TEST REPORT

Reference No.	:	WTU21N03018982L
Applicant	:	LUMATEK LTD.
Address	:	Ewropa Business centre Level 3 – 701 Dun Karm Street Birkirkara BKR 9034 MALTA
Manufacturer	:	Same as applicant
Address	:	Same as applicant
Product Name	:	LED Luminaires
Model No.	:	ZEUS 1000W XTREME PPFD CO2
Standards	:	Luminaires – IEC 60598-1:2014+A1:2017 Part 1: General requirements and tests IEC 60598-2-1:1979+A1:1987 Part 2-1: Fixed general purpose luminaires Used in conjunction with EU deviations
Date of Receipt sample	:	2021-03-01
Date of Test	:	2021-03-01 to 2021-03-12
Date of Issue	:	2021-03-12
Test Report Form No.	:	WSL-6059821F-01A
Test Result	:	**Pass**

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

Prepared By:

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Compiled by:	Approved by:
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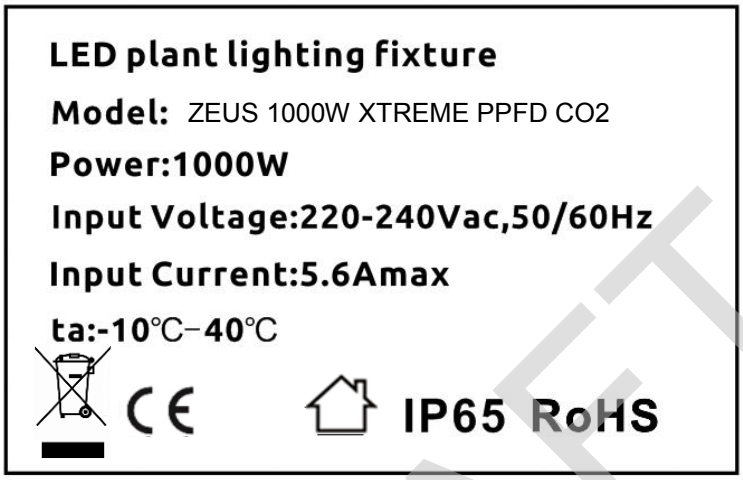
Test item description	..... :	LED Luminaires
Trade Mark	..... :	LUMATEK LTD.
Model/Type reference	..... :	ZEUS 1000W XTREME PPFD CO2
Ratings	..... :	220-240V~, 50/60Hz, 1000W, Class I, IP65, ta:40°C

Copy of marking plate:



Remark:

1. On the luminaries exterior surface;
2. Rating label for other models is identical except different model name and rated power.
3. Manufacture or/and his importer shall ensure product bears label requirements in article 6 and article 8 of the 2014/35/EU relate to name, batch number, post address prior place the product into EU market.

Summary of testing:

1. The following testing standards have considered:

   - EU Group Differences of EN 60598-1:2015+A1:2018 and EN 60598-2-1:1989 have considered. See Annex 5.
   - EN IEC 62031:2020 has evaluated. See Annex 6.
   - EN 62471:2006 has evaluated. Classification group: ☒Exempt ☐Low risk ☐Mod risk; See Annex 7.

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

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Test items particulars:
Classification of installation and use .....: Fixed luminaires, indoor use
Supply Connection .....: Supply cord with plug
Possible test case verdicts:
- test case does not apply to the test object ..... : N (Not applicable)
- test object does meet the requirement ..... : P (Pass)
- test object does not meet the requirement ..... : F (Fail)
General remarks:
"(see remark #)" refers to a remark appended to the report. "(see appended table)" refers to a table appended to the report. Throughout this report a comma is used as the decimal separator.
General product information:
1. Class I, IP65. LED luminaire for general use.

