TEST REPORT
IEC 60598-2-1
Luminaires
Part 2: Particular requirements
Section 1: Fixed general purpose luminaires

Report Number. ..... :	704021503938-00
Date of issue ..... :	2015-11-06
Total number of pages ..... :	54 pages
Name of Testing Laboratory preparing the Report ..... :	TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
Applicant's name ..... :	Philips Lighting Luminaires (Shanghai) Co., Ltd
Address ..... :	2F, Building 6, No. 1805, Huyi Highway, Malu Town, Jiading District, 201801, Shanghai, People's Republic of China
Test specification:	
Standard ..... :	IEC 60598-2-1:1979 (First Edition) + A1:1987 used in conjunction with IEC 60598-1:2014 (Eighth Edition)
Test procedure ..... :	EU-Directive
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC60598_2_1D
Test Report Form(s) Originator .... :	Intertek Semko AB
Master TRF ..... :	2014-08

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
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Test item description ..... :	Fixed general purpose luminaires (LED Waterproof)
Trade Mark ..... :	PHILIPS
Manufacturer..... :	Philips Lighting Luminaires (Shanghai) Co., Ltd
Model/Type reference ..... :	BCW098 LED20/NW PSU L600, BCW098 LED20/CW PSU L600, BCW098 LED40/NW PSU L1200, BCW098 LED40/CW PSU L1200, BCW098 LED40/NW PSD L1200, BCW098 LED40/CW PSD L1200
Ratings ..... :	220-240V~, 50/60Hz, IP65, Class I, ta: 35°C BCW098 LED20/NW PSU L600, BCW098 LED20/CW PSU L600: 19W BCW098 LED40/NW PSU L1200, BCW098 LED40/CW PSU L1200, BCW098 LED40/NW PSD L1200, BCW098 LED40/CW PSD L1200: 38W

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**	TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch	
Testing location/ address ..... :		No. 1999, Duhui Road, Shanghai, 201108, P. R. China	
☐	**Associated CB Testing Laboratory:**	N/A	
Testing location/ address ..... :		N/A	
Tested by (name, function, signature) ..... :		Jiani WANG	
Approved by (name, function, signature)... :		Na ZHANG	
☐	**Testing procedure: TMP/CTF Stage 1:**	N/A	
Testing location/ address ..... :		N/A	
Tested by (name, function, signature) ..... :		N/A	
Approved by (name, function, signature)... :		N/A	
☐	**Testing procedure: WMT/CTF Stage 2:**	N/A	
Testing location/ address ..... :		N/A	
Tested by (name + signature) ..... :		N/A	
Witnessed by (name, function, signature).. :		N/A	
Approved by (name, function, signature)... :		N/A	
☐	**Testing procedure: SMT/CTF Stage 3 or 4:**	N/A	
Testing location/ address ..... :		N/A	

Tested by (name, function, signature).....:	N/A	
Witnessed by (name, function, signature) .:	N/A	
Approved by (name, function, signature)...:	N/A	
Supervised by (name, function, signature) :	N/A	

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

704021503938-00 attachment 1 for the additional requirements of EN 62471.
704021503938-00 attachment 2 for the additional requirements of EN 62493.

Summary of testing:

Determination of the test result includes consideration of measurement uncertainty from the test equipment and methods.
All applicable hazards are covered by the harmonized standard.

Tests performed (name of test and test clause):	**Testing location:**
Complete tests are performed on BCW098 LED20/NW PSU L600, BCW098 LED40/NW PSU L1200 and BCW098 LED40/CW PSD L1200 Construction check on other models Requirement of EN 62031 have been evaluated and found to be met by testing. The test results comply with the requirements	TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch No. 1999, Duhui Road, Shanghai, 201108, P. R. China

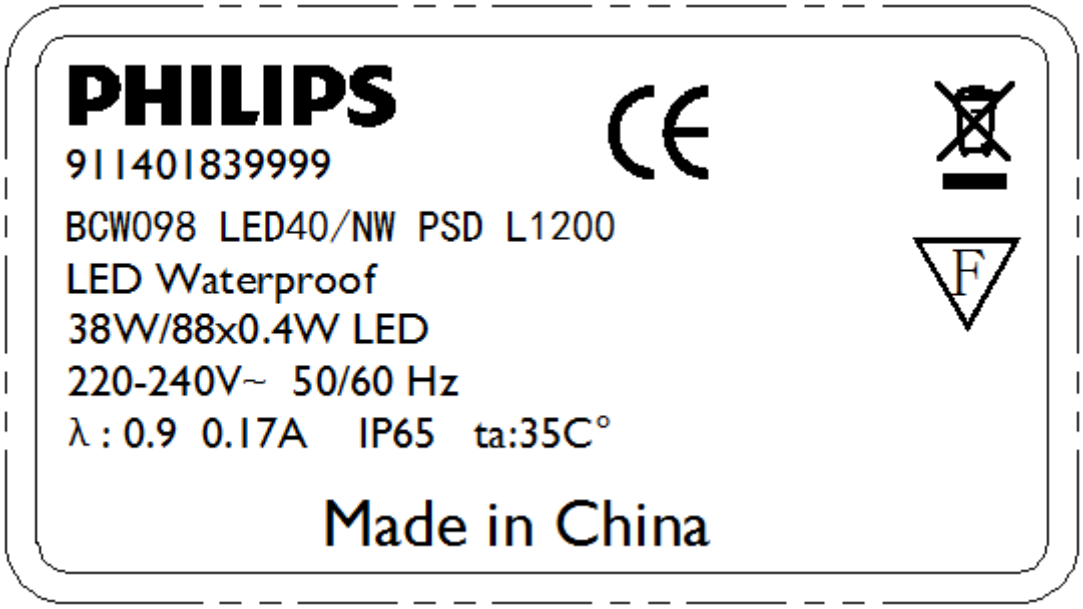
Summary of compliance with National Differences:

List of countries addressed N/A

The deviation between EN 60598-2-1:1989 used in conjunction with EN 60598-1:2015 and IEC 60598-2-1:1979 (First Edition) + A1:1987 used in conjunction with IEC 60598-1:2014 (Eighth Edition) is taken into account at the end of the report, please refer to appendix 1 of this report.

☒ **The product fulfils the requirements of EN 60598-2-1:1989**

Copy of marking plate:



Note 1: Height of letter and numeral not less than 2mm, graphical symbol not less than 5mm, WEEE not less than 7mm.
Note 2: The labels of other types are similar with the above, just the different model name and specification.
The above label are drafts of an artwork for marking plate pending approval by National Certification Bodies and it shall not be affixed to products prior to such an approval.

Test item particulars.....:	Fixed general purpose luminaires (LED Waterproof)
Classification of installation and use.....:	Class I
Supply Connection.....:	Terminal
.....:	
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 .....:	2015-09-22
Date (s) of performance of tests.....:	2015-09-22 to 2015-11-06

General remarks:

"(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.

Remark:
The following contents are included and as appendix of this test report:

1) Test report IEC 60598-2-1:1979 (First Edition) + A1:1987 used in conjunction with IEC 60598-1:2014 (Eighth Edition)
2) Appendix 1: comprising: Deviation of EN 60598-2-1:1989 used in conjunction with EN 60598-1:2015 to IEC 60598-2-1:1979 (First Edition) + A1:1987 used in conjunction with IEC 60598-1:2014 (Eighth Edition).
3) Appendix 2: comprising: Additional requirements of EN 62031: 2008+A1: 2013+A2: 2015
4) Appendix 3: Photograph

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) .....:	NingBo Violet Lighting Electric Co.,Ltd No.885 Jinhai Rd,Cidong Industrial Park,Cixi, 315331, Zhejiang, People's Republic of China

General product information:

The products covered in this test report are LED fixed luminaires.

Model	Power	Lamp	LED driver	LxWxH (CM)
BCW098 LED20/NW PSU L600	19W	19W/44x0,4W LED	Xitanium 36W 0.12-0.4A 115V 230V	63,7x10x8,4
BCW098 LED20/CW PSU L600	19W	19W/44x0,4W LED	Xitanium 36W 0.12-0.4A 115V 230V	63,7x10x8,4
BCW098 LED40/NW PSU L1200	38W	38W/88x0,4W LED	Xitanium 75W 0.12-0.4A 220V 230V	118,9X10X8,4
BCW098 LED40/CW PSU L1200	38W	38W/88x0,4W LED	Xitanium 75W 0.12-0.4A 220V 230V	118,9X10X8,4
BCW098 LED40/NW PSD L1200	38W	38W/88x0,4W LED	Xitanium 75W 0.12-0.40A 215V TD 230V	118,9X10X8,4
BCW098 LED40/CW PSD L1200	38W	38W/88x0,4W LED	Xitanium 75W 0.12-0.40A 215V TD 230V	118,9X10X8,4

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

1.2 (0)	**GENERAL TEST REQUIREMENTS**		P
1.2 (0.1)	Information for luminaire design considered ..... :	Standard EN 62031 Yes ☒ No ☐	—
1.2 (0.3)	More sections applicable..... :	Yes ☐ No ☒	—

1.4 (2)	**CLASSIFICATION**		P
1.4 (2.2)	Type of protection ..... :	Class I	—
1.4 (2.3)	Degree of protection..... :	IP 65	—
1.4 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces ..... :	Yes ☒ No ☐	—
1.4 (2.5)	Luminaire for normal use ..... :	Yes ☒ No ☐	—
	Luminaire for rough service ..... :	Yes ☐ No ☒	—

1.5 (3)	**MARKING**		P
1.5 (3.2)	Mandatory markings		P
	Position of the marking		P
	Format of symbols/text		P
1.5 (3.3)	Additional information		P
	Language of instructions	English	P
1.5 (3.3.1)	Combination luminaires		P
1.5 (3.3.2)	Nominal frequency in Hz	50/60Hz	P
1.5 (3.3.3)	Operating temperature		N/A
1.5 (3.3.4)	Symbol or warning notice		N/A
1.5 (3.3.5)	Wiring diagram		N/A
1.5 (3.3.6)	Special conditions		N/A
1.5 (3.3.7)	Metal halide lamp luminaire – warning		N/A
1.5 (3.3.8)	Limitation for semi-luminaires		N/A
1.5 (3.3.9)	Power factor and supply current		P
1.5 (3.3.10)	Suitability for use indoors		N/A
1.5 (3.3.11)	Luminaires with remote control		N/A
1.5 (3.3.12)	Clip-mounted luminaire – warning		N/A
1.5 (3.3.13)	Specifications of protective shields		N/A
1.5 (3.3.14)	Symbol for nature of supply	~	P
1.5 (3.3.15)	Rated current of socket outlet		N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.5 (3.3.16)	Rough service luminaire		N/A
1.5 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments		P
1.5 (3.3.18)	Non-ordinary luminaires with PVC cable		N/A
1.5 (3.3.19)	Protective conductor current in instruction if applicable		N/A
1.5 (3.3.20)	Provided with information if not intended to be mounted within arm's reach		N/A
1.5 (3.3.21)	Non-replaceable and non-user replaceable light sources information provided		P
	Cautionary symbol		N/A
1.5 (3.3.22)	Controllable luminaires, classification of insulation provided		N/A
1.5 (3.4)	Test with water		P
	Test with hexane		P
	Legible after test		P
	Label attached		P
1.6 (4)	**CONSTRUCTION**		P
1.6 (4.2)	Components replaceable without difficulty		P
1.6 (4.3)	Wireways smooth and free from sharp edges		P
1.6 (4.4)	**Lampholders**		N/A
1.6 (4.4.1)	Integral lampholder		N/A
1.6 (4.4.2)	Wiring connection		N/A
1.6 (4.4.3)	Lampholder for end-to-end mounting		N/A
1.6 (4.4.4)	Positioning		N/A
	- pressure test (N) ..... :		—
	After test the lampholder comply with relevant standard sheets and show no damage		N/A
	After test on single-capped lampholder the lampholder have not moved from its position and show no permanent deformation		N/A
	- bending test (N) ..... :		—
	After test the lampholder have not moved from its position and show no permanent deformation		N/A
1.6 (4.4.5)	Peak pulse voltage		N/A
1.6 (4.4.6)	Centre contact		N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.6 (4.4.7)	Parts in rough service luminaires resistant to tracking		N/A
1.6 (4.4.8)	Lamp connectors		N/A
1.6 (4.4.9)	Caps and bases correctly used		N/A
1.6 (4.4.10)	Light source for lampholder or connection according IEC 60061 not connected another way		N/A
1.6 (4.5)	**Starter holders**		N/A
	Starter holder in luminaires other than class II		N/A
	Starter holder class II construction		N/A
1.6 (4.6)	**Terminal blocks**		**N/A**
	Tails		N/A
	Unsecured blocks		N/A
1.6 (4.7)	**Terminals and supply connections**		**P**
1.6 (4.7.1)	Contact to metal parts		P
1.6 (4.7.2)	Test 8 mm live conductor		P
	Test 8 mm earth conductor		P
1.6 (4.7.3)	Terminals for supply conductors		P
1.6 (4.7.3.1)	Welded method and material		N/A
	- stranded or solid conductor		N/A
	- spot welding		N/A
	- welding between wires		N/A
	- Type Z attachment		N/A
	- mechanical test according to 15.8.2		N/A
	- electrical test according to 15.9		N/A
	- heat test according to 15.9.2.3 and 15.9.2.4		N/A
1.6 (4.7.4)	Terminals other than supply connection		P
1.6 (4.7.5)	Heat-resistant wiring/sleeves		N/A
1.6 (4.7.6)	Multi-pole plug		N/A
	- test at 30 N		N/A
1.6 (4.8)	**Switches**		**N/A**
	- adequate rating		N/A
	- adequate fixing		N/A
	- polarized supply		N/A
	- compliance with IEC 61058-1 for electronic switches		N/A
1.6 (4.9)	**Insulating lining and sleeves**		**P**

