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. .....:	WST18N030087-1SR
Date of issue .....:	2018-03-21
Total number of pages.....	65 pages
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 WASH 406,MOVING 200B,MOVING 200L MOVING 200S, M SPOT 90
Ratings .....:	Input:100-240V~, 50/60Hz, 45W, Class I

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 62471:2008

-Appendix 5: For requirement of EN 62493:2015.

-Appendix 6: Photo documents.

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
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	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

MOVING HEAD
Model: M WASH 406
Input: 100-240V~, 50/60Hz,
Wattage:45W



GuangZhou STS Lighting Equipment Co., Ltd.
Made In China

When steady state is achieved, the temperature of the surface is 38,9°C
"Isolate electrically before re-lamping."

Test item particulars ..... :	MOVING HEAD
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 ..... :	2018-03-12
Date (s) of performance of tests..... :	2018-03-12 to 2018-03-21

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 IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided..... :

☐ Yes
☒ Not applicable

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) ..... : Same as applicant

General product information:

1, All the models are the same ,only different model name ,the model M WASH 406 is the main model

2 So All tests are performed on the representative model M WASH 406

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 ≤ 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	28,2°C	P
	b) when steady state	38,9°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		N/A
17.6 (4.3)	Wireways smooth and free from sharp edges		P
17.6 (4.4)	Lampholders		N/A

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IEC 60598-2-17			
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

IEC 60598-2-17			
Clause	Requirement + Test	Result - Remark	Verdict
	- electrical test according to 15.9		N/A
	- 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)	Retainement		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

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Clause	Requirement + Test	Result - Remark	Verdict
17.6 (4.11.1)	Contact pressure		P
17.6 (4.11.2)	Screws:		N/A
	- 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: 0,5 Nm	P
	Torque test: torque (Nm); part ..... :	Screw of PCB: 0,5Nm	P
	Torque test: torque (Nm); part ..... :	Screw of earthing: 0,5 Nm	P
17.6 (4.12.2)	Screws with diameter < 3 mm screwed into metal		P
17.6 (4.12.4)	Locked connections:		P
	- fixed arms; torque (Nm)..... :		N/A
	- lampholder; torque (Nm)..... :		N/A
	- push-button switches; torque 0,8 Nm..... :		P
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

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Clause	Requirement + Test	Result - Remark	Verdict
	b) hand-held		N/A
	c) delivered with a stand		N/A
	d) for temporary installations and suitable for mounting on a stand		N/A
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/mm²) ..... :		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

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Clause	Requirement + Test	Result - Remark	Verdict
	- electronic circuits exempted		N/A
17.6 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		N/A
	a) construction		N/A
	b) temperature sensing control		N/A
	c) surface temperature		N/A
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

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Clause	Requirement + Test	Result - Remark	Verdict
17.6 (4.25)	No sharp point or edges		P
17.6 (4.26)	Short-circuit protection:		N/A
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 (°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

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Clause	Requirement + Test	Result - Remark	Verdict
17.6 (4.31.1)	SELV circuits		N/A
	Used SELV source		N/A
	Voltage ≤ ELV		N/A
	Insulating of SELV circuits from LV supply		N/A
	Insulating of SELV circuits from other non SELV circuits		N/A
	Insulating of SELV circuits from FELV		N/A
	Insulating of SELV circuits from other SELV circuits		N/A
	SELV circuits insulated from accessible parts according Table X.1		N/A
	Plugs not able to enter socket-outlets of other voltage systems		N/A
	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 ≤ 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

IEC 60598-2-17			
Clause	Requirement + Test	Result - Remark	Verdict
	- equipotential bonding in master/slave applications		N/A
	- master luminaire provided with terminal for accessible conductive parts of slave luminaires		N/A
	- slave luminaire constructed as class I		N/A
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.:3,25mm, Cl: 3,25m mm	P

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Clause	Requirement + Test	Result - Remark	Verdict
	(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
	(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 ..... :	0.244Ω	P
	Self-tapping screws used		P
	Thread-forming screws		N/A
	Thread-forming screw used in a grove		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

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Clause	Requirement + Test	Result - Remark	Verdict
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
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 (mm²)..... :		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

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Clause	Requirement + Test	Result - Remark	Verdict
	a) at least one part fixed		N/A
	b) types of cable		N/A
	c) no damaging of the cable		N/A
	d) whole cable can be mounted		N/A
	e) no touching of clamping screws		N/A
	f) metal screw not directly on cable		N/A
	g) replacement without special tool		N/A
	Glands not used as anchorage		N/A
	Labyrinth type anchorages		N/A
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)		P
	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	1612 18AWG	P
	Through wiring		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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
17.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		N/A
	Cross-sectional area (mm²)..... :		N/A
	Insulation thickness		N/A
	Extra insulation added where necessary		N/A
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

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Clause	Requirement + Test	Result - Remark	Verdict
17.10.1 (-)	Cross-sectional area (mm²) ≥ 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
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

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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
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 ≥ 0,5 μF	12V	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) ..... :	240	—
	- 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 ..... :		—

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Clause	Requirement + Test	Result - Remark	Verdict
	- electronic lamp control gear		N/A
	- measured winding temperature (°C): at 1,1 Un . :		—
	- measured mounting surface temperature (°C) at 1,1 Un ..... :		N/A
	- calculated mounting surface temperature (°C) .. :		N/A
	- track-mounted luminaires		N/A
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		—