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.2 (0)	**GENERAL TEST REQUIREMENTS**		P
1.2 (0.3)	More sections applicable ..... :	Yes ☐ No ☒ Section/s:	—
1.2 (0.5)	Components	(see Annex 1)	—
1.2 (0.7)	**Information for luminaire design in light sources standards**		—
1.2 (0.7.2)	Light source safety standard ..... :	EN IEC 62031	—
	Luminaire design in the light source safety standard		P
1.4 (2)	**CLASSIFICATION OF LUMINAIRES**		P
1.4 (2.2)	Type of protection ..... :	Class I	P
1.4 (2.3)	Degree of protection ..... :	IP65	—
1.4 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces ..... :	Yes ☒ No ☐	—
1.4 (2.5)	Luminaire for normal use ..... :	Yes ☒ No ☐	—
	Luminaire for rough service ..... :	Yes ☐ No ☒	—
1.5 (3)	**MARKING**		P
1.5 (3.2)	Mandatory markings		P
	Position of the marking		P
	Format of symbols/text		P
1.5 (3.3)	Additional information		P
	Language of instructions	English	P
1.5 (3.3.1)	Combination luminaires		N
1.5 (3.3.2)	Nominal frequency in Hz		P
1.5 (3.3.3)	Operating temperature		N
1.5 (3.3.5)	Wiring diagram		N
1.5 (3.3.6)	Special conditions		N
1.5 (3.3.7)	Metal halide lamp luminaire – warning		N
1.5 (3.3.8)	Limitation for semi-luminaires		N
1.5 (3.3.9)	Power factor and supply current		N
1.5 (3.3.10)	Suitability for use indoors		P
1.5 (3.3.11)	Luminaires with remote control		N
1.5 (3.3.12)	Clip-mounted luminaire – warning		N
1.5 (3.3.13)	Specifications of protective shields		N
1.5 (3.3.14)	Symbol for nature of supply		P

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.5 (3.3.15)	Rated current of socket outlet		N
1.5 (3.3.16)	Rough service luminaire		P
1.5 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments	Type X	P
1.5 (3.3.18)	Non-ordinary luminaires with PVC cable		P
1.5 (3.3.19)	Protective conductor current in instruction if applicable		N
1.5 (3.3.20)	Provided with information if not intended to be mounted within arm's reach		N
1.5 (3.3.21)	Non replaceable and non-user replaceable light sources information provided	Non-user replaceable	P
1.5 (3.3.22)	Controllable luminaires, classification of insulation provided		N
1.5 (3.3.23)	Luminaire without controlgear provided with necessary information for selection of appropriate component		N
1.5 (3.3.24)	If not supplied with terminal block, information on the packaging		N
1.5 (3.4)	Test with water	Rubbing lightly for 15 s	P
	Test with hexane	Rubbing lightly for 15 s	P
	Legible after test		P
	Label attached		P
1.6 (4)	**CONSTRUCTION**		P
1.6 (4.2)	Components replaceable without difficulty		N
1.6 (4.3)	Wireways smooth and free from sharp edges		P
1.6 (4.4)	**Lampholders**		**N**
1.6 (4.4.1)	Integral lampholder		N
1.6 (4.4.2)	Wiring connection		N
1.6 (4.4.3)	Lampholder for end-to-end mounting		N
1.6 (4.4.4)	Positioning		N
	- pressure test (N) ..... :		—
	After test the lampholder comply with relevant standard sheets and show no damage		N
	After test on single-capped lampholder the lampholder have not moved from its position and show no permanent deformation		N
	- bending test (N) ..... :		—

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	After test the lampholder have not moved from its position and show no permanent deformation		N
1.6 (4.4.5)	Peak pulse voltage		N
1.6 (4.4.6)	Centre contact		N
1.6 (4.4.7)	Parts in rough service luminaires resistant to tracking		N
1.6 (4.4.8)	Lamp connectors		N
1.6 (4.4.9)	Caps and bases correctly used		N
1.6 (4.4.10)	Light source for lampholder or connection according IEC 60061 not connected another way		N
1.6 (4.5)	**Starter holders**		**N**
	Starter holder in luminaires other than class II		N
	Starter holder class II construction		N
1.6 (4.6)	**Terminal blocks**		**N**
	Tails		N
	Unsecured blocks		N
1.6 (4.7)	**Terminals and supply connections**		**N**
1.6 (4.7.1)	Contact to metal parts		N
1.6 (4.7.2)	Test 8 mm live conductor		N
	Test 8 mm earth conductor		N
1.6 (4.7.3)	Terminals for supply conductors		N
1.6 (4.7.3.1)	Welded method and material		N
	- stranded or solid conductor		N
	- spot welding		N
	- welding between wires		N
	- Type Z attachment		N
	- mechanical test according to 15.6.2		N
	- electrical test according to 15.6.3		N
	- heat test according to 15.6.3.2.3 and 15.6.3.2.4		N
1.6 (4.7.4)	Terminals other than supply connection		N
1.6 (4.7.5)	Heat-resistant wiring/sleeves		N
1.6 (4.7.6)	Multi-pole plug		N
	- test at 30 N		N
1.6 (4.8)	**Switches**		**P**
	- adequate rating		P
	- adequate fixing		P