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.6 (4.9.1)	Retainment		P
	Method of fixing ..... :	Heat shrinkable	—
1.6 (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
1.6 (4.10)	**Double or reinforced insulation**		N/A
1.6 (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
1.6 (4.10.2)	Assembly gaps:		N/A
	- not coincidental		N/A
	- no straight access with test probe		N/A
1.6 (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
1.6 (4.11)	**Electrical connections and current-carrying parts**		**P**
1.6 (4.11.1)	Contact pressure		P
1.6 (4.11.2)	Screws:		N/A
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
1.6 (4.11.3)	Screw locking:		N/A
	- spring washer		N/A
	- rivets		N/A
1.6 (4.11.4)	Material of current-carrying parts		P
1.6 (4.11.5)	No contact to wood or mounting surface		P
1.6 (4.11.6)	Electro-mechanical contact systems		N/A
1.6 (4.12)	**Screws and connections (mechanical) and glands**		**P**
1.6 (4.12.1)	Screws not made of soft metal		P

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Screws of insulating material		N/A
	Torque test: torque (Nm); part..... :		N/A
	Torque test: torque (Nm); part..... :		N/A
	Torque test: torque (Nm); part..... :		N/A
1.6 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
1.6 (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
1.6 (4.12.5)	Screwed glands; force (Nm)..... :		N/A
1.6 (4.13)	**Mechanical strength**		**P**
1.6 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm) ..... :		N/A
	- other parts; energy (Nm)..... :	0,35Nm	P
	1) live parts		P
	2) linings		N/A
	3) protection		P
	4) covers		P
1.6 (4.13.3)	Straight test finger		P
1.6 (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
	d) for temporary installations and suitable for mounting on a stand		N/A
1.6 (4.13.6)	Tumbling barrel		N/A
1.6 (4.14)	**Suspensions, fixings and means of adjusting**		**P**
1.6 (4.14.1)	Mechanical load:		P
	A) four times the weight		P
	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

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Metal rod. diameter (mm) ..... :		N/A
	Fixed luminaire or independent control gear without fixing devices		N/A
1.6 (4.14.2)	Load to flexible cables		N/A
	Mass (kg) ..... :		—
	Stress in conductors (N/mm²) ..... :		N/A
	Mass (kg) of semi-luminaire ..... :		—
	Bending moment (Nm) of semi-luminaire ..... :		N/A
1.6 (4.14.3)	Adjusting devices:		N/A
	- flexing test; number of cycles..... :		N/A
	- strands broken ..... :		N/A
	- electric strength test afterwards		N/A
1.6 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N/A
1.6 (4.14.5)	Guide pulleys		N/A
1.6 (4.14.6)	Strain on socket-outlets		N/A
1.6 (4.15)	**Flammable materials**		**P**
	- glow-wire test 650°C ..... :	See Test Table 1.15 (13.3.2)	P
	- spacing ≥30 mm		N/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
1.6 (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
1.6 (4.16)	**Luminaires for mounting on normally flammable surfaces**		**P**
	No lamp control gear..... :	(compliance with Section 12)	N/A
1.6 (4.16.1)	Lamp control gear spacing:		P
	- spacing 35 mm		P
	- spacing 10 mm		N/A
1.6 (4.16.2)	Thermal protection:		N/A
	- in lamp control gear		N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- external		N/A
	- fixed position		N/A
	- temperature marked lamp control gear		N/A
1.6 (4.16.3)	Design to satisfy the test of 12.6	(see clause 12.6)	N/A
1.6 (4.17)	**Drain holes**		N/A
	Clearance at least 5 mm		N/A
1.6 (4.18)	**Resistance to corrosion**		P
1.6 (4.18.1)	- rust-resistance		P
1.6 (4.18.2)	- season cracking in copper		N/A
1.6 (4.18.3)	- corrosion of aluminium		N/A
1.6 (4.19)	Igniters compatible with ballast		N/A
1.6 (4.20)	Rough service vibration		N/A
1.6 (4.21)	**Protective shield**		N/A
1.6 (4.21.1)	Shield fitted if tungsten halogen lamps or metal halide lamps		N/A
	Shield of glass if tungsten halogen lamps		N/A
1.6 (4.21.2)	Particles from a shattering lamp not impair safety		N/A
1.6 (4.21.3)	No direct path		N/A
1.6 (4.21.4)	Impact test on shield		N/A
	Glow-wire test on lamp compartment..... :	See Test Table 1.15 (13.3.2)	N/A
1.6 (4.22)	Attachments to lamps not cause overheating or damage		N/A
1.6 (4.23)	Semi-luminaires comply Class II		N/A
1.6 (4.24)	**Photobiological hazards**		**P**
1.6 (4.24.1)	No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P)		N/A
1.6 (4.24.2)	Retinal blue light hazard		P
	Luminaires with $E_{thr:}$		P
	a) Fixed luminaires		P
	- distance x m, borderline between RG1 and RG2 .. :	RG0	N/A
	- marking and instruction according 3.2.23		N/A
	b) Portable and handheld luminaires		N/A
	- marking according 3.2.23 if RG1 exceeded at 200 mm according to IEC/TR 62778		N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Portable luminaires for children IEC 60598-2-10 and Mains socket outlet nightlights IEC 60598-2-12 not exceed RG1 at 200 mm according to IEC/62778		N/A
1.6 (4.25)	**Mechanical hazard**		**P**
	No sharp point or edges		P
1.6 (4.26)	**Short-circuit protection**		**N/A**
1.6 (4.26.1)	Adequate means of uninsulated accessible SELV parts		N/A
1.6 (4.26.2)	Short-circuit test with test chain according 4.26.3		N/A
	Test chain not melt through		N/A
	Test sample not exceed values of Table 12.1 and 12.2		N/A
1.6 (4.27)	**Terminal blocks with integrated screwless earthing contacts**		**N/A**
	Test according Annex V		N/A
	Pull test of terminal fixing (20 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Pull test of mechanical connection (50 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Voltage drop test, resistance < 0,05 Ω		N/A
1.6 (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
1.6 (4.29)	**Luminaires with non-replaceable light source**		**P**
	Not possible to replace light source		P
	Live part not accessible after parts have been opened by hand or tools		P
1.6 (4.30)	**Luminaires with non-user replaceable light source**		**N/A**
	If protective cover provide protection against electric shock and marked with “caution, electric shock risk” symbol:		N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Minimum two fixing means		N/A
1.6 (4.31)	**Insulation between circuits**		**N/A**
	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
1.6 (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
1.6 (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
1.6 (4.31.3)	Other circuits		P
	Other circuits insulated from accessible parts according Table X.1		N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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 of above		N/A
	- conductive part not cause an electric shock in case of an insulation fault		N/A
	- equipotential bonding in master/slave applications		N/A
	- master luminaire provided with terminal for accessible conductive parts of slave luminaires		N/A
	- slave luminaire constructed as class I		N/A
1.6 (4.32)	**Overvoltage protective devices**		N/A
	Comply with IEC 61643-11		N/A
	External to control gear and connected to earth:		N/A
	- only in fixed luminaires		N/A
	- only connected to protective earth		N/A

1.7 (11)	**CREEPAGE DISTANCES AND CLEARANCES**		P
1.7 (11.2)	Creepage distances and clearances ..... :	See Table 1.7 (11.2)	P
	Working voltage (V) ..... :	220-240V	—
	Rated pulse voltage (kV) ..... :	N/A	—
	Voltage form ..... :	Sinusoidal ☒ Non-sinusoidal ☐	—
	PTI ..... :	< 600 ☒ ≥ 600 ☐	—
	Impulse withstand category (Normal category II) (Category III Annex U)	Category II ☒ Category III ☐	—

1.8 (7)	**PROVISION FOR EARTHING**		
1.8 (7.2.1 + 7.2.3)	Accessible metal parts		P
	Metal parts in contact with supporting surface		P
	Resistance < 0,5 Ω ..... :	Functional earthing	N/A
	Self-tapping screws used		N/A
	Thread-forming screws		N/A
	Thread-forming screw used in a grove		N/A
	Earth makes contact first		P

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
	Protective earthing of the luminaire not via built-in control gear		P
1.8 (7.2.2 + 7.2.3)	Earth continuity in joints, etc.		N/A
1.8 (7.2.4)	Locking of clamping means		N/A
	Compliance with 4.7.3		N/A
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
1.8 (7.2.5)	Earth terminal integral part of connector socket		N/A
1.8 (7.2.6)	Earth terminal adjacent to mains terminals		N/A
1.8 (7.2.7)	Electrolytic corrosion of the earth terminal		N/A
1.8 (7.2.8)	Material of earth terminal		P
	Contact surface bare metal		P
1.8 (7.2.10)	Class II luminaire for looping-in		N/A
	Double or reinforced insulation to functional earth		N/A
1.8 (7.2.11)	Earthing core coloured green-yellow		P
	Length of earth conductor		P
1.9 (14)	**SCREW TERMINALS**		P
	Separately approved; component list ..... :	(see Annex 1)	P
	Part of the luminaire ..... :	(see Annex 3)	N/A
1.9 (15)	**SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS**		P
	Separately approved; component list ..... :	(see Annex 1)	P
	Part of the luminaire ..... :	(see Annex 4)	N/A
1.10 (5)	**EXTERNAL AND INTERNAL WIRING**		P
1.10 (5.2)	**Supply connection and external wiring**		**P**
1.10 (5.2.1)	Means of connection ..... :	Terminal	P
	Outdoor luminaire has not PVC insulated external wiring if not class III or SELV ≤ 25 V a.c./60 V d.c. or protected from outdoor environment		N/A
1.10 (5.2.2)	Type of cable ..... :	IEC 60245	P
	Nominal cross-sectional area (mm²) ..... :	3X1,0mm²	P

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Cables equal to IEC 60227 or IEC 60245		P
1.10 (5.2.3)	Type of attachment, X, Y or Z		P
1.10 (5.2.5)	Type Z not connected to screws		N/A
1.10 (5.2.6)	Cable entries:		P
	- suitable for introduction		P
	- adequate degree of protection		P
1.10 (5.2.7)	Cable entries through rigid material have rounded edges		P
1.10 (5.2.8)	Insulating bushings:		P
	- suitably fixed		P
	- material in bushings		P
	- material not likely to deteriorate		P
	- tubes or guards made of insulating material		P
1.10 (5.2.9)	Locking of screwed bushings		N/A
1.10 (5.2.10)	Cord anchorage:		P
	- covering protected from abrasion		P
	- clear how to be effective		P
	- no mechanical or thermal stress		P
	- no tying of cables into knots etc.		P
	- insulating material or lining		P
1.10 (5.2.10.1)	Cord anchorage for type X attachment:		N/A
	a) at least one part fixed		N/A
	b) types of cable		N/A
	c) no damaging of the cable		N/A
	d) whole cable can be mounted		N/A
	e) no touching of clamping screws		N/A
	f) metal screw not directly on cable		N/A
	g) replacement without special tool		N/A
	Glands not used as anchorage		N/A
	Labyrinth type anchorages		N/A
1.10 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment		P
1.10 (5.2.10.3)	Tests:		P