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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 (12.7.1.3)	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		P
	a) no deposit in dust-proof luminaire		N/A
	b) no talcum in dust-tight luminaire		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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
	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	25℃,93%RH	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 ..... :		N/A
	- between current-carrying parts and mounting surface ..... :		N/A
	- between current-carrying parts and metal parts of the luminaire ..... :		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts ..... :		N/A
	- Insulation bushings as described in Section 5 .. :		N/A
	Other than SELV:		P
	- between live parts of different polarity..... :	>2.6MΩ	P
	- between live parts and mounting surface..... :	>2.6MΩ	P
	- between live parts and metal parts..... :	>2.6MΩ	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts ..... :		N/A
	- Insulation bushings as described in Section 5 .. :		N/A
17.14 (10.2.2)	Electric strength test		P
	Dummy lamp		N/A
	Luminaires with ignitors after 24 h test		N/A
	Luminaires with manual ignitors		N/A
	Test voltage (V):		P
	SELV:		N/A
	- between current-carrying parts of different polarity ..... :		N/A
	- between current-carrying parts and mounting surface ..... :		N/A
	- between current-carrying parts and metal parts of the luminaire ..... :		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts ..... :		N/A
	- Insulation bushings as described in Section 5 .. :		N/A
	Other than SELV:		P
	- between live parts of different polarity..... :	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) ..... :	0.053	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 0.57mm	P
	- part tested; temperature (°C)..... :	Appliance inlet: 125°C 0.4mm	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- part tested; temperature (°C)..... :	Appliance connector: 125°C 0.37mm	P
	- part tested; temperature (°C)..... :	Connector: 125°C 0.72mm	P
	- part tested; temperature (°C)..... :	Lampshade: 75°C 0.69mm	P
17.15 (13.3.1)	Needle flame test (10 s):		P
	- part tested..... :	PCB	P
	- part tested..... :	Appliance connector	P
	- part tested..... :	Connector	P
17.15 (13.3.2)	Glow-wire test (650°C):		P
	- part tested..... :	Lampshade	P
	- part tested..... :	Bobbin of transformer	P
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

object/part No.	code	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity
Plug	B	SUZHOU TONGYUAN ELECTRIC WIRE & CABLE Co., Ltd.	UE-312	250VAC, 16A	VDE 0620-1	VDE40041494
Supply cord	B	SUZHOU TONGYUAN ELECTRIC WIRE & CABLE Co., Ltd.	H05VV-F	3G0.75mm^2	DIN EN 50525-2-11	VDE 128253
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 ℃	EN 60598-1 EN 60598-2-17	UL E214500 and tested with appliance
PCB	C	NANTONG RODA ELECTRON CO LTD	RD140	130℃,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	XC Electronics (Shen Zhen) Corp. Ltd.	5T	250VAC, 6,3A	DIN EN 60127-1	VDE 40009610
Varistor	B	Cerglass MFG Inc	10D471K	2500VAC, 500A,85 ℃	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℃	EN 60598-1 EN 60598-2-17	UL E302608 and tested with appliance
-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 and tested with appliance

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Clause	Requirement + Test	Result - Remark	Verdict

-Primary wire	C	SHANGHAI ZHONGMA MAGNETIC WIRE CO	UEW(QA)	Poyurethane, 155℃[#]	EN 60598-1 EN 60598-2-17	UL E226756 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 0.75mm²	DIN VED 0281-5	VDE 124381
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	DongGuan NarKen Industry Investment Co. Ltd.	XD-102	250VAC, 10A	DIN EN 60320-1	VDE 40023560
Heat shrinkable tube	C	DONGGUAN SALIPT CO LTD	SALIPT S-901-600	600 V, 125°C	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

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

	Type reference ..... :	M WASH 406	—
	Lamp used..... :	LED lamp	—
	Lamp control gear used ..... :	Internal driver	—
	Mounting position of luminaire ..... :	As in normal use	—
	Supply wattage (W)..... :	44,5	—
	Supply current (A) ..... :	0,193	—
	Calculated power factor ..... :	0,4256	—
	Table: measured temperatures corrected for ta = 25 °C:		P
	- abnormal operating mode..... :	Shut-circuit output of driver	—
	- 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 (°C) of part	Clause 12.4 – normal				Clause 12.5 – abnormal	
	test 1	test 2	test 3	limit	test 4	limit
Appliance inlet	--	42,3	--	Cl. 13.1	--	--
T winding	--	72,3	--	120	29,3	175
T bobbin	--	69,8		Cl. 13.1	27,5	175
C1		53,9		105	26,2	115
CY3	--	53,6	--	125	27,1	135
VR1	--	64,8	--	85	--	--
PCB	--	55,6	--	130	--	--
L Winding	--	48,5	--	120	--	--
L bobbin		47,0		Cl. 13.1	--	--
Internal wire	--	52,2	--	105	--	--
Switch	--	30,2	--	55	--	--

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

Fan surface	--	29,9	--	Ref	--	--
Metal enclosure	--	38,9	--	60	--	--
Lampshade	--	31,9	--	Cl. 13.1	--	--
Lighted Objected(0.1m)	--	32,3	--	90	--	--
Mounting Surface	--	34,0	--	90	25,8	130