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- polarized supply		N
	- compliance with IEC 61058-1 for electronic switches		N
1.6 (4.9)	**Insulating lining and sleeves**		**N**
1.6 (4.9.1)	Retainment		N
	Method of fixing ..... :		N
1.6 (4.9.2)	Insulated linings and sleeves:		N
	Resistant to a temperature > 20 °C to the wire temperature or		N
	a) & c) Insulation resistance and electric strength		N
	b) Ageing test. Temperature (°C) ..... :		N
1.6 (4.10)	**Double or reinforced insulation**		**N**
1.6 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		N
	Safe installation fixed luminaires		N
	Capacitors and switches		N
	Interference suppression capacitors according to IEC 60384-14		N
1.6 (4.10.2)	Assembly gaps:		N
	- not coincidental		N
	- no straight access with test probe		N
1.6 (4.10.3)	Retainment of insulation:		N
	- fixed		N
	- unable to be replaced; luminaire inoperative		N
	- sleeves retained in position		N
	- lining in lampholder		N
1.6 (4.10.4)	Protective impedance device		N
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		N
	Y1 or Y2 capacitors comply with IEC 60384-14		N
	Resistors comply with test (a) in 14.1 of IEC 60065		N
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
	- self-tapping screws		N

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- thread-cutting screws		N
1.6 (4.11.3)	Screw locking:		N
	- spring washer		N
	- rivets		N
1.6 (4.11.4)	Material of current-carrying parts	>50% Copper	P
1.6 (4.11.5)	No contact to wood or mounting surface		P
1.6 (4.11.6)	Electro-mechanical contact systems		N
1.6 (4.12)	**Screws and connections (mechanical) and glands**		**P**
1.6 (4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N
	Torque test: torque (Nm); part..... :	LED driver: Φ3,97mm, 1,2Nm	P
	Torque test: torque (Nm); part..... :		N
1.6 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N
1.6 (4.12.4)	Locked connections:		N
	- fixed arms; torque (Nm) ..... :		N
	- lampholder; torque (Nm) ..... :		N
	- push-button switches; torque 0,8 Nm ..... :		N
1.6 (4.12.5)	Screwed glands; force (Nm)..... :		N
1.6 (4.13)	**Mechanical strength**		**P**
1.6 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm) ..... :		N
	- other parts; energy (Nm)..... :	Black plastic cover, Metal enclosure: 0,35Nm	P
	1) live parts		P
	2) linings		N
	3) protection		P
	4) covers		P
1.6 (4.13.2)	Metal parts have adequate mechanical strength		P
1.6 (4.13.3)	Straight test finger		P
1.6 (4.13.4)	Rough service luminaires		N
	- IP54 or higher		N
	a) fixed		N
	b) hand-held		N
	c) delivered with a stand		N

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	d) for temporary installations and suitable for mounting on a stand		N
1.6 (4.13.6)	Tumbling barrel		N
1.6 (4.14)	**Suspensions, fixings and means of adjusting**		**P**
1.6 (4.14.1)	Mechanical load:		P
	A) four times the weight	Whole set: 18,43 Kg x 4= 73,72 Kg; Single LED light bar: 0,78 Kg x 4= 3,12 Kg	P
	B) torque 2,5 Nm		N
	C) bracket arm; bending moment (Nm)..... :		N
	D) load track-mounted luminaires		N
	E) clip-mounted luminaires, glass-shelve. Thickness (mm) ..... :		N
	Metal rod. diameter (mm) ..... :		N
	Fixed luminaire or independent control gear without fixing devices		N
1.6 (4.14.2)	Load to flexible cables		N
	Mass (kg) ..... :		—
	Stress in conductors (N/mm²) ..... :		N
	Mass (kg) of semi-luminaire ..... :		N
	Bending moment (Nm) of semi-luminaire ..... :		N
1.6 (4.14.3)	Adjusting devices:		N
	- flexing test; number of cycles..... :		N
	- strands broken ..... :		N
	- electric strength test afterwards		N
1.6 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N
1.6 (4.14.5)	Guide pulleys		N
1.6 (4.14.6)	Strain on socket-outlets		N
1.6 (4.15)	**Flammable materials**		**P**
	- glow-wire test 650°C ..... :	See Test Table 1.15 (13.3.2)	P
	- spacing ≥30 mm		N
	- screen withstanding test of 13.3.1		N
	- screen dimensions		N
	- no fiercely burning material		P