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- impossible to push cable; unsafe		P
	- pull test: 25 times; pull (N) ..... :	60	P
	- torque test: torque (Nm) ..... :	0,25	P
	- displacement ≤ 2 mm		P
	- no movement of conductors		P
	- no damage of cable or cord		P
	- function independent of electrical connection		P
1.10 (5.2.11)	External wiring passing into luminaire		P
1.10 (5.2.12)	Looping-in terminals		N/A
1.10 (5.2.13)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		N/A
1.10 (5.2.14)	Mains plug same protection		N/A
	Class III luminaire plug		N/A
	No unsafe compatibility		N/A
1.10 (5.2.16)	Appliance inlets (IEC 60320)		N/A
	Installation couplers (IEC 61535)		N/A
	Other appliance inlet or connector according relevant IEC standard		N/A
1.10 (5.2.17)	No standardized interconnecting cables properly assembled		N/A
1.10 (5.2.18)	Used plug in accordance with		N/A
	- IEC 60083		N/A
	- other standard		N/A
1.10 (5.3)	**Internal wiring**		**P**
1.10 (5.3.1)	Internal wiring of suitable size and type		P
	Through wiring		N/A
	- not delivered/ mounting instruction		N/A
	- factory assembled		N/A
	- socket outlet loaded (A) ..... :		N/A
	- temperatures ..... :	(see Annex 2)	N/A
	Green-yellow for earth only		N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		P
	Cross-sectional area (mm²)..... :	0,5-1,0	P
	Insulation thickness		P
	Extra insulation added where necessary		N/A
1.10 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		N/A
	Adequate cross-sectional area and insulation thickness	24AWG	N/A
1.10 (5.3.1.3)	Double or reinforced insulation for class II		N/A
1.10 (5.3.1.4)	Conductors without insulation		N/A
1.10 (5.3.1.5)	SELV current-carrying parts		N/A
1.10 (5.3.1.6)	Insulation thickness other than PVC or rubber		N/A
1.10 (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
1.10 (5.3.3)	Insulating bushings:		P
	- suitable fixed		P
	- material in bushings		P
	- material not likely to deteriorate		P
	- cables with protective sheath		P
1.10 (5.3.4)	Joints and junctions effectively insulated		N/A
1.10 (5.3.5)	Strain on internal wiring		N/A
1.10 (5.3.6)	Wire carriers		N/A
1.10 (5.3.7)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		N/A
1.11 (8)	**PROTECTION AGAINST ELECTRIC SHOCK**		P
1.11 (8.2.1)	Live parts not accessible		P
	Basic insulated parts not used on the outer surface without appropriate protection		N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Basic insulated parts not accessible with standard test finger on portable, settable and adjustable luminaires		N/A
	Basic insulated parts not accessible with Ø 50 mm probe from outside, other types of luminaires		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		P
	Protection in any position		P
	Double-ended tungsten filament lamp		N/A
	Insulation lacquer not reliable		N/A
	Double-ended high pressure discharge lamp		N/A
	Relevant warning according to 3.2.18 fitted to the luminaire		N/A
1.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N/A
1.11 (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
	- glass protective shields not used as supplementary insulation		N/A
1.11 (8.2.3.b)	BC lampholder of metal in class I luminaires shall be earthed		N/A
1.11 (8.2.3.c)	SELV circuits with exposed current carrying parts:		N/A
	Ordinary luminaire:		N/A
	- touch current ..... :		N/A
	- no-load voltage..... :		N/A
	Other than ordinary luminaire:		N/A
	- nominal voltage ..... :		N/A
1.11 (8.2.4)	Portable luminaire have protection independent of supporting surface		N/A
1.11 (8.2.5)	Compliance with the standard test finger or relevant probe		P
1.11 (8.2.6)	Covers reliably secured		P

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.11 (8.2.7)	Discharging of capacitors ≥ 0,5 μF		N/A
	Portable plug connected luminaire with capacitor		N/A
	Other plug connected luminaire with capacitor		N/A
	Discharge device on or within capacitor		N/A
	Discharge device mounted separately		N/A
1.12 (12)	**ENDURANCE TEST AND THERMAL TEST**		P
1.12 (-)	If IP > IP 20 relevant test of (12.4), (12.5) and (12.6) after (9.2) before (9.3) specified in 4.13		—
1.12 (12.3)	Endurance test:		P
	- mounting-position ..... :	Fixed mounted	—
	- test temperature (°C) ..... :	45°C	—
	- total duration (h) ..... :	240h	—
	- supply voltage: Un factor; calculated voltage (V) ... :	1,1 x 240V=264,4V	—
	- lamp used ..... :	Integral LED module	—
1.12 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		P
	- marking legible		P
	- no cracks, deformation etc.		P
1.12 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
1.12 (12.5)	Thermal test (abnormal operation)	(see Annex 2)	P
1.12 (12.6)	Thermal test (failed lamp control gear condition):		N/A
1.12 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A) ..... :		—
	- case of abnormal conditions ..... :		—
	- electronic lamp control gear		N/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

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.12 (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
1.12 (12.7)	Thermal test (failed lamp control gear in plastic luminaires):		N/A
1.12 (12.7.1)	Luminaire without temperature sensing control		N/A
1.12 (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 .....:	See Table 1.15 (13.2.1)	N/A
1.12 (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) ..... :		—
	Ball-pressure test ..... :	See Table 1.15 (13.2.1)	N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.12 (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
1.12 (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: ..... :	See Table 1.15 (13.2.1)	N/A
1.13 (9)	**RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE**		P
1.13 (-)	If IP > IP 20 the order of tests as specified in clause 1.12		P
1.13 (9.2)	Tests for ingress of dust, solid objects and moisture:		—
	- classification according to IP..... :	IP 65	—
	- mounting position during test ..... :	Fixed mounted	—
	- fixing screws tightened; torque (Nm) :	N/A	—
	- tests according to clauses :	9.2.2 & 9.2.6	—
	- electric strength test afterwards	(see 10.2.2)	P
	a) no deposit in dust-proof luminaire		P
	b) no talcum in dust-tight luminaire		P
	c) no trace of water on current-carrying parts or on insulation where it could become a hazard		P
	d) i) For luminaires without drain holes – no water entry		P
	d) ii) For luminaires with drain holes – no hazardous water entry		N/A
	e) no water in watertight luminaire		N/A
	f) no contact with live parts (IP 2X)		N/A
	f) no entry into enclosure (IP 3X and IP 4X)		N/A
	f) no contact with live parts (IP3X and IP4X)		N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	g) no trace of water on part of lamp requiring protection from splashing water		P
	h) no damage of protective shield or glass envelope		P
1.13 (9.3)	Humidity test 48 h	25°C; 93 %RH	P
1.14 (10)	**INSULATION RESISTANCE AND ELECTRIC STRENGTH**		P
1.14 (10.2.1)	Insulation resistance test		P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø ..... :	covered by metal foil	—
	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 ..... :	1000MΩ	P
	- between live parts and mounting surface ..... :	1000MΩ	P
	- between live parts and metal parts ..... :	1000MΩ	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
1.14 (10.2.2)	Electric strength test		P
	Dummy lamp		P
	Luminaires with ignitors after 24 h test		P
	Luminaires with manual ignitors		P
	Test voltage (V) ..... :	1480V	P
	SELV		N/A

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- 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
1.14 (10.3)	Touch current or protective conductor current (mA) :	0,5 mA	P

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

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

1.7 (11.2)	**TABLES: Creepage distances and clearances**	P
Table 11.1	**Minimum distances (mm) for a.c. (50/60 Hz) sinusoidal voltages**	

RMS working voltage (V) not exceeding	50	150	250	500	750	1000
Creepage distances						
Required basic insulation, PTI ≥ 600	0,6	0,8	1,5	3	4	5,5
Measured						
Required basic insulation, PTI < 600	1,2	1,6	2,5	5	8	10
Measured L, N			3			
Required supplementary insulation PTI ≥ 600	-	0,8	1,5	3	4	5,5
Measured						
Required supplementary insulation PTI < 600	-	1,6	2,5	5	8	10
Measured						
Required reinforced insulation	-	3,2	5	6	8	11
Measured						
Clearances						
Required basic insulation	0,2	0,8	1,5	3	4	5,5
Measured L,N			3			
Required supplementary insulation	-	0,8	1,5	3	4	5,5
Measured						
Required reinforced insulation	-	1,6	3	6	8	11
Measured						

Table 11.2	**Minimum distances (mm) for non-sinusoidal pulse voltages**						
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							

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

1.15 (13.2.1)	**TABLE: Ball Pressure Test of Thermoplastics**			**P**
Allowed impression diameter (mm) ..... :		2mm		—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)	
Enclosure	See annex 1	75	0,9	
lampshade	See annex 1	75	0,6	
Connector on LED module	See annex 1	125	1,2	
Gland	See annex 1	75	0,8	
Supplementary information:				

1.15 (13.3.1)	**TABLE: Needle-flame test (IEC 60695-11-5)**				P
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Connector on LED module	See annex 1	10s	No	20s	P
Supplementary information:					

1.15 (13.3.2)	**TABLE: Glow-wire test (IEC 60695-2-11)**				**P**
Glow wire temperature ..... :		650°C			—
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Enclosure	See Annex 1	30s	No	5s	P
lampshade	See Annex 1	30s	No	5s	P
Gland	See Annex 1	30s	No	5s	P
Any flame or glowing of the sample extinguished within 30 s of withdrawing the glow-wire, and any burning or molten drop did not ignite the underlying parts (Yes/No) ..... :					Yes
Supplementary information:					

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

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

ANNEX 1	**TABLE: Critical components information**					
Object / part No.	**Code**	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Terminal	B	Yuyao Yunhuan Ruixin Electronics Co., Ltd.	AS02	AC450V, 0,5…1,5mm², 3 poles, T85, 100A	IEC 60998-2-2	VDE 40038526
Alternative	D	Ningbo Economic & Technical Development Zone Hengda Electrical Co., Ltd.	TB-7020B/3	AC450V, 0,75…2,5mm², 3 poles, T110, 16A	EN 60998-2-2	TUV Rheinland 50160873
Alternative	D	Yuyao Yunhuan Ruixin Electronics Co., Ltd.	AS02-5	AC450V, 0,5…1,5mm², 5 poles, T85, 100A	IEC 60998-2-2	VDE 40038526
Alternative	D	Ningbo Economic & Technical Development Zone Hengda Electrical Co., Ltd.	TB-7020B/5	AC450V, 0,75…2,5mm², 5 poles, T110, 16A	EN 60998-2-2	TUV Rheinland 50160873
Internal wire (input of LED driver)	B	Ningbo A-Line Cable and Wire Co., Ltd.	H05V-U, H05V-K	1x0,5…1,0mm²	IEC 60227	VDE 40041361
Alternative	D	Cixi Hongyu Electric Appliance Co., Ltd.	H05V-U, H05V-K	1x0,5…1,0mm²	IEC 60227	VDE 40012841
Alternative	D	Cixi Hongxin Wire and Cable Factory	H05V-U, H05V-K	1x0,5…1,0mm²	IEC 60227	VDE 40028426

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

Alternative	D	Tongxiang Xintianhong Wire and Cable Factory	H05V-U, H05V-K	1x0,5…1,0mm²	IEC 60227	Test with appliance
LED driver	B	Philips	Xitanium 36W 0.12-0.4A 115V 230V	220-240V, 50…60Hz, Uout: 55…115Vdc, 36W, Iout: 0.12…0.4A	IEC 61347-2-13	NL-33383
LED driver	B	Philips	Xitanium 75W 0.12-0.4A 220V 230V	220-240V, 50…60Hz, Uout: 100…220Vdc, 75W, Iout: 0.12…0.4A	IEC 61347-2-13	NL-33383
LED driver	B	Philips	Xitanium 75W 0.12-0.40A 215V TD 230V	220-240V, 50…60Hz, Uout: 100-215Vdc, 75W, Iout: 0.12…0.4A	IEC 61347-2-13	NL-33383
Internal wire (output of LED driver)	C	MOLEX INCORPORATED	29014031	24AWG	IEC 60598-2-1	Test with appliance UL (E29179)
Alternative	C	JAPAN SOLDERLESS TERMINAL MFG CO LTD	THB	24AWG	IEC 60598-2-1	Test with appliance UL (E60389)
LED module	C	Lejin Electronics products(HuiZhou) CO., Ltd	Fortimo LED line	Imax: 560mA, Umax: 38V	IEC 62471	Test with appliance
LED module	C	Lejin Electronics products(HuiZhou) CO., Ltd	Fortimo LED line	Imax: 400mA, Umax: 70V	IEC 62471	Test with appliance
Earth wire	B	Ningbo A-Line Cable and Wire Co., Ltd.	H05V-K H05V-U	1x0,5…1,0mm²	IEC 60227	VDE 40041361
Alternative	D	Cixi Hongyu Electric Appliance Co., Ltd.	H05V-U, H05V-K	1x0,5…1,0mm²	IEC 60227	VDE 40012841
Alternative	D	Cixi Hongxin Wire and Cable Factory	H05V-U, H05V-K	1x0,5…1,0mm²	IEC 60227	VDE 40028426
Heat shrinkable sleeve	C	SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO LTD	RSFR-H	600V, 125ºC	IEC 60598-2-1	Test with appliance UL (E203950)

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

Gland	C	SHANGHAI WEYER ELECTRIC APPLIANCES CO LTD	HSK-P13.5G	6-12mm	IEC 60598-2-1	Test with appliance UL (E316890)

Supplementary information:

[1)] Provided evidence ensures the agreed level of compliance. See OD-CB2039.