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IEC 60598-2-17			
Clause	Requirement + Test	Result - Remark	Verdict
	ANNEX 3: screw terminals (part of the luminaire)		N/A
(14)	**SCREW TERMINALS**		N/A
(14.2)	Type of terminal.....:		—
	Rated current (A).....:		—
(14.3.2.1)	One or more conductors		N/A
(14.3.2.2)	Special preparation		N/A
(14.3.2.3)	Terminal size		N/A
	Cross-sectional area (mm²).....:		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	N/A
	External wiring		N/A
	No soft metal		N/A
(14.4.5)	Corrosion		N/A
(14.4.6)	Nominal diameter of thread (mm) .....:		N/A
	Torque (Nm).....:		N/A
(14.4.7)	Between metal surfaces		N/A
	Lug terminal		N/A
	Mantle terminal		N/A
	Pull test; pull (N).....:		N/A
(14.4.8)	Without undue damage		N/A

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IEC 60598-2-17			
Clause	Requirement + Test	Result - Remark	Verdict
	ANNEX 4: screwless terminals (part of the luminaire)		N/A
(15)	**SCREWLESS TERMINALS**		N/A
(15.2)	Type of terminal.....:		—
	Rated current (A).....:		—
(15.3.1)	Material		N/A
(15.3.2)	Clamping		N/A
(15.3.3)	Stop		N/A
(15.3.4)	Unprepared conductors		N/A
(15.3.5)	Pressure on insulating material		N/A
(15.3.6)	Clear connection method		N/A
(15.3.7)	Clamping independently		N/A
(15.3.8)	Fixed in position		N/A
(15.3.10)	Conductor size		N/A
	Type of conductor		N/A
(15.5)	Terminals and connections for internal wiring		N/A
(15.5.1)	Mechanical tests		N/A
(15.5.1.1.1)	Pull test spring-type terminals (4 N, 4 samples).:		N/A
(15.5.1.1.2)	Pull test pin or tab terminals (4 N, 4 samples)...:		N/A
	Insertion force not exceeding 50 N		N/A
(15.5.1.2)	Permanent connections: pull-off test (20 N)		N/A
(15.6)	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
	Terminal size and rating		N/A

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

(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)											

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

Appendix 1: For European group national deviation.

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_17D
Annex Form Originator .....:	IMQ S.p.A.
Master Annex Form.....:	2010-08

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	CENELEC COMMON MODIFICATIONS (EN)		**P**

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

ZB	**ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)**		**P**
(3.3)	DK: power supply cord with label		N/A

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EN 60598-2-17			
Clause	Requirement + Test	Result - Remark	Verdict
	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 LED controlgear with applicable clauses of 4, 6 , 11, 12, 14, 15, 16 and Annex I of EN 61347-2-13:2014 + EN 61347-1:2008 + A1:2011 + A2:2013.

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 60 598-1		N/A
- (4)	Built-in magnetic ballast with double or reinforced insulation comply with Annex I of IEC 61347-1		N/A
- (4)	Built-in electronic controlgear with double or reinforced insulation comply with Annex O of IEC 61347-1	(see Annex O)	N/A
4 (4)	SELV controlgear comply with Annex I of this part 2 and Annex L of IEC 61347-1	(see Annex L)	N/A
4 (-)	Transformer comply with IEC 61558		P
	Dielectric strength test of insulated winding wires is limited to 3 kV if input voltage ≤ 300 V		P

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 ☒	—

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 ≥ 2 MΩ ..... :	>2,6 MΩ	P
	For double or reinforced insulation ≥ 4 MΩ ..... :	>5,2 MΩ	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

EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
12 (12)	**ELECTRIC STRENGTH**		**P**
- (12)	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V		N/A
	Working voltage ≤ 50 V, test voltage 500 V		N/A
	Working voltage > 50 V ≤ 1000 V, test voltage (V):		P
	Basic insulation, 2U + 1000 V	1480V	P
	Supplementary insulation, 2U + 1000 V	1480V	P
	Double or reinforced insulation, 4U + 2000 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)	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		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)	P
- (14.5)	After the tests has been carried out on three samples:		P
	The insulation resistance ≥ 1 MΩ ..... :	>1,3 MΩ	P

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EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	No flammable gases		P
	No accessible parts have become live		P
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
- (14.6)	Relevant fault condition tests with high-power supply		—
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/A
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/A
	Double LED modules or equivalent load connected in series to the output terminals of constant current type		P
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	UL recognized	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

EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	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
	- socket-outlets not admit plugs of other standardised system		N/A
	- socket-outlets without protective earth		N/A

14	TABLE: tests of fault conditions	P
Part	Simulated fault	Hazard
BD1	Short-circuit, Fuse opened	NO
D6	Short-circuit, Fuse opened	NO
D8	Short-circuit, output shutdown, recoverable	NO
Output of controlgear	Short-circuit, output shutdown, recoverable	NO

I (L)	**ANNEX I: PARTICULAR ADDITIONAL REQUIREMENTS FOR SELV D.C. OR A.C. SUPPLIED ELECTRONIC CONTROLGEAR 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/A**
	Adequate symbols are used			N/A
(L.5)	**Protection against electric shock**			**P**
	Comply with 9.2 of IEC 61558-1			P
(L.6)	**Heating**			**P**
	No excessive temperatures in normal use			P
	Value if capacitor t_c marked ..... :	105℃		—

EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Winding insulation classified as Class ..... :	Class B	—
	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 %		P
(L.8.2)	Insulation resistance		P
	Between input- and output circuits not less than 5 MΩ ..... :	>6,5 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/A
	Between metal foil in contact with the inner and outer surfaces of enclosures of insulating material not less than 2 MΩ ..... :	>2,6MΩ	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:		P
	a) live parts having different polarity ..... :	1875V	P
	b) live parts and body if intended to be connected to protective earth ..... :		N/A
	c) accessible metal parts and a metal rod of the same diameter as the flexible cable or cord ..... :		N/A
	d) live parts and an intermediate metal part ..... :		N/A
	e) intermediate metal parts and the body ..... :		N/A
	f) each input circuit and all other input circuits ... :		N/A
	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/A
(L.10)	**Components**		**P**
	Protective devices comply with 20.6 – 20.11 of IEC 61558-1		P
(L.11)	**Creepage distances and clearances**		**P**

EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	1. Insulation between input and output circuits, basic insulation:		P
	a) measured values ≥ specified values (mm) ..... :		N/A
	b) measured values ≥ specified values (mm) ..... :		N/A
	c) measured values ≥ specified values (mm) ..... :		N/A
	2. Insulation between input and output circuits, double or reinforced insulation:		P
	a) measured values ≥ specified values (mm) ..... :	Cr.: 6,5; Cl.: 6,5	P
	b) measured values ≥ specified values (mm) ..... :		N/A
	c) measured values ≥ specified values (mm) ..... :	Multi-layer insulated wire	P
	3. Insulation between adjacent input circuits		N/A
	- measured values ≥ specified values (mm) ..... :		N/A
	3. Insulation between adjacent output circuits		N/A
	- measured values ≥ specified values (mm) ..... :		N/A
	4. Insulation between terminals for external connection:		N/A
	- measured values ≥ specified values (mm) ..... :		N/A
	5. Basic or supplementary insulation:		P
	a) measured values ≥ specified values (mm) ..... :	Cr.:4,33; Cl.: :4,33	P
	b) measured values ≥ specified values (mm) ..... :		N/A
	c) measured values ≥ specified values (mm) ..... :		N/A
	d) measured values ≥ specified values (mm) ..... :		N/A
	e) measured values ≥ specified values (mm) ..... :		N/A
	6. Reinforced insulation or insulation:		P
	Between body and output circuit: measured values ≥ specified values (mm) ..... :	Cr.> 6,5; Cl.>6,5mm	P
	Between body and output circuit if provision against transient voltages: measured values ≥ specified values (mm) ..... :		N/A
	7. Distance through insulation:		P
	a) measured values ≥ specified values (mm) ..... :	DTI 5,3mm	P
	b) measured values ≥ specified values (mm) ..... :		N/A
	c) measured values ≥ specified values (mm) ..... :	Three layers of insulation tape	P
(N)	**ANNEX N: REQUIREMENTS FOR INSULATION MATERIALS USED FOR DOUBLE OR REINFORCED INSULATION**		P
(N.4)	**General requirements**		**P**
(N.4.1)	Material comply with IEC 60085 and IEC 60216 series		P
(N.4.2)	**Solid insulation**		**N/A**

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EN 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Electric strength test at least 5 kV or 1,35 x test voltage in Table N.1		N/A
	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/A
(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/A
	- Non-separated layers: Min. 3 layers and fulfil mandrel test of 150N		P
	- Separated layers: Min. 2 layers and each layer fulfil mandrel test of 50N		N/A
	- Separated layers (alternative): Min. 3 layers and 2/3 of the layers fulfil mandrel test of 100N		N/A
(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		P
	- 2/3 of min. 3 separated layers: min. 5 kV or 1,25 x test voltage in Table N.1		N/A
	- one of 2 separated layers: min. 5 kV or 1,25 x test voltage in Table N.1		N/A
	No flashover or breakdown occurred		N/A

EN 62031			
Clause	Requirement + Test	Result - Remark	Verdict

Appendix 3: For requirement of EN 62031:2008+A1:2013+A2:2015

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 ≤ 50 V, test voltage 500 V		N/A
	Working voltage > 50 V ≤ 1000 V, test voltage (V):		P
	Basic insulation, 2U + 1000 V	1480V	P
	Supplementary insulation, 2U + 1000 V	1480V	P
	Double or reinforced insulation, 4U + 2000 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

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)	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		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)	P
- (14.5)	After the tests has been carried out on three samples:		P

EN 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	The insulation resistance ≥ 1 MΩ :	>1.3 MΩ	P
	No flammable gases		P
	No accessible parts have become live		N/A
	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	Module withstands overpower condition >15 min.		P
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		P
	During the tests, tissue paper, spread below module, does not ignite		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

EN 62471			
Clause	Requirement + Test	Result - Remark	Verdict

-Appendix 4: 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
	$E_s \cdot t = \sum_{200}^{400} \sum_{t} E_\lambda(\lambda,t) \cdot S_{UV}(\lambda) \cdot \Delta t \cdot \Delta\lambda \le 30$ J·m^{-2}		P
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye or skin shall be computed by:		P
	$t_{max} = \frac{30}{E_S}$ 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 10W·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
	$t_{max} \le \frac{10\,000}{E_{UVA}}$ s		P
4.3.3	Retinal blue light hazard exposure limit		P