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- thermal protection		N
	- electronic circuits exempted		N
1.6 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		N
	a) construction		N
	b) temperature sensing control		N
	c) surface temperature		N
1.6 (4.16)	**Luminaires for mounting on normally flammable surfaces**		**P**
	No lamp control gear ..... :	(compliance with Section 12)	N
	Provided with adaptor for a track meet the requirements for direct mounting on normally flammable surfaces		N
1.6 (4.16.1)	Lamp control gear spacing:		P
	- spacing 35 mm		N
	- spacing 10 mm		P
1.6 (4.16.2)	Thermal protection:		N
	- in lamp control gear		N
	- external		N
	- fixed position		N
	- temperature marked lamp control gear		N
1.6 (4.16.3)	Design to satisfy the test of 12.6	(see clause 12.6)	N
1.6 (4.17)	**Drain holes**		**N**
	Clearance at least 5 mm		N
1.6 (4.18)	**Resistance to corrosion**		**P**
1.6 (4.18.1)	- rust-resistance		P
1.6 (4.18.2)	- season cracking in copper		N
1.6 (4.18.3)	- corrosion of aluminium		P
1.6 (4.19)	Ignitors compatible with ballast		N
1.6 (4.20)	Rough service vibration		N
1.6 (4.21)	**Protective shield**		**N**
1.6 (4.21.1)	Shield fitted if tungsten halogen lamps or metal halide lamps		N
	Shield of glass if tungsten halogen lamps		N
1.6 (4.21.2)	Particles from a shattering lamp not impair safety		N
1.6 (4.21.3)	No direct path		N
1.6 (4.21.4)	Impact test on shield		N
	Glow-wire test on lamp compartment..... :	See Test Table 1.15 (13.3.2)	N

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.6 (4.22)	Attachments to lamps not cause overheating or damage		N
1.6 (4.23)	Semi-luminaires comply Class II		N
1.6 (4.24)	**Photobiological hazards**		**P**
1.6 (4.24.1)	No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P)		N
1.6 (4.24.2)	Retinal blue light hazard		P
	Class of risk group assessed according to IEC/TR 62778 ..... :	RG1 Unlimited	—
	Luminaires with E_{thr} :		N
	a) Fixed luminaires		N
	- distance x m, borderline between RG1 and RG2 .. :		N
	- marking and instruction according 3.2.23		N
	b) Portable and handheld luminaires		N
	- marking according 3.2.23 if RG1 exceeded at 200 mm according to IEC/TR 62778		N
	Portable luminaires for children IEC 60598-2-10 and Mains socket outlet nightlights IEC 60598-2-12 not exceed RG1 at 200 mm according to IEC/62778		N
1.6 (4.25)	**Mechanical hazard**		**P**
	No sharp point or edges		P
1.6 (4.26)	**Short-circuit protection**		**N**
1.6 (4.26.1)	Adequate means of uninsulated accessible SELV parts		N
1.6 (4.26.2)	Short-circuit test with test chain according 4.26.3		N
	Test chain not melt through		N
	Test sample not exceed values of Table 12.1 and 12.2		N
1.6 (4.27)	**Terminal blocks with integrated screwless earthing contacts**		**N**
	Test according Annex V		N
	Pull test of terminal fixing (20 N)		N
	After test, resistance < 0,05 Ω		N
	Pull test of mechanical connection (50 N)		N
	After test, resistance < 0,05 Ω		N
	Voltage drop test, resistance < 0,05 Ω		N
1.6 (4.28)	**Fixing of thermal sensing control**		**N**
	Not plug-in or easily replaceable type		N