The codes above have the following meaning:

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

B - The component is replaceable if authorised by the test house

C - Integrated component tested together with the appliance

D - Alternative component

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		P
	Type reference ..... :	BCW098 LED20/NW PSU L600	—
	Lamp used..... :	Integral LED module	—
	Lamp control gear used..... :	Xitanium 36W 0.12-0.4A 115V 230V	—
	Mounting position of luminaire ..... :	Fixed mounting	—
	Supply wattage (W) ..... :	20,87	—
	Supply current (A) ..... :	0,09	—
	Calculated power factor..... :	0,9	—
	Table: measured temperatures corrected for ta = 35 °C:		P
	- abnormal operating mode ..... :	N/A	—
	- test 1: rated voltage..... :	N/A	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage ..... :	1,06 X240V=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 ..... :	264V	—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :	N/A	—

Temperature measurements, (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Supply cord	35	--	53,3	--	90	--	--

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

Supply cord (stress)	35	--	49,2	--	75	--	--
Terminal	35	--	50,4	--	110	--	--
Internal wire	35	--	57,7	--	90	--	--
tc	35	--	65,1	--	75	73,8	85
Enclosure	35	--	43,7	--	Ref.	--	--
lampshade	35	--	46,8	--	Ref.	--	--
Connector on LED module	35	--	60,1	--	Ref.	--	--
LED module	35	--	66,3	--	Ref.	--	--
Gland	35	--	51,9	--	Ref.	--	--
Mounting surface	35	--	43,9	--	90	40,1	130
Supplementary information:							

	Type reference ..... :	BCW098 LED40/NW PSU L1200	—
	Lamp used..... :	Integral LED module	—
	Lamp control gear used..... :	Xitanium 75W 0.12-0.4A 220V 230V	—
	Mounting position of luminaire ..... :	Fixed mounting	—
	Supply wattage (W) ..... :	39,65	—
	Supply current (A) ..... :	0,16	—
	Calculated power factor..... :	0,9	—
	Table: measured temperatures corrected for ta = 35 °C:		P
	- abnormal operating mode ..... :	N/A	—
	- test 1: rated voltage..... :	N/A	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage ..... :	1,06 X240V=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 ..... :	264V	—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :	N/A	—

Temperature measurements, (°C)			
Part	Ambient	Clause 12.4 – normal	Clause 12.5 – abnormal

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

		test 1	test 2	test 3	limit	test 4	limit
Supply cord	35	--	54,7	--	90	--	--
Supply cord (stress)	35	--	49,9	--	75	--	--
Terminal	35	--	51,9	--	110	--	--
Internal wire	35	--	55,4	--	90	--	--
tc	35	--	67,6	--	75	83,3	85
Enclosure	35	--	43,1	--	Ref.	--	--
lampshade	35	--	45,8	--	Ref.	--	--
Connector on LED module	35	--	57,2	--	Ref.	--	--
LED module	35	--	67,2	--	Ref.	--	--
Gland	35	--	52,3	--	Ref.	--	--
Mounting surface	35	--	44,7	--	90	41,3	130
Supplementary information:							

	Type reference ..... :	BCW098 LED40/CW PSD L1200	—
	Lamp used..... :	Integral LED module	—
	Lamp control gear used..... :	Xitanium 75W 0.12-0.40A 215V TD 230V	—
	Mounting position of luminaire ..... :	Fixed mounting	—
	Supply wattage (W) ..... :	39,69	—
	Supply current (A) ..... :	0,16	—
	Calculated power factor..... :	0,9	—
	Table: measured temperatures corrected for ta = 35 °C:		P
	- abnormal operating mode ..... :	N/A	—
	- test 1: rated voltage..... :	N/A	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage..... :	1,06 X240V=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..... :	264V	—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :	N/A	—

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

Temperature measurements, (°C)							
Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Supply cord	35	--	43,0	--	90	--	--
Supply cord (stress)	35	--	41,1	--	75	--	--
Terminal	35	--	41,3	--	110	--	--
Internal wire	35	--	41,7	--	90	--	--
tc	35	--	54,1	--	75	41,0	85
Enclosure	35	--	37,7	--	Ref.	--	--
lampshade	35	--	40,2	--	Ref.	--	--
Connector on LED module	35	--	42,8	--	Ref.	--	--
LED module	35	--	48,4	--	Ref.	--	--
Gland	35	--	42,0	--	Ref.	--	--
Mounting surface	35	--	39,6	--	90	34,5	130
Supplementary information:							

IEC 60598-2-1			
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).....:		—
(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

ANNEX 4	**Screwless terminals (part of the luminaire)**		P
(15)	**SCREWLESS TERMINALS**		P
(15.2)	Type of terminal.....:	Connector	—
	Rated current (A).....:		—
(15.3.1)	Material		P
(15.3.2)	Clamping		P
(15.3.3)	Stop		P
(15.3.4)	Unprepared conductors		P

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
(15.3.5)	Pressure on insulating material		P
(15.3.6)	Clear connection method		P
(15.3.7)	Clamping independently		P
(15.3.8)	Fixed in position		P
(15.3.10)	Conductor size		P
	Type of conductor		P
(15.5.1)	Terminals internal wiring		P
(15.5.1.1)	Pull test spring-type terminals (4 N, 4 samples) .....:		N/A
(15.5.1.2)	Pull test pin or tab terminals (4 N, 4 samples) .....:	4N, 1min	P
	Insertion force not exceeding 50 N		P
(15.5.1.2)	Permanent connections: pull-off test (20 N)		N/A
(15.5.2)	Electrical tests		P
	Voltage drop (mV) after 1 h (4 samples).....:	Max. 0,7mV	P
	Voltage drop of two inseparable joints		N/A
	Number of cycles:	25 cycles	—
	Voltage drop (mV) after 10th alt. 25th cycle (4 samples).....:	Max.0,9mV / Max.1,1mV	P
	Voltage drop (mV) after 50th alt. 100th cycle (4 samples).....:		N/A
	After ageing, voltage drop (mV) after 10th alt. 25th cycle (4 samples) .....:		N/A
	After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples) .....:		N/A
(15.6)	Terminals external wiring		N/A
	Terminal size and rating		N/A
(15.6.2.1)	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
(15.6.3.1)	**TABLE: Contact resistance test**		N/A
	Voltage drop (mV) after 1 h		—

terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										

	Voltage drop of two inseparable joints		N/A
	Voltage drop after 10th alt. 25th cycle		N/A
	Max. allowed voltage drop (mV) ..... :		—

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

terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Voltage drop after 50th alt. 100th cycle									N/A
	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									P
	Max. allowed voltage drop (mV) ..... :	22,5								—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)	1,1	1,3	1,3	1,4	1,3	1,4	1,4	1,4	1,2	1,3
	Continued ageing: voltage drop after 50th alt. 100th cycle									N/A
	Max. allowed voltage drop (mV) ..... :									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
Supplementary information:										

IEC60598_2_1D – Appendix 1			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 60598-2-1
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES
Luminaires
Part 2: Particular requirements
Section 1: Fixed general purpose luminaires

Differences according to.....:	EN 60598-2-1:1989 used in conjunction with EN 60598-1:2015
Annex Form No.....:	EU_GD_IEC60598_2_1D
Annex Form Originator.....:	OVE
Master Annex Form.....:	2015-04

	CENELEC COMMON MODIFICATIONS (EN)		P
1.5 (3)	**MARKING**		**P**
1.5 (3.3.101)	For luminaires not supplied with terminal block: Adequate warning on the package		P
1.6 (4)	**CONSTRUCTION**		N/A
1.6 (4.11.6)	Electro-mechanical contact systems		N/A
1.10 (5)	**EXTERNAL AND INTERNAL WIRING**		N/A
1.10 (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
1.10 (5.2.2)	Cables equal to EN 50525		N/A
	Replace table 5.1 – Supply cord		N/A
1.12 (12)	**ENDURANCE TESTS AND THERMAL TESTS**		**P**
1.12 (12.4.2c)	Thermal test (normal operation) see footnote c to table 12.2 relating to unsleeved fixed wiring		P

IEC60598_2_1D – Appendix 1			
Clause	Requirement + Test	Result - Remark	Verdict

ZB	**ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)**		N/A
(3.3)	DK: power supply cords of class I luminaires with label		N/A
(4.5.1)	DK: socket-outlets		N/A
(5.2.1)	CY, DK, FI, GB: type of plug		N/A

ZC	**ANNEX ZC, NATIONAL DEVIATIONS (EN)**		N/A
(4 & 5)	FR: Shuttered socket-outlets 10/16A		N/A
	FR: Safety requirements for high buildings (Arrêté du 30 décembre 2011 portant règlement de sécurité pour la construction des immeubles de grande hauteur et leur protection contre les risques d'incendie et de panique; Section VIII; Article GH 48, Eclairage) Glow-wire test for outer parts of luminaires:		N/A
	- 850°C for luminaires in stairways and horizontal travel paths		N/A
	- 650°C for indoor luminaires		N/A
	GB: Requirements according to United Kingdom Building Regulation		N/A

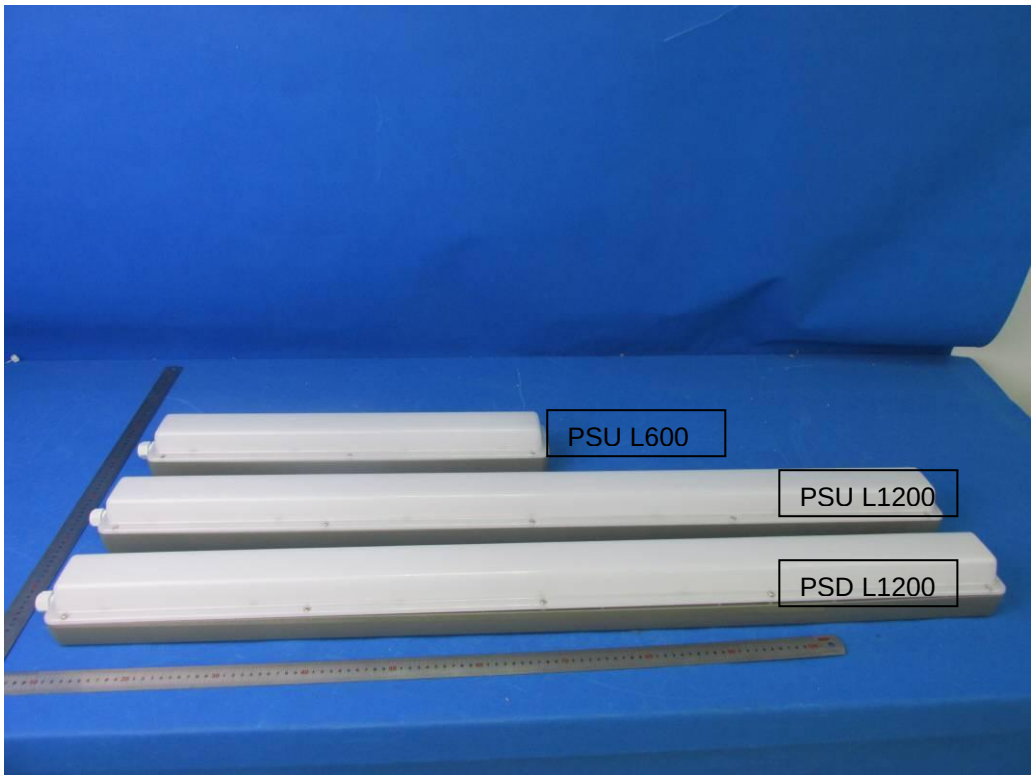
Appendix 2 Additional requirements of EN 62031			
Clause	Requirement + Test	Result - Remark	Verdict

6	**CLASSIFICATION**		**P**
	Built-in module .....:	Yes ☐ No ☒	—
	Independent module .....:	Yes ☐ No ☒	—
	Integral module .....:	Yes ☒ No ☐	—
	For Integral module; Note to 1.2.1 in IEC 60598-1 applies.		P