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	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(λ), i.e., the blue-light weighted radiance , L_B, shall not exceed the levels defined by:		P
	$L_B \cdot t = \sum_{300}^{700} \sum_{t} L_\lambda(\lambda,t) \cdot B(\lambda) \cdot \Delta t \cdot \Delta\lambda \le 10^6$ J · m^{-2} · sr^{-1}	fort ≤ 10^4 s $t_{max} = \frac{10^6}{L_B}$	P
	$I_B = \sum_{300}^{700} I_\lambda \cdot B(\lambda) \cdot \Delta\lambda \le 100$ W · m^{-2} · 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(λ) shall not exceed the levels defined by:		N/A
	$E_B \cdot t = \sum_{300}^{700} \sum_{t} E_\lambda(\lambda,t) \cdot B(\lambda) \cdot \Delta t \cdot \Delta\lambda \le 100$ J · m^{-2}		N/A
	$E_B = \sum_{300}^{700} E_\lambda \cdot B(\lambda) \cdot \Delta\lambda \le 1$ W · 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
	$I_R = \sum_{380}^{1400} I_\lambda \cdot R(\lambda) \cdot \Delta\lambda \le \frac{50\,000}{\alpha \cdot t^{0,25}}$ W · m^{-2} · sr^{-1}	(10 µs ≤ t ≤ 10 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
	$L_{IR} = \sum_{780}^{1400} L_\lambda \cdot R(\lambda) \cdot \Delta\lambda \le \frac{6\,000}{\alpha}$ W · m^{-2} · sr^{-1}	t > 10 s	P
4.3.7	Infrared radiation hazard exposure limits for the		P
	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

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	$E_{IR} = \sum_{780}^{3000} E_\lambda \cdot \Delta\lambda \le 18000 \cdot t^{-0,75}$ W · m^{-2}	t ≤ 1000 s	P
	For times greater than 1000 s the limit becomes:		P
	$E_{IR} = \sum_{780}^{3000} E_\lambda \cdot \Delta\lambda \le 100$ W · m^{-2}	t > 1000 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
	$E_H \cdot t = \sum_{380}^{3000} \sum_{t} E_\lambda(\lambda,t) \cdot \Delta t \cdot \Delta\lambda \le 20000 \cdot t^{0,25}$ J · 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±1℃, 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
	– 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

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	– 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
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

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	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
	– 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

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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
	– 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[1]	**UV hazard function**	**Wavelength**	**UV hazard function**

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Table 4.1	Spectral weighting function for assessing ultraviolet hazards for skin and eye	--

λ, nm	$S_{UV}(\lambda)$	λ, nm	$S_{UV}(\lambda)$
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

[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	--

Wavelength	Blue-light hazard function	Burn hazard function

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Table 4.2	Spectral weighting functions for assessing retinal hazards from broadband optical sources	--

nm	B (λ)	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
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		$0{,}2\ 10^{0{,}02(1150-\lambda)}$
1200-1400		0,02

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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	$20000/t^{0,75}$

Table 5.5	Summary of the ELs for the retina (radiance based values)	--

Hazard Name	Relevant equation	Wavelength range nm	Exposure duration sec	Field of view radians	EL in terms of constant radiance $W \cdot m^{-2} \cdot sr^{-1}$)
Blue light	$L_B = \sum L_\lambda \cdot B(\lambda) \cdot \Delta\lambda$	300 – 700	0,25 – 10 10-100 100-10000 ≥ 10000	$0,011 \cdot \sqrt{(t/10)}$ 0,011 $0,0011 \cdot \sqrt{t}$ 0,1	$10^6/t$ $10^6/t$ $10^6/t$ 100
Retinal thermal	$L_R = \sum L_\lambda \cdot R(\lambda) \cdot \Delta\lambda$	380 – 1400	< 0,25 0,25 – 10	0,0017 $0,011 \cdot \sqrt{(t/10)}$	$50000/(\alpha \cdot t^{0,25})$ $50000/(\alpha \cdot t^{0,25})$
Retinal thermal (weak visual stimulus)	$L_{IR} = \sum L_\lambda \cdot R(\lambda) \cdot \Delta\lambda$	780 – 1400	> 10	0,011	6000/α

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Table 6.1	Emission limits for risk grou s of continuous wave lamps(Base on IEC62471:2 t								N/A
Risk	Action spectrum	Sym bo l	Units	Emission Measurement					
				Exemp		Low risk		Mod risk	
				Limi	Resul	Limi	Resul	Limi	Resul
Act ni c UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	t t 0,001	t --	t 0.003	t --	t 0.03	t --
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	--	33	--	100	--
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	--	100	--	4000000	--
Blue light, sm all sou ce r	$B(\lambda)$	E_B	$W \cdot m^{-2}$	--	--	00 --	--	--	--
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/ α	--	28000/ α	--	71000/ α	--
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/ α	--	6000/ α	--	6000/ α	--
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	--	570	--	3200	--
Re ark: m Angular subtense of apparent source, α=*mrad * Small source defined as one with α< 0,011 radian. Averaging field of view at 10000 s is 0,1 radian. ** Involves evaluation of non-GLS source									

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ATTACHMENT TO TEST REPORT IEC 62471 EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES Photobiological safety of lamps and lamps systems	
Differences according to.....:	EN 62471:2008
Attachment Form No.....:	EU_GD_IEC62471A
Attachment Originator.....:	IMQ S.p.A.
Master Attachment.....:	2009-07
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	CENELEC COMMON MODIFICATIONS (EN)		P
4	**EXPOSURE LIMITS**		P
	Contents of the whole Clause 4 of IEC 62471:2006 moved into a new informative Annex ZB		—
	Clause 4 replaced by the following:		P
	Limits of the Artificial Optical Radiation Directive (2006/25/EC) have been applied instead of those fixed in IEC 62471:2006	See appended table 6.1	P
4.1	General		P
	First paragraph deleted		—