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Reliably kept in position		N
	No adhesive fixing if UV radiations from a lamp can degrade the fixing		N
	Not outside the luminaire enclosure		N
	Test of adhesive fixing:		N
	Max. temperature on adhesive material (°C) ..... :		—
	100 cycles between t min and t max		N
	Temperature sensing control still in position		N
1.6 (4.29)	**Luminaires with non-replaceable light source**		**N**
	Not possible to replace light source		N
	Live part not accessible after parts have been opened by hand or tools		N
1.6 (4.30)	**Luminaires with non-user replaceable light source**		**P**
	If protective cover provide protection against electric shock and marked with “caution, electric shock risk” symbol:		N
	Minimum two fixing means		N
1.6 (4.31)	**Insulation between circuits**		**P**
	Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3		P
	Controllable luminaires requiring same level of insulation for all components, the insulation between control terminals and LV supply fulfil requirements according 4.31.1 – 4.31.3		N
1.6 (4.31.1)	SELV circuits		P
	Used SELV source		P
	Voltage ≤ ELV		P
	Insulating of SELV circuits from LV supply		P
	Insulating of SELV circuits from other non SELV circuits		N
	Insulating of SELV circuits from FELV		N
	Insulating of SELV circuits from other SELV circuits		N
	SELV circuits insulated from accessible parts according Table X.1		P
	Plugs not able to enter socket-outlets of other voltage systems		N
	Socket outlets does not admit plugs of other voltage systems		N
	Plugs and socket-outlets does not have protective conductor contact		N

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.6 (4.31.2)	FELV circuits		N
	Used FELV source		N
	Voltage ≤ ELV		N
	Insulating of FELV circuits from LV supply		N
	FELV circuits insulated from accessible parts according Table X.1		N
	Plugs not able to enter socket-outlets of other voltage systems		N
	Socket outlets does not admit plugs of other voltage systems		N
	Socket-outlets does not have protective conductor contact		N
1.6 (4.31.3)	Other circuits		N
	Other circuits insulated from accessible parts according Table X.1		N
	Class II construction with equipotential bonding for protection against indirect contacts with live parts:		N
	- conductive parts are connected together		N
	- test according 7.2.3		N
	- conductive part not cause an electric shock in case of an insulation fault		N
	- equipotential bonding in master/slave applications		N
	- master luminaire provided with terminal for accessible conductive parts of slave luminaires		N
	- slave luminaire constructed as class I		N
1.6 (4.32)	**Overvoltage protective devices**		**N**
	Comply with IEC 61643-11		N
	External to controlgear and connected to earth:		N
	- only in fixed luminaires		N
	- only connected to protective earth		N

1.7 (11)	**CREEPAGE DISTANCES AND CLEARANCES**		P
1.7 (11.2.1)	Impulse withstand category (Normal category II)	Category II ☒ Category III ☐	—
	Category III according Annex U		N
	Protected against pollution, reduced creepage and clearance according Annex P of IEC 61347-1		N
1.7 (11.2.2)	Creepage distances for frequency up to 30 kHz	See Test Table 1.7 (11.2) I	P
	Creepage distances for frequency over 30 kHz:		N

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- Controlgear marked with $\hat{U}_{OUT}$ and f_{UOUT} according IEC 61347-1, clause 7.1, item w	See Test Table 1.7 (11.2) II	N
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 1.7 (11.2) II	N
1.7 (11.2.3)	Clearances for frequency up to 30 kHz	See Test Table 1.7 (11.2) I	P
	Clearances distances for frequency over 30 kHz:		N
	- Controlgear marked with U_P	See Test Table 1.7 (11.2) II	N
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 1.7 (11.2) II	N
1.8 (7)	**PROVISION FOR EARTHING**		P
1.8 (7.2.1 + 7.2.3)	Accessible metal parts		P
	Metal parts in contact with supporting surface		P
	Resistance < 0,5 Ω..... :	0,07 Ω	P
	Self-tapping screws used		P
	Thread-forming screws		N
	Thread-forming screw used in a grove		N
	Earth makes contact first		P
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N
	Protective earthing of the luminaire not via built-in control gear		P
1.8 (7.2.2 + 7.2.3)	Earth continuity in joints, etc.		P
1.8 (7.2.4)	Locking of clamping means		P
	Compliance with 4.7.3		P
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N
1.8 (7.2.5)	Earth terminal integral part of connector socket		N
1.8 (7.2.6)	Earth terminal adjacent to mains terminals		P
1.8 (7.2.7)	Electrolytic corrosion of the earth terminal		P
1.8 (7.2.8)	Material of earth terminal		P
	Contact surface bare metal		P
1.8 (7.2.10)	Class II luminaire for looping-in		N
	Double or reinforced insulation to functional earth		N
1.8 (7.2.11)	Earthing core coloured green-yellow		P
	Length of earth conductor		P