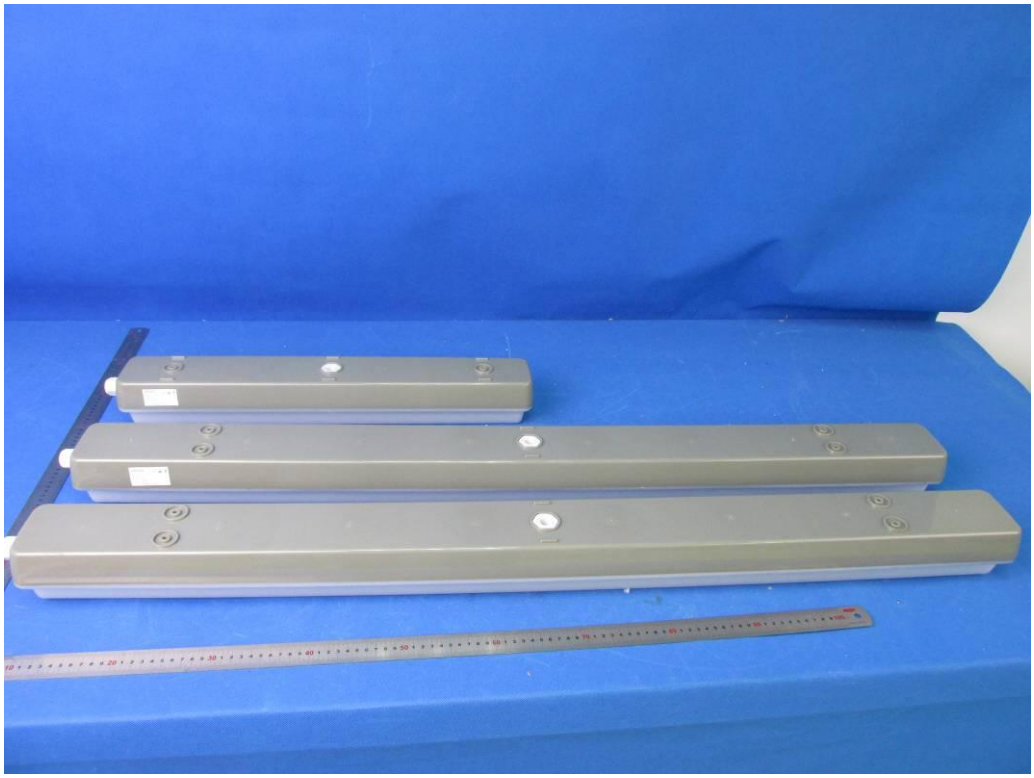
13.2	Module withstands overpower condition >15 min.	150% rated voltage, thermally stabilised	P
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		N/A
	During the tests, tissue paper, spread below module, does not ignite		P

14	**TABLE: tests of fault conditions**	**P**
Part	Simulated fault	Hazard
LED bulb	Short circuit: Lighting not work	No