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Clause	Requirement + Test	Result - Remark	Verdic
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Table 6.1 Em on limi s for risk grou of contin ous wave lamps (Base on directive: 2006/25/EC) t P

Risk	Actio spectrum	Symbol	Units	Emission Measurement					
				Exemp		Low risk		Mod risk	
				Li t mi t	Resul t	Li t mi	Resul	Limi	Resul
Actinic UV	$S_{UV}(\lambda)$	E_s	W•m-2	0,001	2,50E-	--	--	--	--
Near UV E		UVA	W•m-2	0,33	6,45E- 08	--	--	--	--
Blue light	$B(\lambda)$	L_B	W•m-2 sr-1	100	5,12E+ 04	100	5,32E+01	4000000	6,21E+01
Blue light, sm sou ce all r	$B(\lambda)$	E_B	W•m-2	0,01	01 --	00 --	--	--	--
Retinal thermal	$R(\lambda)$	LR	W•m-2 sr-1	28000/ α	3,20E+	28000/ α	3,20E+03	71000/ α	2,85E+04
Retinal thermal, weak visual stimulus**	$R(\lambda)$	LIR	W•m-2 sr-1	545000 0,0017 ≤ α ≤ 0,011	03 --				
				6000/ α 0,011 ≤ α ≤ 0,1	0,00E+				
IR radiation, eye		E_{IR}	W•m-2	100	2,28E- 04	570	2,22E-04 00	3200	2,22E-04

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Table 6.1	Emission limits for risk groups of continuous wave lamps (Base on directive: 2006/25/EC)	P

Remark:

Angular subtense of apparent source, α = 35 mrad

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

** Involves evaluation of non-GLS source

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-Appendix 5: 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 echnologies;		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

	Power supply system utilised:		—
	Voltage ..... :	240 V	—
	Frequency..... :	50 Hz	—
	Environmental conditions:		—
	Temperature ..... :	25 °C	—
	Humidity..... :	60 %	—
	EuT operation mode:		—
	☒ Normal operation		—
	☐ Other operation:		—

4.2.3	**MEASUREMENT RESULTS**			P
	Measuring with "Van der Hoofden" test head			P
Location of EuT	Measuring distance	Result (F)	Limit (F)	Verdict
On the table	15 cm	0,049	0,85	P

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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

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-Appendix 6: Photo document of product



Photo 1: Overall view



Photo 2: Overall view



Photo 3: Overall view



Photo 4: Overall view

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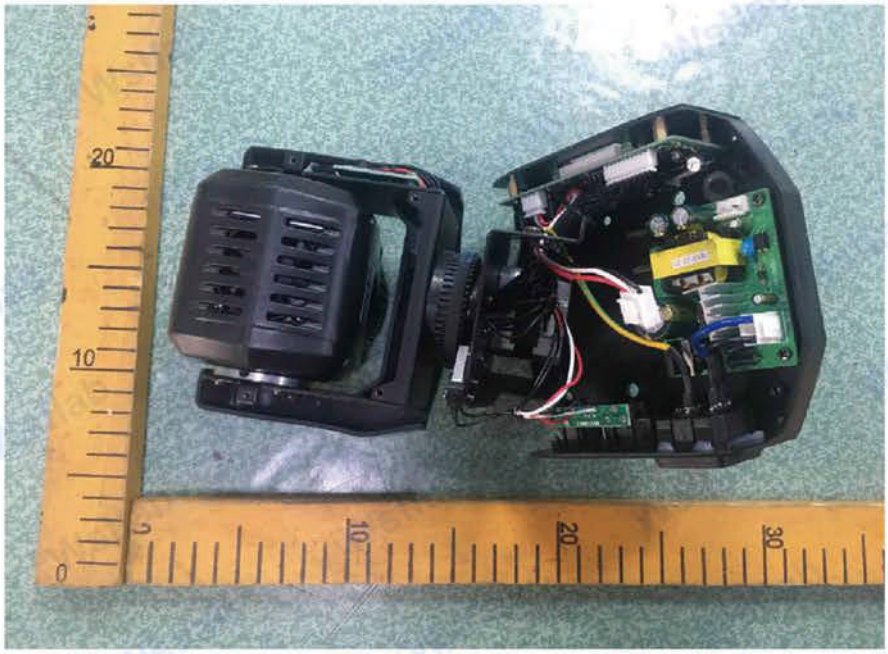