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

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

1.9 (15)	**SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS**		N
	Separately approved; component list..... :	(see Annex 1)	N
	Part of the luminaire ..... :	(see Annex 4)	N

1.10 (5)	**EXTERNAL AND INTERNAL WIRING**		P
1.10 (5.2)	**Supply connection and external wiring**		**P**
1.10 (5.2.1)	Means of connection ..... :	Supply cord with plug	P
	Outdoor luminaire has not PVC insulated external wiring if not class III or SELV ≤ 25 V a.c./60 V d.c. or protected from outdoor environment		N
1.10 (5.2.2)	Type of cable..... :	See Annex 1	P
	Nominal cross-sectional area (mm²) ..... :	See Annex 1	P
	Cables equal to IEC 60227 or IEC 60245		N
1.10 (5.2.3)	Type of attachment, X, Y or Z	Type X	P
1.10 (5.2.5)	Type Z not connected to screws		P
1.10 (5.2.6)	Cable entries:		P
	- suitable for introduction		P
	- adequate degree of protection		P
1.10 (5.2.7)	Cable entries through rigid material have rounded edges		P
1.10 (5.2.8)	Insulating bushings:		N
	- suitably fixed		N
	- material in bushings		N
	- material not likely to deteriorate		N
	- tubes or guards made of insulating material		N
1.10 (5.2.9)	Locking of screwed bushings		N
1.10 (5.2.10)	Cord anchorage:		P
	- covering protected from abrasion		P
	- clear how to be effective		P
	- no mechanical or thermal stress		P

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

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Clause	Requirement + Test	Result - Remark	Verdict
	Other appliance inlet or connector according relevant IEC standard	EN 61984	P
1.10 (5.2.17)	No standardized interconnecting cables properly assembled		N
1.10 (5.2.18)	Used plug in accordance with		P
	- IEC 60083		N
	- other standard		P
1.10 (5.3)	**Internal wiring**		**P**
1.10 (5.3.1)	Internal wiring of suitable size and type		P
	Through wiring		N
	- not delivered/ mounting instruction		N
	- factory assembled		N
	- socket outlet loaded (A) ..... :		N
	- temperatures ..... :	(see Annex 2)	N
	Green-yellow for earth only		P
1.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		N
	Cross-sectional area (mm²)..... :		N
	Insulation thickness (mm) ..... :		N
	Extra insulation added where necessary		N
1.10 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		P
	Cross-sectional area (mm²)..... :	See Annex 2	P
1.10 (5.3.1.3)	Double or reinforced insulation for class II		N
1.10 (5.3.1.4)	Conductors without insulation		N
1.10 (5.3.1.5)	SELV current-carrying parts		N
1.10 (5.3.1.6)	Insulation thickness other than PVC or rubber		N
1.10 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		N
	Joints, raising/lowering devices		N
	Telescopic tubes etc.		N
	No twisting over 360°		P
1.10 (5.3.3)	Insulating bushings:		N

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Clause	Requirement + Test	Result - Remark	Verdict
	- suitable fixed		N
	- material in bushings		N
	- material not likely to deteriorate		N
	- cables with protective sheath		N
1.10 (5.3.4)	Joints and junctions effectively insulated		N
1.10 (5.3.5)	Strain on internal wiring		N
1.10 (5.3.6)	Wire carriers		N
1.10 (5.3.7)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		N
1.10 (5.4)	**Test to determine suitability of conductors having a reduced cross-sectional area**		**P**
	Under test the temperature of the luminaire wiring insulation not exceed the limits stated in Table 12.2	(see Annex 2)	P
	No damage to luminaire wiring after test		P
1.11 (8)	**PROTECTION AGAINST ELECTRIC SHOCK**		P
1.11 (8.2.1)	Live parts not accessible		P
	Basic insulated parts not used on the outer surface without appropriate protection		P
	Basic insulated parts not accessible with standard test finger on portable, settable and adjustable luminaires		N
	Basic insulated parts not accessible with Ø 50 mm probe from outside, other types of luminaires		P
	Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N
	Basic insulation only accessible under lamp or starter replacement		N
	Protection in any position		P
	Double-ended tungsten filament lamp		N
	Insulation lacquer not reliable		N
	Double-ended high-pressure discharge lamp		N
	Relevant warning according to 3.2.18 fitted to the luminaire		N
1.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N
1.11 (8.2.3.a)	Class II luminaire:		N