Appendix 3 – Photograph



Over view



Bottom view

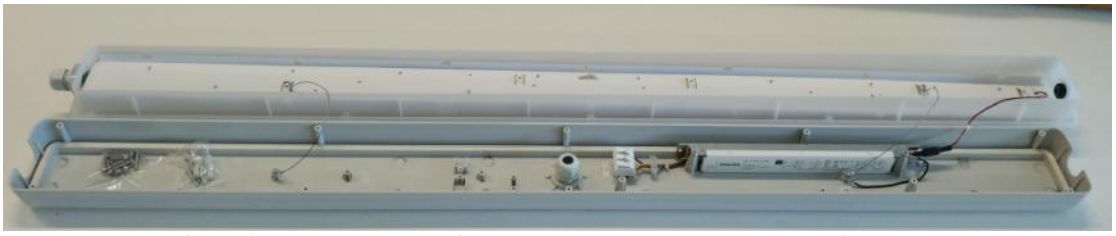
Appendix 3 – Photograph

Gland 1

Gland 2

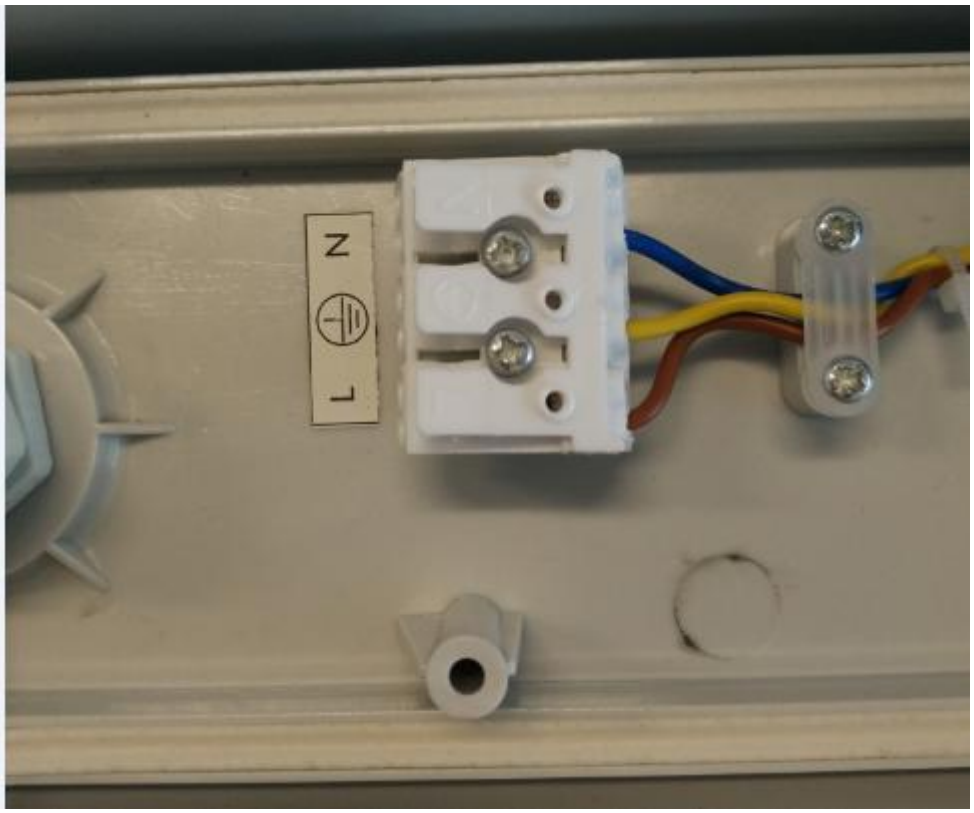
Appendix 3 – Photograph

Side view

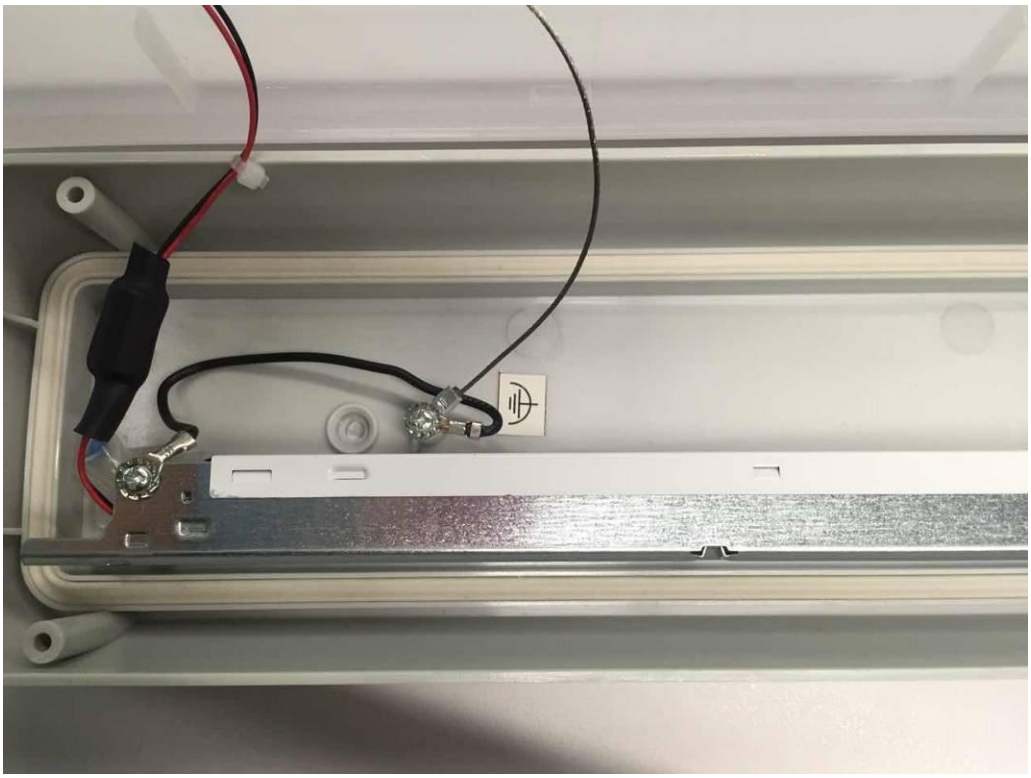


Open view of BCW098 LED20/NW PSU L600, BCW098 LED20/CW PSU L600

Appendix 3 – Photograph



Terminal



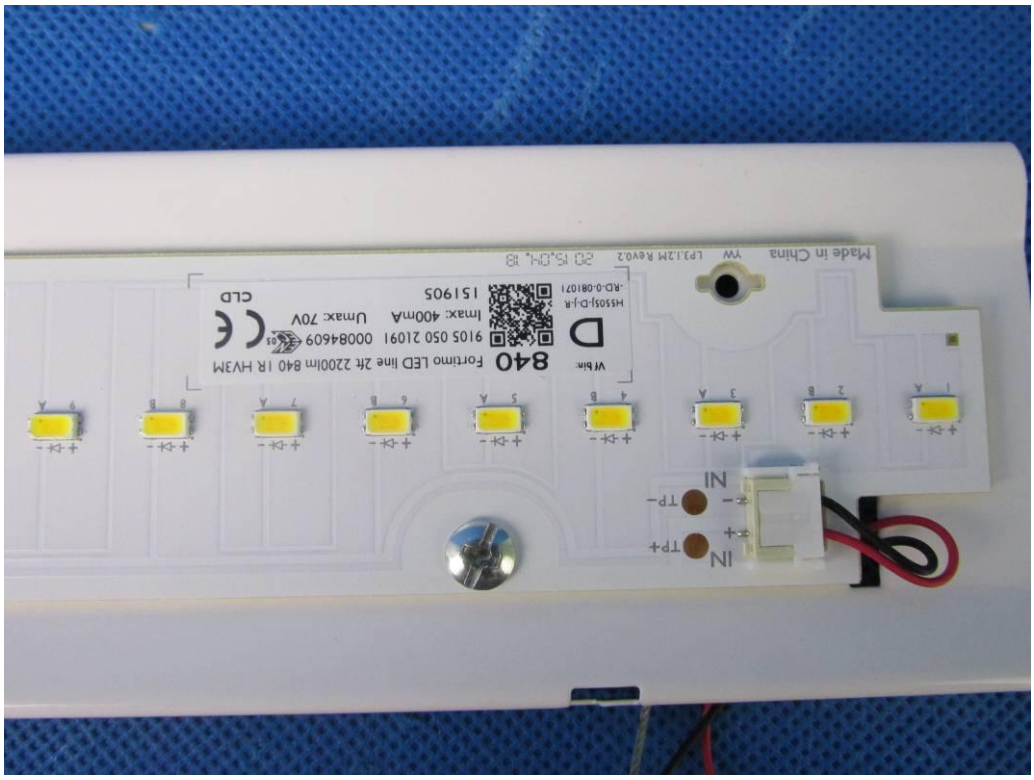
Earth connection

Appendix 3 – Photograph

LED module

LED module

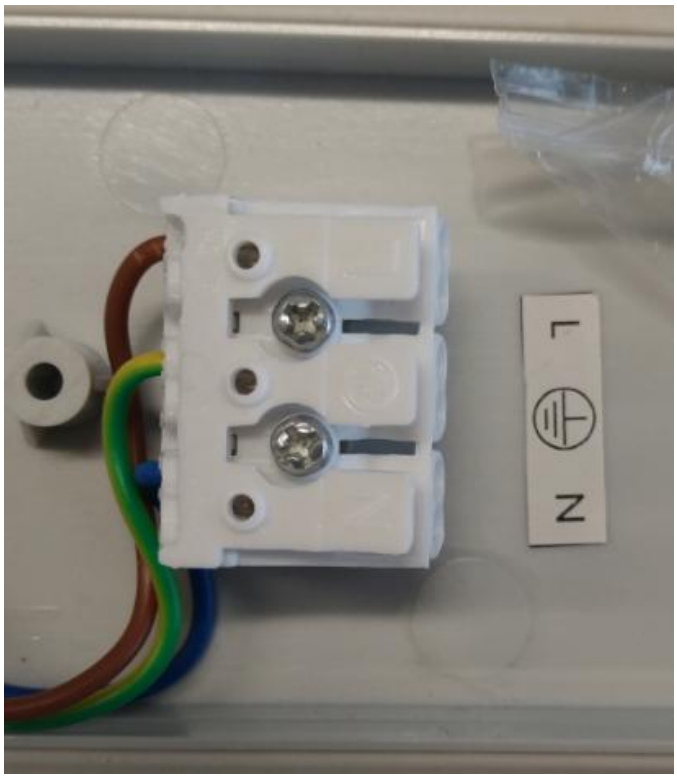
Appendix 3 – Photograph



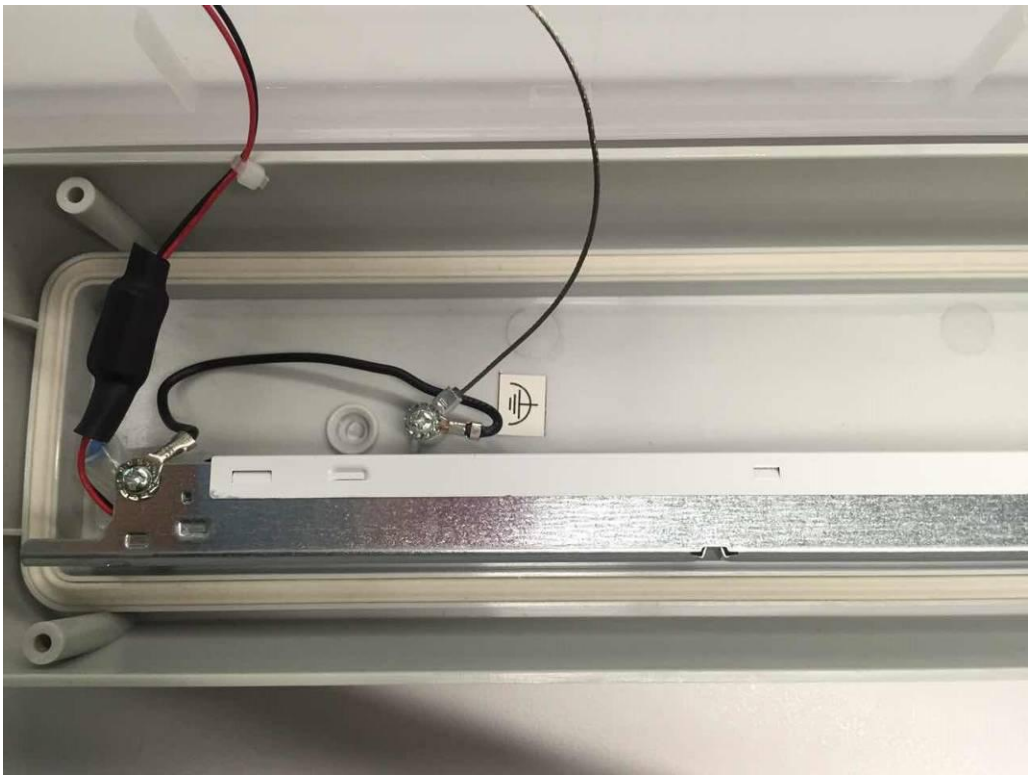
LED module

Open view of BCW098 LED40/NW PSU L1200, BCW098 LED40/CW PSU L1200

Appendix 3 – Photograph



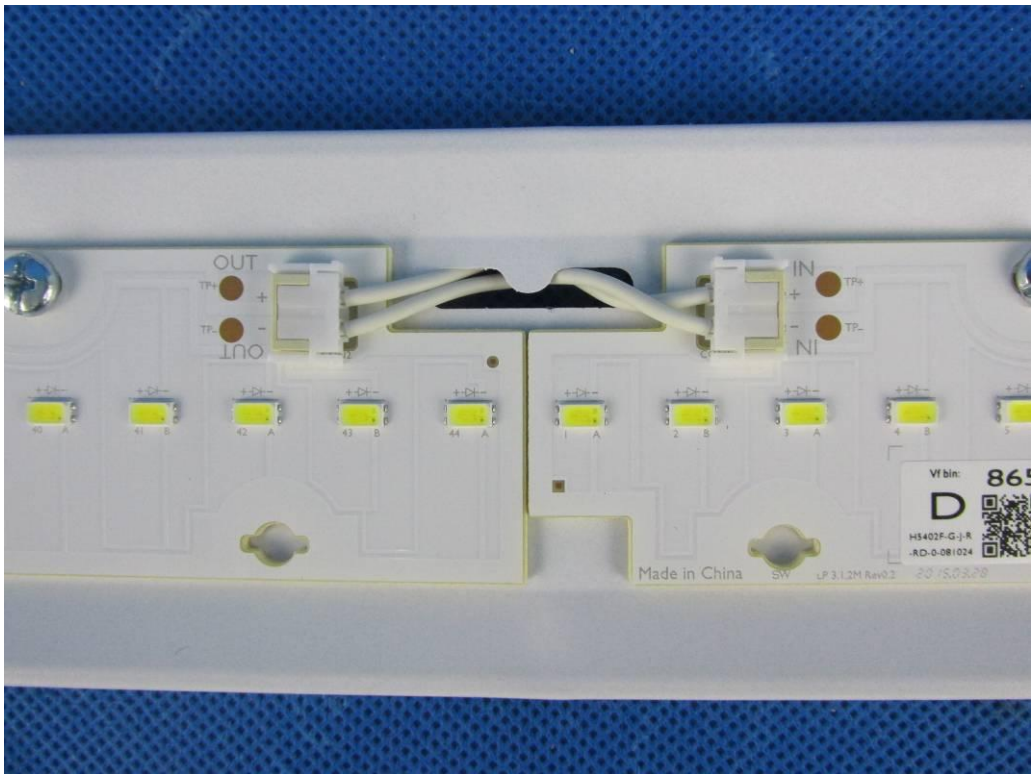
Terminal



Earth connection

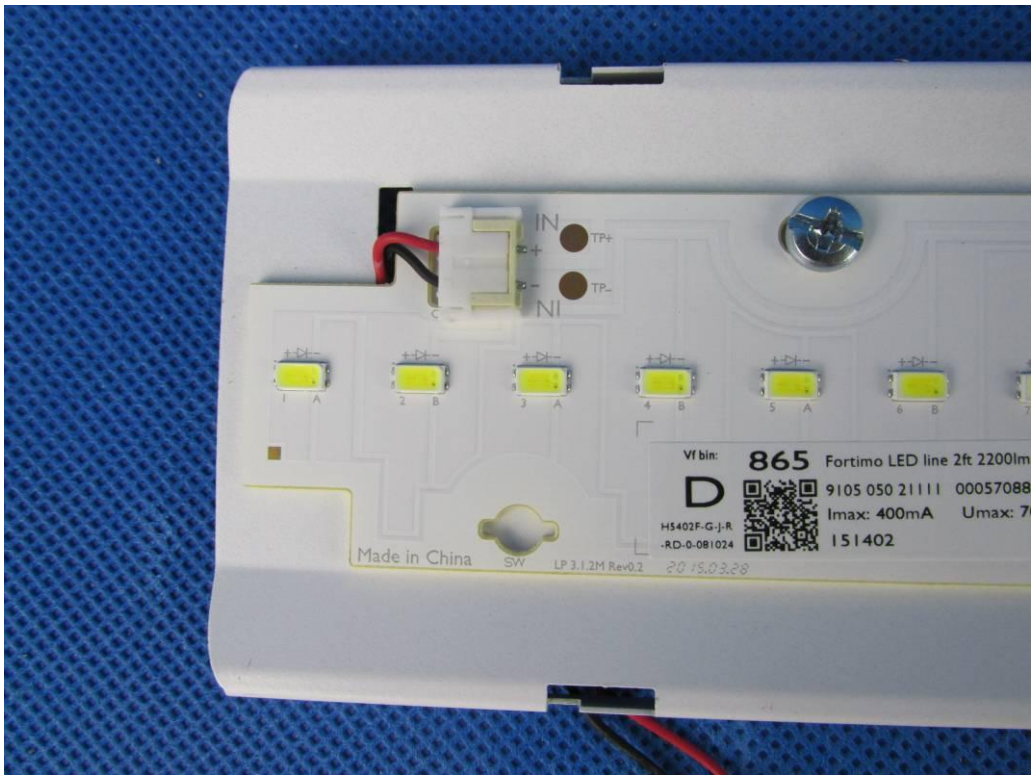
Appendix 3 – Photograph

LED module

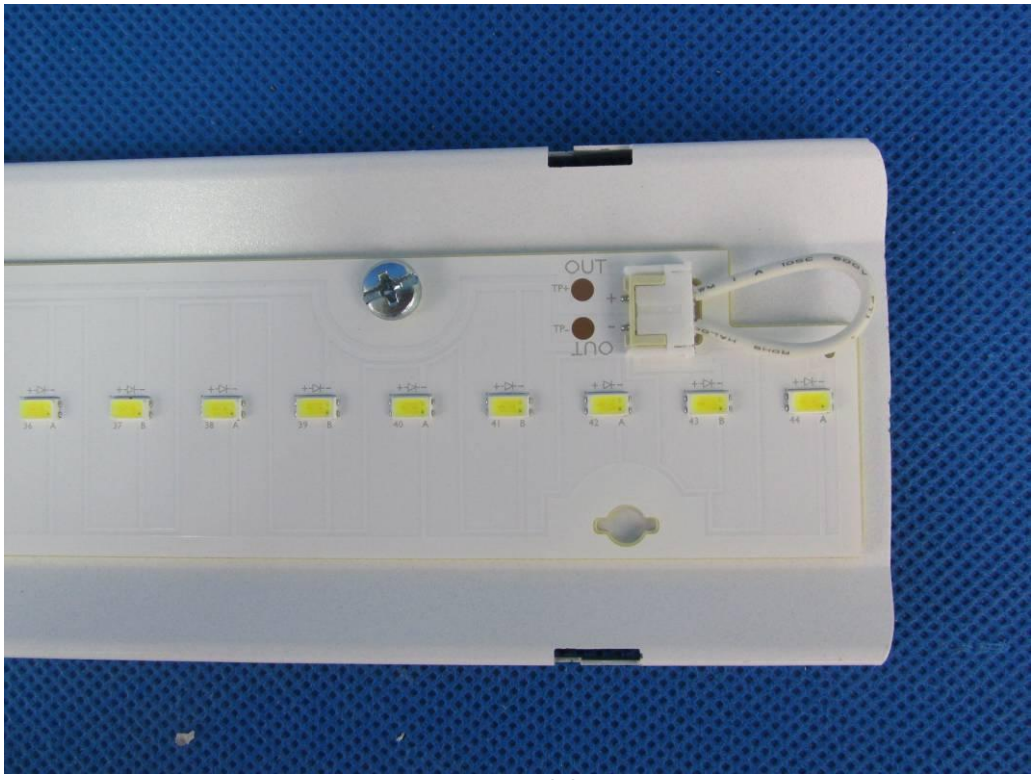


LED module

Appendix 3 – Photograph



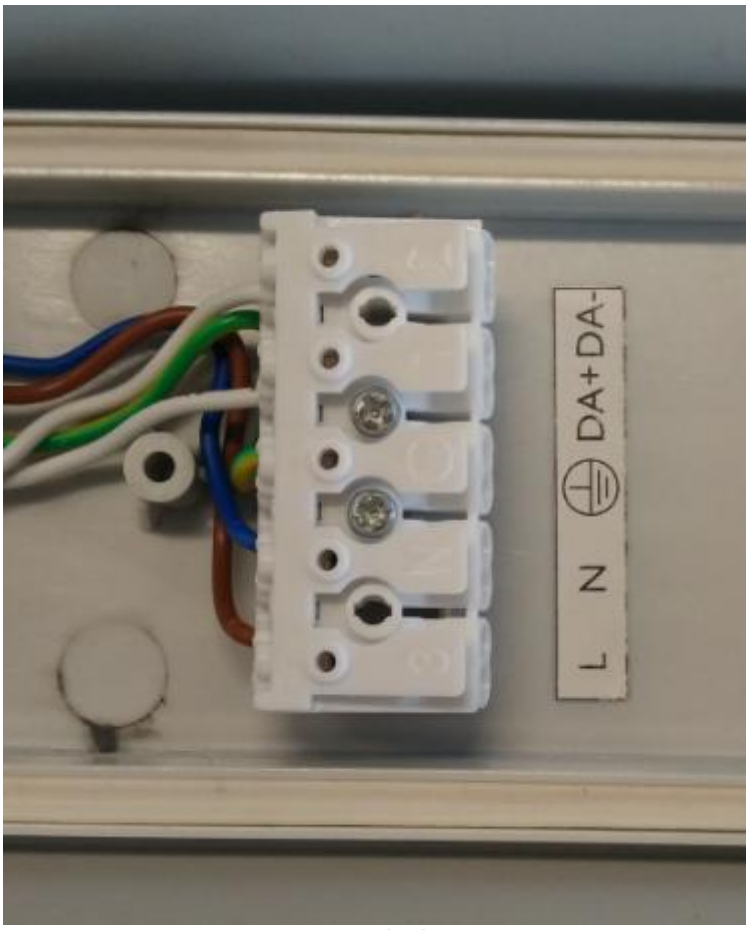
LED module



LED module

Appendix 3 – Photograph

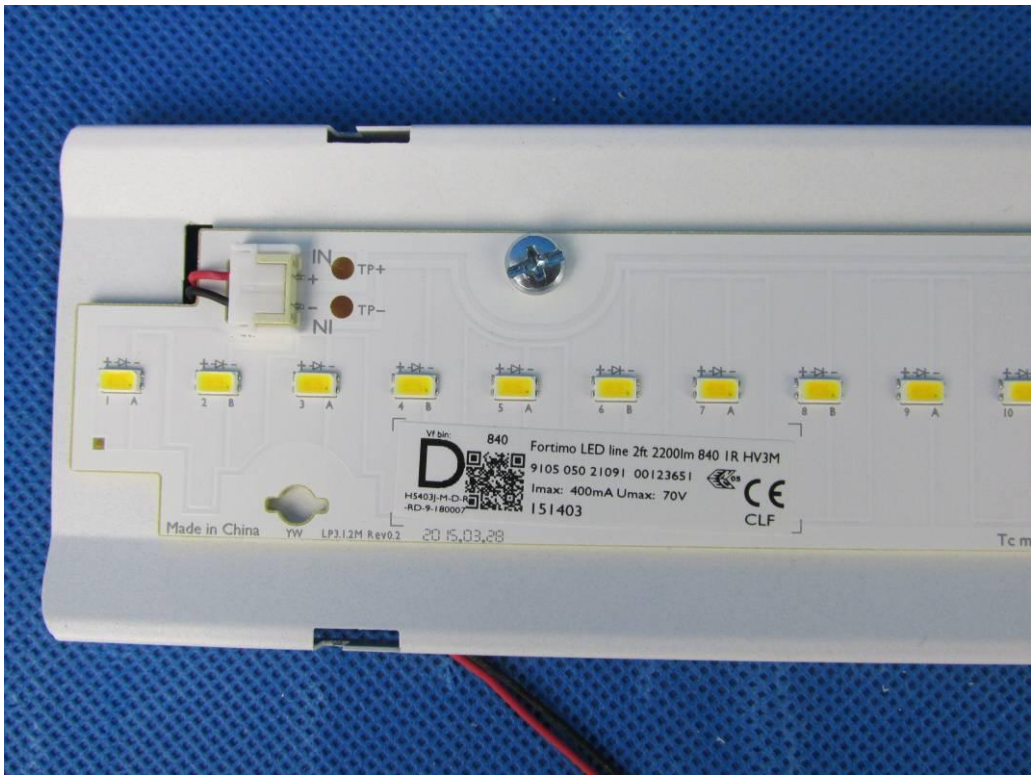
Open view of BCW098 LED40/NW PSD L1200, BCW098 LED40/CW PSD L1200



Terminal

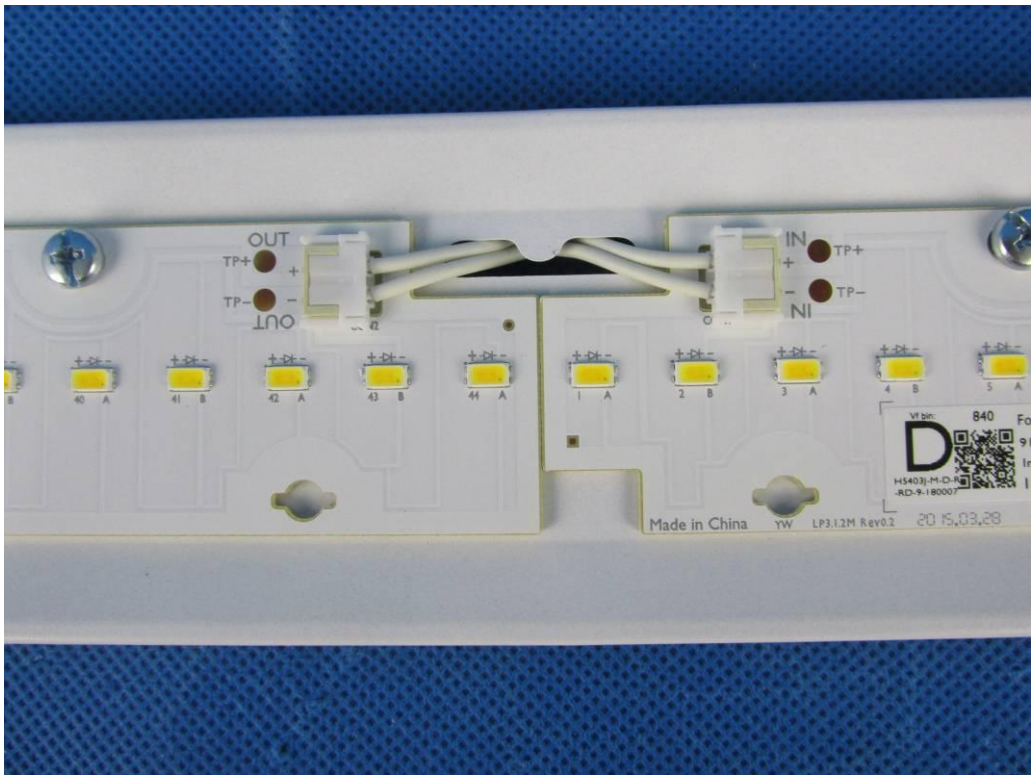
Appendix 3 – Photograph

LED module

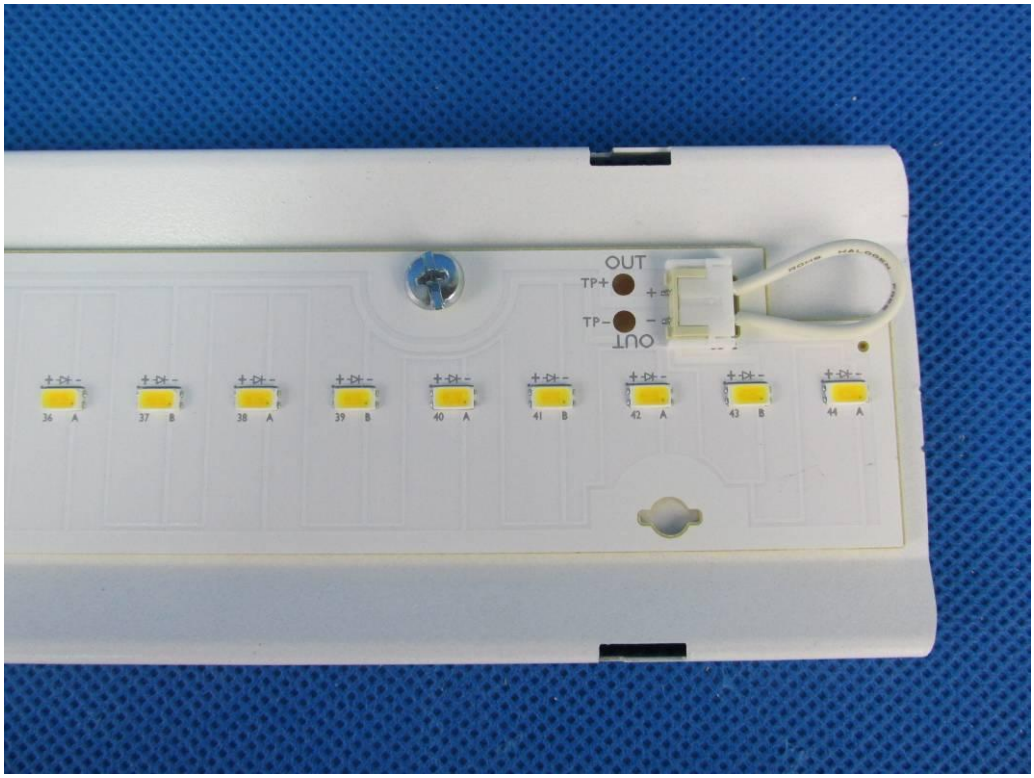


LED module

Appendix 3 – Photograph



LED module



LED module

Appendix 3 – Photograph

Fixed screw

TEST REPORT
IEC 62471
Photobiological safety of lamps and lamp systems

Report Reference No. ..... :	704021503938-00 attachment 1
Date of issue ..... :	2015-11-06
Total number of pages ..... :	18 pages
CB Testing Laboratory ..... :	TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
Address ..... :	No.88 Heng Tong Road, 200070 Shanghai, P.R.China
Applicant's name ..... :	Philips Lighting Luminaires (Shanghai) Co., Ltd
Address ..... :	2F, Building 6, No. 1805, Huyi Highway, Malu Town, Jiading District, 201801, Shanghai, People's Republic of China
Test specification:	
Standard..... :	IEC 62471:2006 (First Edition)
Test procedure ..... :	EU-Directive
Non-standard test method…….:	N/A
Test Report Form No. ..... :	IEC62471A
TRF Originator ..... :	VDE Testing and Certification Institute
Master TRF ..... :	Dated 2009-05

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

Test item description ..... :	Fixed general purpose luminaires (LED Waterproof)
Trade Mark..... :	PHILIPS
Manufacturer ..... :	Philips Lighting Luminaires (Shanghai) Co., Ltd
Model/Type reference ..... :	Refer to 704021503938-00
Ratings ..... :	Refer to 704021503938-00

Testing procedure and testing location:	
☒ **CB Testing Laboratory**:	TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
Testing location/ address ..... :	No. 1999, Duhui Road, Shanghai, 201108, P. R. China
☐ **Associated CB Laboratory:**	
Testing location/ address ..... :	N/A