Photo 5: internal view

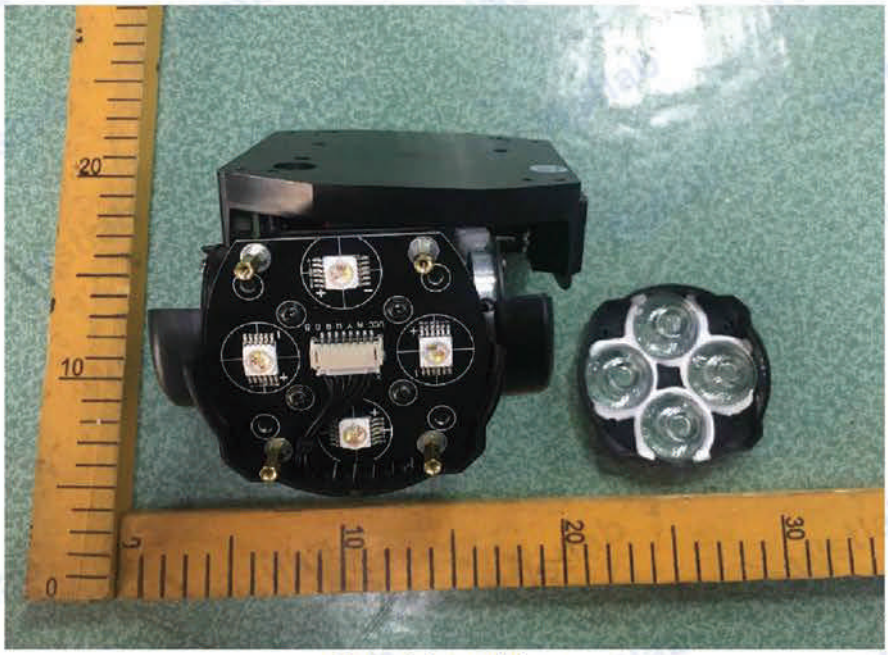


Photo 6: internal view

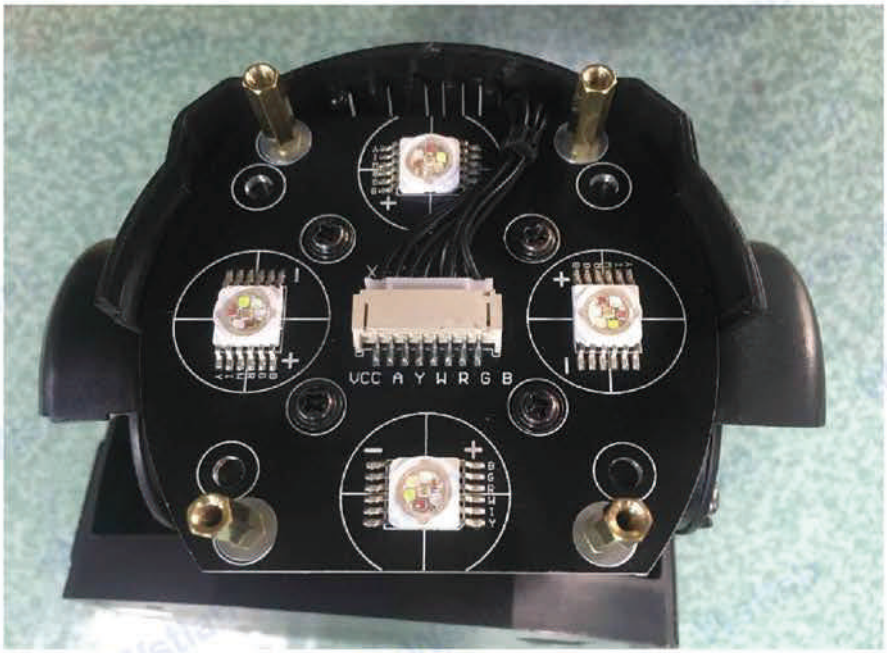


Photo 7: LED view

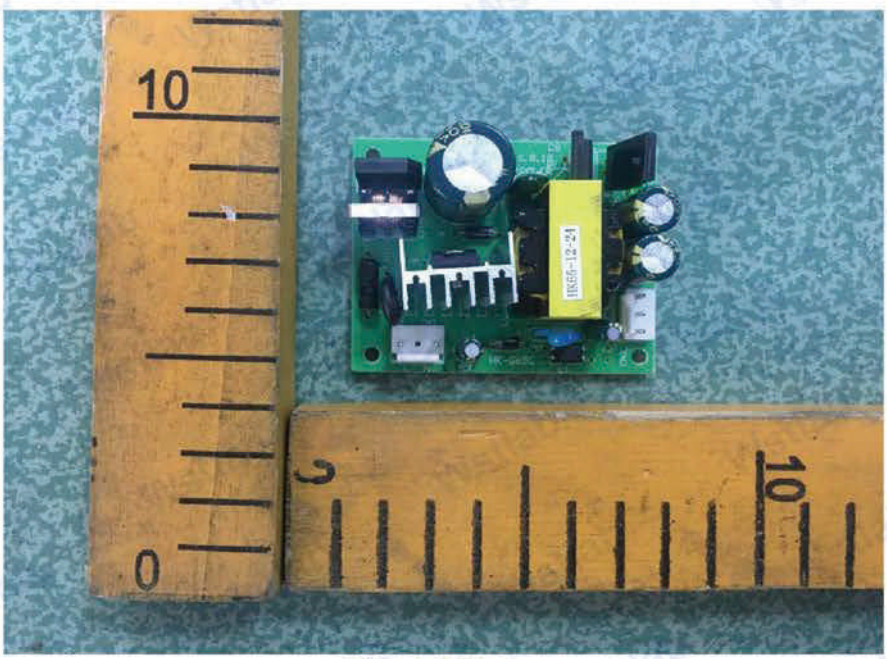


Photo 8: PCB view

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