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Clause	Requirement + Test	Result - Remark	Verdict
	- basic insulated metal parts not accessible during starter or lamp replacement		N
	- basic insulation not accessible other than during starter or lamp replacement		N
	- glass protective shields not used as supplementary insulation		N
1.11 (8.2.3.b)	BC lampholder of metal in class I luminaires shall be earthed		N
1.11 (8.2.3.c)	SELV circuits with exposed current carrying parts:		N
	Ordinary luminaire:		N
	- voltage under load (V)..... :		N
	- no-load voltage (V)..... :		N
	- touch current if applicable (mA) ..... :		N
	One conductive part insulated if required		N
	Other than ordinary luminaire:		N
	- nominal voltage (V) ..... :		N
	Class III luminaire only for connection to SELV		N
	Class III luminaire not provided with means for protective earthing		N
1.11 (8.2.4)	Portable luminaire has protection independent of supporting surface		N
1.11 (8.2.5)	Compliance with the standard test finger or relevant probe		P
1.11 (8.2.6)	Covers reliably secured		P
1.11 (8.2.7)	Luminaire other than below with capacitor > 0,5 μF not exceed 50 V 1 min after disconnection		N
	Portable luminaire with capacitor > 0,1 μF (0.25) not exceed 34 V 1 s after disconnection		N
	Other luminaires with capacitor > 0,1 μF (0.25) with plug and track adaptors not exceed 60 V 5 s after disconnection	5,65 μF; 8V	P

1.12 (12)	**ENDURANCE TEST AND THERMAL TEST**		P
1.12 (-)	If IP > IP 20 relevant test of (12.4), (12.5) and (12.6) after (9.2) before (9.3) specified in 1.13		—
1.12 (12.2)	**Selection of lamps and ballasts**		—
	Lamp used according Annex B	(Lamp used see Annex 2)	—
	Controlgear if separate and not supplied	(Controlgear used see Annex 2)	—

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Clause	Requirement + Test	Result - Remark	Verdict
1.12 (12.3)	**Endurance test**		**P**
	a) mounting-position ..... :	Acc. to user manual	—
	b) test temperature (°C) ..... :	50	—
	c) total duration (h) ..... :	240	—
	d) supply voltage (V) ..... :	264	—
	d) if not equipped with controlgear, constant voltage/current (V) or (A) ..... :	---	—
	e) luminaire ceases to operate		—
1.12 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N
	- marking legible		P
	- no cracks, deformation etc.		P
1.12 (12.4)	**Thermal test (normal operation)**	(see Annex 2)	P
1.12 (12.5)	**Thermal test (abnormal operation)**	(see Annex 2)	N
1.12 (12.6)	**Thermal test (failed lamp control gear condition):**		**N**
1.12 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A) ..... :		—
	- case of abnormal conditions ..... :		—
	- electronic lamp control gear		N
	- measured winding temperature (°C): at 1,1 Un .... :		—
	- measured mounting surface temperature (°C) at 1,1 Un ..... :		N
	- calculated mounting surface temperature (°C) ..... :		N
	- track-mounted luminaires		N
1.12 (12.6.2)	Temperature sensing control		N
	- case of abnormal conditions ..... :		—
	- thermal link		N
	- manual reset cut-out		N
	- auto reset cut-out		N
	- measured mounting surface temperature (°C) ..... :		N
	- track-mounted luminaires		N
1.12 (12.7)	**Thermal test (failed lamp control gear in plastic luminaires):**		**N**