Tested by (name + signature).....:	Jiani WANG
Approved by (+ signature) .....:	Na ZHANG
☐ Testing procedure: TMP	
Tested by (name + signature).....:	N/A
Approved by (+ signature) ..... :	N/A
Testing location/ address ..... :	N/A
☐ Testing procedure: WMT	
Tested by (name + signature).....:	N/A
Witnessed by (+ signature)..... :	N/A
Approved by (+ signature) .....:	N/A
Testing location/ address ..... :	N/A
☐ Testing procedure: SMT	
Tested by (name + signature).....:	N/A
Approved by (+ signature) .....:	N/A
Supervised by (+ signature).....:	N/A
Testing location/ address ..... :	N/A
☐ Testing procedure: RMT	
Tested by (name + signature).....:	N/A
Approved by (+ signature) .....:	N/A
Supervised by (+ signature).....:	N/A
Testing location/ address ..... :	N/A

Summary of testing:

Determination of the test result includes consideration of measurement uncertainty from the test equipment and methods.

All test performed with positive result.

Tests performed (name of test and test clause):	**Testing location:**
Complete tests on model BCW098 LED40/CW PSD L1200 The test results comply with the requirements.	TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch No. 1999, Duhui Road, Shanghai, 201108, P. R. China

Summary of compliance with National Differences:

The deviation between EN 62471:2008 and of IEC 62471:2006 (First Edition) is taken into account at the end of the report, please refer to appendix 1 of this report.

Copy of marking plate:

N/A

Test item particulars ..... :	Fixed general purpose luminaires (LED Waterproof)
Tested lamp ..... :	☒ continuous wave lamps ☐ pulsed lamps
Tested lamp system ..... :	LED lamp
Lamp classification group ..... :	☒ exempt ☐ risk 1 ☐ risk 2 ☐ risk 3
Lamp cap ..... :	N/A
Bulb ..... :	Original LED bulb
Rated of the lamp ..... :	220-240V~, 50/60Hz,
Furthermore marking on the lamp ..... :	N/A
Seasoning of lamps according IEC standard ..... :	N/A
Used measurement instrument ..... :	Normal use
Temperature by measurement ..... :	35 °C
Information for safety use ..... :	For general purpose use

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 ..... :	2015-09-22
Date (s) of performance of tests ..... :	2015-09-22 to 2015-11-06

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.
List of test equipment must be kept on file and available for review.

Remark 1:

The following contents are included and as attachments of this test report:

- Test report IEC 62471:2006 (15 pages)
- Appendix 1: Comprising deviation of EN 62471:2008 (3 pages)

Remark 2:

Name of factory: NingBo Violet Lighting Electric Co.,Ltd

Address: No.885 Jinhai Rd,Cidong Industrial Park,Cixi, 315331, Zhejiang, People's Republic of China

General product information:

After evaluations on the measurement results, The samples are classified as exempt group.

