtained by logarithmic interpolation at intermediate wavelengths.

* Emission lines of a mercury discharge spectrum.

Table 4.2	Spectral weighting functions for assessing retinal hazards from broadband optical sources	--
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Wavelength nm	Blue-light hazard function B (λ)	Burn hazard function R (λ)
300	0,01	
305	0,01	
310	0,01	
315	0,01	
320	0,01	
325	0,01	
330	0,01	
335	0,01	
340	0,01	
345	0,01	
350	0,01	
355	0,01	
360	0,01	
365	0,01	
370	0,01	
375	0,01	
380	0,01	0,1
385	0,013	0,13
390	0,025	0,25
395	0,05	0,5
400	0,10	1,0
405	0,20	2,0
410	0,40	4,0
415	0,80	8,0
420	0,90	9,0
425	0,95	9,5
430	0,98	9,8
435	1,00	10,0
440	1,00	10,0
445	0,97	9,7
450	0,94	9,4
455	0,90	9,0
460	0,80	8,0
465	0,70	7,0
470	0,62	6,2
475	0,55	5,5
480	0,45	4,5
485	0,40	4,0
490	0,22	2,2

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Clause	Requirement + Test	Result - Remark	Verdict

Table 4.2	Spectral weighting functions for assessing retinal hazards from broadband optical sources		--
495	0,16	1,6	
500-600	$10^{[(450-\lambda)/50]}$	1,0	
600-700	0,001	1,0	
700-1050		$10^{[(700-\lambda)/500]}$	
1050-1150		0,2	
1150-1200		$0,2 \cdot 10^{0,02(1150-\lambda)}$	
1200-1400		0,02	

Table 5.4	Summary of the ELs for the surface of the skin or cornea (irradiance based values)					--
Hazard Name	Relevant equation	Wavelength range nm	Exposure duration sec	Limiting aperture rad (deg)	EL in terms of constant irradiance $W \cdot m^{-2}$	
Actinic UV skin & eye	$E_S = \sum E_\lambda \cdot S(\lambda) \cdot \Delta\lambda$	200 – 400	< 30000	1,4 (80)	30/t	
Eye UV-A	$E_{UVA} = \sum E_\lambda \cdot \Delta\lambda$	315 – 400	≤ 1000 > 1000	1,4 (80)	10000/t 10	
Blue-light small source	$E_B = \sum E_\lambda \cdot B(\lambda) \cdot \Delta\lambda$	300 – 700	≤ 100 > 100	< 0,011	100/t 1,0	
Eye IR	$E_{IR} = \sum E_\lambda \cdot \Delta\lambda$	780 – 3000	≤ 1000 > 1000	1,4 (80)	18000/t ^{0,75} 100	
Skin thermal	$E_H = \sum E_\lambda \cdot \Delta\lambda$	380 – 3000	< 10	2π sr	20000/t ^{0,75}	