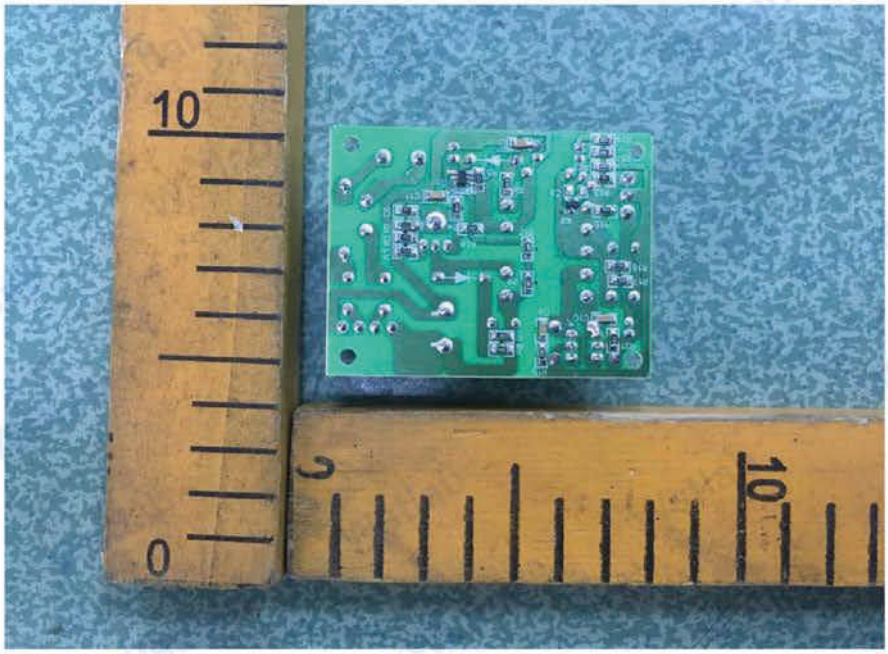


Photo 9: PCB view

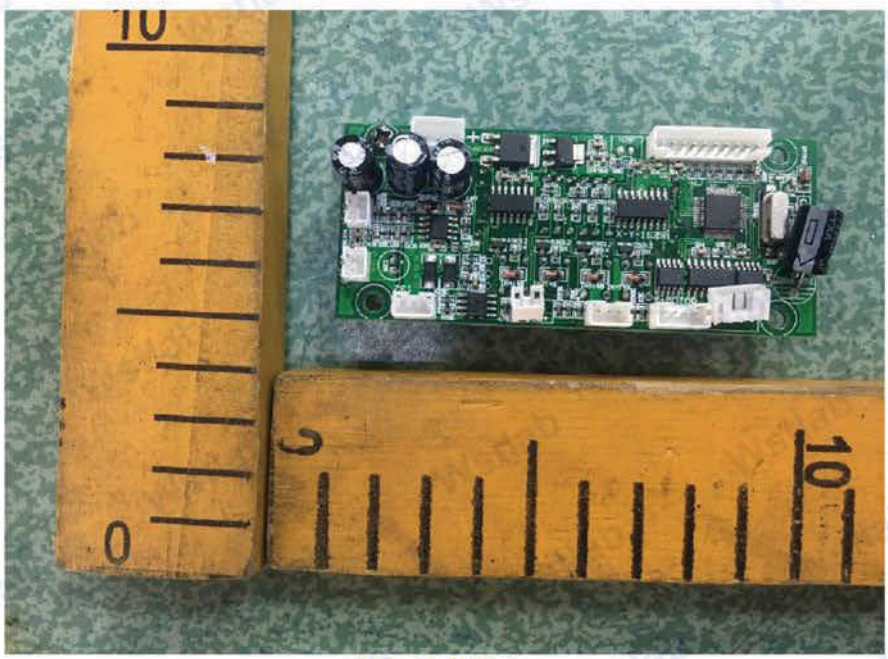


Photo 10: PCB view

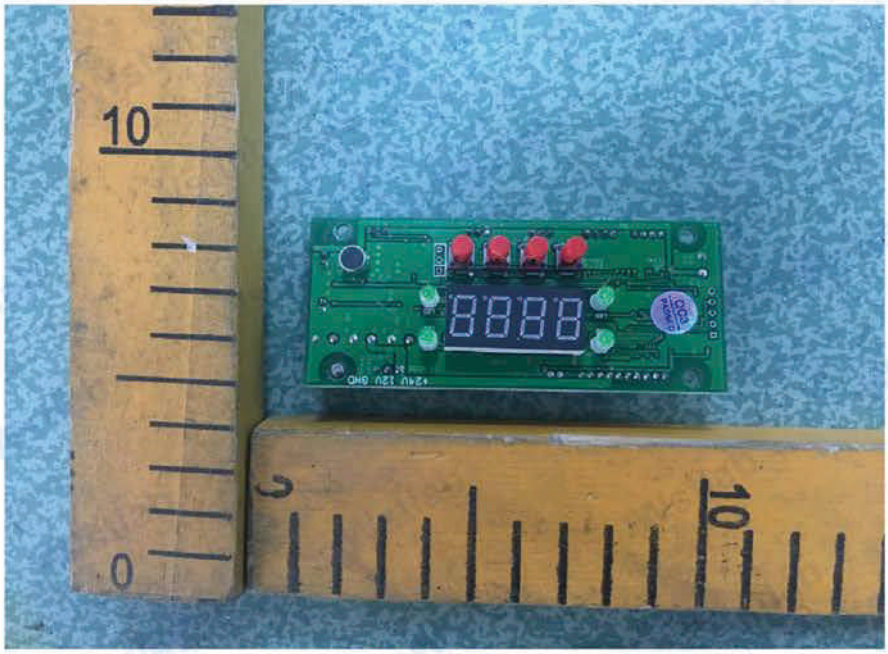


Photo 11: PCB view

--- End of report ---

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