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
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}	see clause 4.3	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 broad-band 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 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
	$t_{max} \le \frac{10\,000}{E_{UVA}}$ s		P
4.3.3	Retinal blue light hazard exposure limit		P
	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}	for t ≤ 10^4 s $t_{max} = \frac{10^6}{L_B}$	N/A

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
	$L_B = \sum_{300}^{700} L_\lambda \cdot B(\lambda) \cdot \Delta\lambda \le 100$ $W \cdot m^{-2} \cdot sr^{-1}$	for $t > 10^4$ 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:	see table 4.2	N/A
	$E_B \cdot t = \sum_{300}^{700} \sum_{t} E_\lambda(\lambda,t) \cdot B(\lambda) \cdot \Delta t \cdot \Delta\lambda \le 100$ $J \cdot m^{-2}$	for t ≤ 100 s	N/A
	$E_B = \sum_{300}^{700} E_\lambda \cdot B(\lambda) \cdot \Delta\lambda \le 1$ $W \cdot m^{-2}$	for t > 100 s	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
	$L_R = \sum_{380}^{1400} L_\lambda \cdot R(\lambda) \cdot \Delta\lambda \le \frac{50\,000}{\alpha \cdot t^{0,25}}$ $W \cdot m^{-2} \cdot sr^{-1}$	(10 µs ≤ t ≤ 10 s)	P
4.3.6	Retinal thermal hazard exposure limit – weak visual stimulus		N/A
	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:		N/A
	$L_{IR} = \sum_{780}^{1400} L_\lambda \cdot R(\lambda) \cdot \Delta\lambda \le \frac{6\,000}{\alpha}$ $W \cdot m^{-2} \cdot sr^{-1}$	t > 10 s	N/A
4.3.7	Infrared radiation hazard exposure limits for the eye		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
	$E_{IR} = \sum_{780}^{3\,000} E_\lambda \cdot \Delta\lambda \le 18\,000 \cdot t^{-0,75}$ $W \cdot m^{-2}$	t ≤ 1000 s	N/A
	For times greater than 1000 s the limit becomes:		P
	$E_{IR} = \sum_{780}^{3\,000} E_\lambda \cdot \Delta\lambda \le 100$ $W \cdot m^{-2}$	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

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
	$E_H \cdot t = \sum_{380}^{3\,000} \sum_{t} E_\lambda(\lambda,t) \cdot \Delta t \cdot \Delta\lambda \le 20\,000 \cdot t^{0,25}$ 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)		P
	Seasoning of lamps shall be done as stated in the appropriate IEC lamp standard.		P
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.		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		P
	Operation of the test lamp shall be provided in accordance with:		P
	– the appropriate IEC lamp standard, or		P
	– 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		P
	– the manufacturer' s recommendation		N/A
5.2	Measurement procedure		P
5.2.1	Irradiance measurements		P
	Minimum aperture diameter 7mm.		N/A
	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		N/A
	The measurements made with an optical system.		N/A

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
	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.		N/A
5.2.2.2	Alternative method		P
	Alternatively to an imaging radiance set-up, an ir-radiance measurement set-up with a circular field stop placed at the source can be used to perform radiance measurements.		P
5.2.3	Measurement of source size		P
	The determination of α, the angle subtended by a source, requires the determination of the 50% emis-sion points of the source.		P
5.2.4	Pulse width measurement for pulsed sources		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 in-terpolation on the log of given values to obtain in-termediate points at the wavelength intervals de-sired.	see table 4.1	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		N/A
	The quality of all measurement results must be quantified by an analysis of the uncertainty.	see Annex C in the norm	N/A
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 ir-radiance or radiance values at a distance which produces an illuminance of 500 lux, but not at a distance less than 200 mm		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	Except Group		P

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
	In the except 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 except 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
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

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
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.		N/A
	A pulsed lamp shall be evaluated at the highest nominal energy loading as specified by the manu-facturer.		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

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

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

Wavelength[1] 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

[1] Wavelengths chosen are representative: other values should be obtained by logarithmic interpolation at intermediate wavelengths.
* Emission lines of a mercury discharge spectrum.

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

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

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
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

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

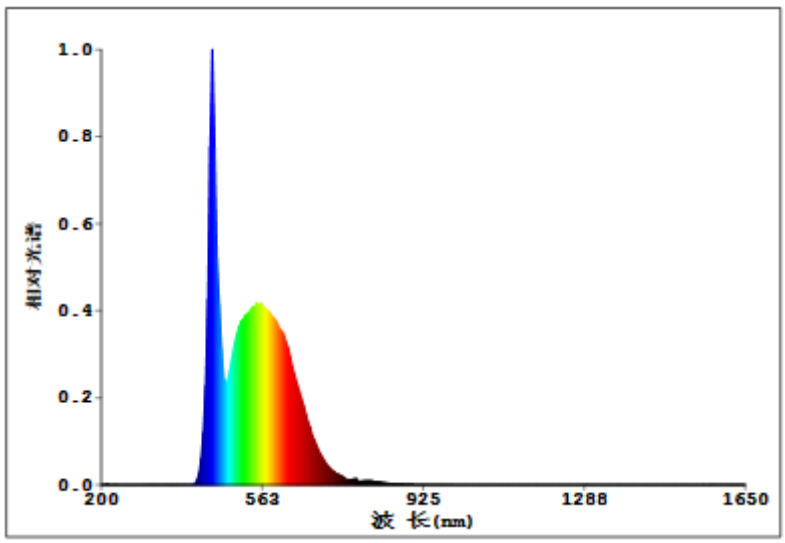
Table 5.4	Summary of the ELs for the surface of the skin or cornea (irradiance based values)				P
Hazard Name	**Relevant equation**	**Wavelength range nm**	**Exposure duration sec**	**Limiting aperture rad (deg)**	**EL in terms of constant irradiance $W \cdot m^{-2}$**
Actinic UV skin & eye	$E_S = \sum E_\lambda \cdot S(\lambda) \cdot \Delta\lambda$	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)				P
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

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps									P
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	$6{,}0 \times 10^{-5}$	0,003	---	0,03	---	
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	$5{,}8 \times 10^{-4}$	33	---	100	---	
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	4,2	10000	---	4000000	---	
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	1,0*	N/A (α>0,011)	1,0	---	400	---	
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	210	28000/α	---	71000/α	---	
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/α	0,3	6000/α	---	6000/α	---	
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0	570	---	3200	---	
* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian. ** Involves evaluation of non-GLS source										

Furthermore remarks:



IEC62471A - Appendix 1			
Clause	Requirement + Test	Result - Remark	Verdict

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

	CENELEC COMMON MODIFICATIONS (EN)		
4	**EXPOSURE LIMITS**		
	Contents of the whole Clause 4 of IEC 62471:2006 moved into a new informative Annex ZB		—
	Clause 4 replaced by the following:		
	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		
	First paragraph deleted		—

EN 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)								P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	SUV(λ)	Es	W•m-2	0,001	$6{,}0x10^{-5}$	-	-	-	-
Near UV		EUVA	W•m-2	0,33	$5{,}8\ x10^{-4}$	-	-	-	-
Blue light	B(λ)	LB	W•m-2•sr-1	100	4,2	10000	---	4000000	---
Blue light, small source	B(λ)	EB	W•m-2	0,01*	N/A (α>0,011)	1,0	---	400	---
Retinal thermal	R(λ)	LR	W•m-2•sr-1	28000/α	210	28000/α	---	71000/α	---
Retinal thermal, weak visual stimulus**	R(λ)	LIR	W•m-2•sr-1	545000 0,0017≤ α ≤ 0,011	N/A				
				6000/α 0,011≤ α ≤ 0,1	0,3				
IR radiation, eye		EIR	W•m-2	100	0	570	---	3200	---

EN 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)	P
* 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 NOTE The action functions: see Table 4.1 and Table 4.2 The applicable aperture diameters: see 4.2.1 The limitations for the angular subtenses: see 4.2.2 The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5.		

TEST REPORT

IEC 62493

Assessment of lighting equipment related to human exposure to electromagnetic fields

Report Number ..... :	704021503938-00 attachment 2
Date of issue..... :	2015-11-06
Total number of pages ..... :	6 pages
Testing Laboratory..... :	TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
Address ..... :	No.88 Heng Tong Road, 200070 Shanghai, P.R.China
Applicant's name..... :	Philips Lighting Luminaires (Shanghai) Co., Ltd
Address ..... :	2F, Building 6, No. 1805, Huyi Highway, Malu Town, Jiading District, 201801, Shanghai, People's Republic of China
Test specification:	
Standard..... :	IEC 62493(ed.1):2009
Test procedure ..... :	EU-Directive
Non-standard test method…….. :	N/A
Test Report Form No..... :	IEC62493A
Test Report Form(s) Originator ..... :	Intertek Semko AB
Master TRF..... :	2011-04

Test item description .....:	Fixed general purpose luminaires (LED Waterproof)
Trade Mark ..... :	PHILIPS
Manufacturer ..... :	Philips Lighting Luminaires (Shanghai) Co., Ltd
Model/Type reference ..... :	Refer to 704021503938-00
Ratings ..... :	Refer to 704021503938-00

Testing procedure and testing location:	
☒ **Testing Laboratory:**	TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
Testing location/ address..... :	No. 1999, Duhui Road, Shanghai, 201108, P. R. China
☐ **Associated CB Laboratory:**	N/A
Testing location/ address..... :	N/A
Tested by (name + signature) ..... :	Jiani WANG
Approved by (+ signature)..... :	Na ZHANG
☐ Testing procedure: TMP	
Tested by (name + signature) ..... :	N/A
Approved by (+ signature)..... :	N/A
Testing location/ address..... :	N/A
☐ Testing procedure: WMT	
Tested by (name + signature) ..... :	N/A
Witnessed by (+ signature) ..... :	N/A
Approved by (+ signature)..... :	N/A
Testing location/ address..... :	N/A
☐ Testing procedure: SMT	
Tested by (name + signature) ..... :	N/A
Approved by (+ signature)..... :	N/A
Supervised by (+ signature) ..... :	N/A
Testing location/ address..... :	N/A
☐ Testing procedure: RMT	
Tested by (name + signature) ..... :	N/A
Approved by (+ signature)..... :	N/A
Supervised by (+ signature) ..... :	N/A
Testing location/ address..... :	N/A

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

Test report IEC 62493(ed.1):2009 (6 pages).

Summary of testing:

All test performed with positive result.

Tests performed (name of test and test clause):	**Testing location:**
Complete tests. The test results comply with the requirements	TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch No. 1999, Duhui Road, Shanghai, 201108, P. R. China

Summary of compliance with National Differences

List of countries addressed:

EN 62493:2010 is identical to IEC 62493(ed.1):2009 without any modification

☒ The product fulfils the requirements of EN 62493:2010

Copy of marking plate (sample)

Refer to 704021503938-00

Test item particulars .....:	Fixed general purpose luminaires (LED Waterproof)
Classification of installation and use .....:	Normal use
Supply Connection .....:	Terminal
Protection class .....:	Class I
Degree of protection against liquids .....:	IP65
Rated operation .....:	Continuous operation
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 .....:	2015-09-22
Date (s) of performance of tests .....:	2015-09-22 to 2015-10-06

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.

Manufacturer's Declaration per sub-clause 6.2.5 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) .....:	NingBo Violet Lighting Electric Co.,Ltd No.885 Jinhai Rd,Cidong Industrial Park,Cixi, 315331, Zhejiang, People's Republic of China

General product information:

Refer to 704021503938-00

IEC 62493			
Clause	Requirement + Test	Result - Remark	Verdict

4.2	**APPLICATION OF LIMITS (Test summary)**		
	Specific absorption rate (SAR)		
a)	CISPR 15 clause 4.3.1 Disturbance voltage mains terminals 20 kHz – 30 MHz	*)	P
b)	CISPR 15 clause 4.4 Radiated electromagnetic disturbances 100 kHz – 30 MHz	*)	P
c)	CISPR 15 clause 4.4.2 Radiated electromagnetic disturbances 30 MHz – 300 MHz	*)	P
*)	☐ See separate Test Report for measurements of a), b) and c) above Test Report with Ref. No.: 708881503938-00 ☒ Only measurement of d) below. See measurement results below. In this case this test report does not show compliance with IEC 62493.		—
	Induced current density		P
d)	Induced current density 20 kHz – 10 MHz	See measurement results below	P

4.2.d	**INDUCED CURRENT DENSITY**	**P**

	Power supply system utilised:		—
	Voltage ..... :	220-240V~	—
	Frequency..... :	50/60Hz	—
	Environmental conditions:		—
	Temperature ..... :	23,8 °C	—
	Humidity..... :	48%	—
	EuT operation mode:		—
	☒ Normal operation		—
	☐ Other operation:	N/A	—
			—

IEC 62493			
Clause	Requirement + Test	Result - Remark	Verdict

4.2.d	MEASUREMENT RESULTS			
	Measuring with “Van der Hoofden” test head			P
Location of EuT	Measuring distance	Result (F)	Limit (F)	Verdict
On the table	50cm	0,071163 (with Xitanium 36W 0.12-0.4A 115V 230V)	0,85	P
On the table	50cm	0,056005 (with Xitanium 75W 0.12-0.4A 220V 230V)	0,85	P
On the table	50cm	0,067039 (with Xitanium 75W 0.12-0.40A 215V TD 230V)	0,85	P

4.2.d	EQUIPMENT USED DURING TEST		
Equipment	Manufacturer	Type	Id. No.
“Van der Hoofden” test head	AFJ	VDH30	S1201628-YQ
Measurement receiver	AFJ	R 3010	S1201629-YQ

Test set-up, photos