-Appendix 5: Photo document of product

For model: M SPOT 200



Photo 1: Overall view



Photo 2: Bottom view



Photo 3: Terminal view

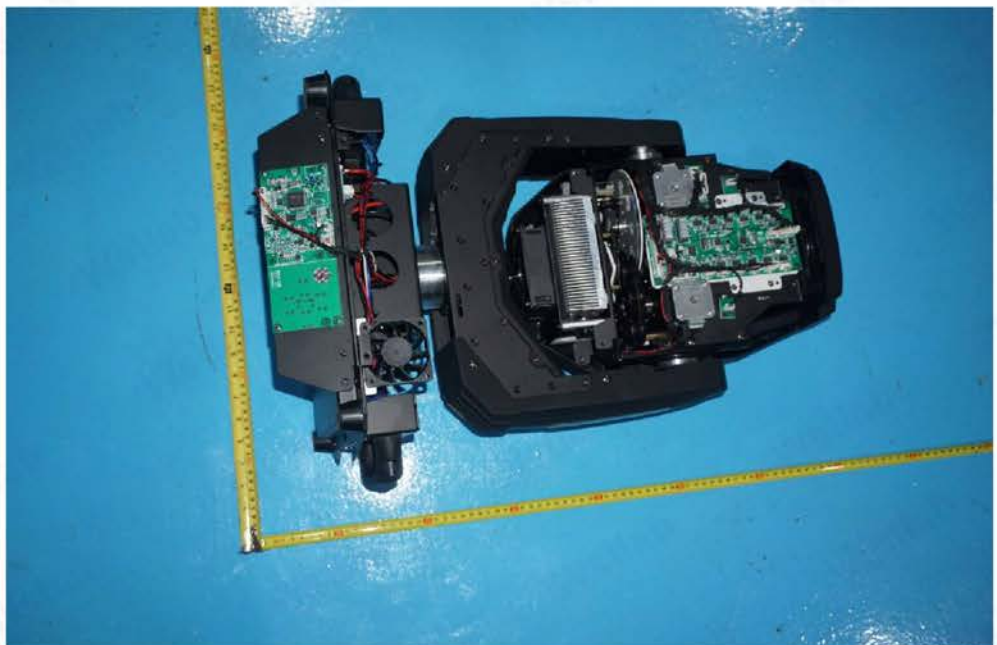


Photo 4: Internal view

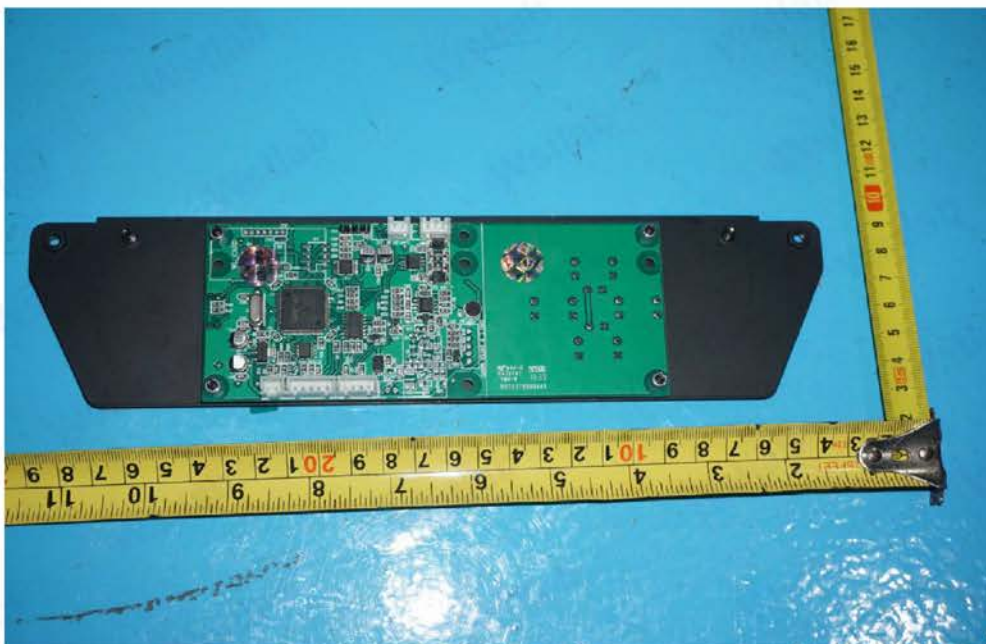


Photo 5: PCB view

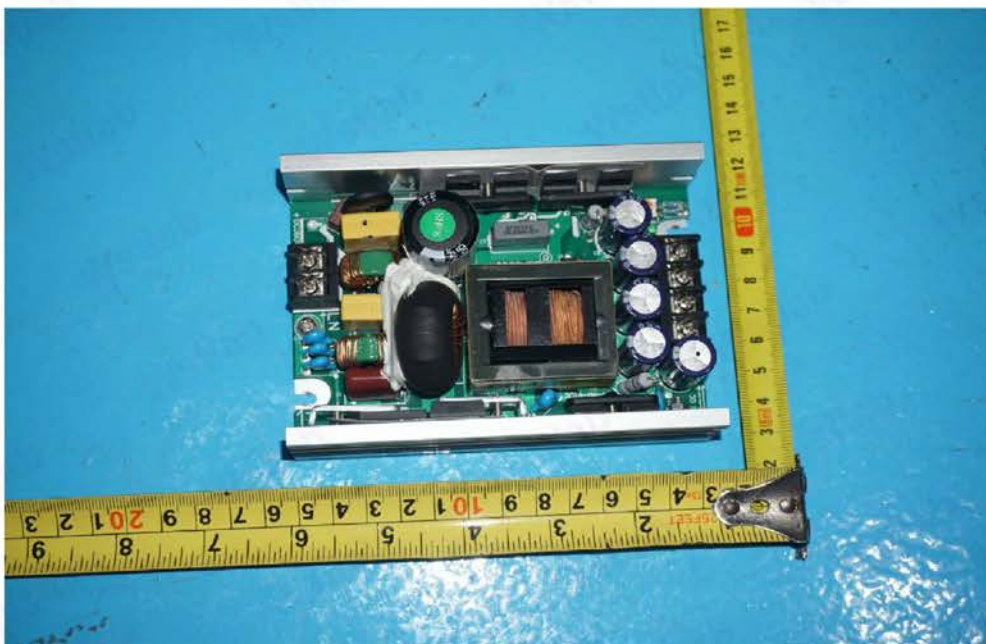


Photo 6: Control PCB

--- End of report ---