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Clause	Requirement + Test	Result - Remark	Verdict
1.12 (12.7.1)	Luminaire without temperature sensing control		N
1.12 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		N
	Test method 12.7.1.1 or Annex W ..... :		—
	Test according to 12.7.1.1:		N
	- case of abnormal conditions ..... :		—
	- Ballast failure at supply voltage (V) ..... :		—
	- Components retained in place after the test		N
	- Test with standard test finger after the test		N
	Test according to Annex W:		N
	- case of abnormal conditions ..... :		—
	- measured winding temperature (°C): at 1,1 Un ..... :		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un ..... :		—
	- calculated temperature of fixing point/exposed part (°C) ..... :		—
	Ball-pressure test ..... :	See Test Table 1.15 (13.2.1)	N
1.12 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		N
	- case of abnormal conditions ..... :		—
	- measured winding temperature (°C): at 1,1 Un ..... :		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un ..... :		—
	- calculated temperature of fixing point/exposed part (°C) ..... :		—
	Ball-pressure test ..... :	See Test Table 1.15 (13.2.1)	N
1.12 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N
	- case of abnormal conditions ..... :		—
	- Components retained in place after the test		N
	- Test with standard test finger after the test		N
1.12 (12.7.2)	Luminaire with temperature sensing control		N
	- thermal link ..... :	Yes ☐ No ☐	—
	- manual reset cut-out ..... :	Yes ☐ No ☐	—
	- auto reset cut-out ..... :	Yes ☐ No ☐	—

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Clause	Requirement + Test	Result - Remark	Verdict
	- case of abnormal conditions ..... :		—
	- highest measured temperature of fixing point/ exposed part (°C): ..... :		—
	Ball-pressure test: ..... :	See Test Table 1.15 (13.2.1)	N
1.13 (9)	**RESISTANCE TO DUST AND MOISTURE**		P
1.13 (-)	If IP > IP 20 the order of tests as specified in clause 1.12		P
1.13 (9.2)	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP..... :	IP65	—
	- mounting position during test ..... :	Acc. to user manual	—
	- fixing screws tightened; torque (Nm) ..... :	---	—
	- tests according to clauses..... :	Cl.9.2.2, Cl.9.2.6	—
	- electric strength test afterwards	Cl.10	P
	a) no deposit in dust-proof luminaire		N
	b) no talcum in dust-tight luminaire		P
	c) no trace of water on current-carrying parts or on insulation where it could become a hazard		P
	c.1) For luminaires without drain holes – no water entry		P
	c.2) For luminaires with drain holes – no hazardous water entry		N
	d) no water in watertight or pressure watertight luminaire		N
	e) no contact with live parts (IP 2X)		N
	e) no entry into enclosure (IP 3X and IP 4X)		N
	e) no contact with live parts through drain holes and ventilation slots (IP3X and IP4X)		N
	f) no trace of water on part of lamp requiring protection from splashing water		N
	g) 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 ..... :	Metal foil	—
	Insulation resistance (MΩ) ..... :	See below	—

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Clause	Requirement + Test	Result - Remark	Verdict
	SELV		P
	- between current-carrying parts of different polarity :	---	N
	- between current-carrying parts and mounting surface..... :	>100 MΩ	P
	- between current-carrying parts and metal parts of the luminaire..... :	>100 MΩ	P
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :	---	N
	- Insulation bushings as described in Section 5 ..... :	---	N
	Other than SELV		P
	- between live parts of different polarity ..... :	>100 MΩ	P
	- between live parts and mounting surface ..... :	>100 MΩ	P
	- between live parts and metal parts ..... :	>100 MΩ	P
	- between live parts of different polarity through action of a switch..... :	---	N
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :	---	N
	- Insulation bushings as described in Section 5 ..... :	---	N
1.14 (10.2.2)	Electric strength test		P
	Dummy lamp		N
	Luminaires with ignitors after 24 h test		N
	Luminaires with manual ignitors		N
	Test voltage (V)..... :	See below	P
	SELV		P
	- between current-carrying parts of different polarity :	---	N
	- between current-carrying parts and mounting surface..... :	500V	P
	- between current-carrying parts and metal parts of the luminaire..... :	500V	P
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :	---	N
	- Insulation bushings as described in Section 5 ..... :	---	N
	Other than SELV		
	- between live parts of different polarity ..... :	1480V	P
	- between live parts and mounting surface ..... :	1480V	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- between live parts and metal parts ..... :	1480V; 2960V for Class II construction	P
	- between live parts of different polarity through action of a switch..... :	---	N
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :	---	N
	- Insulation bushings as described in Section 5 ..... :	---	N
1.14 (10.3)	Touch current or protective conductor current (mA).:	Protective conductor current: 0,96mA (limit 2 / 3,5mA)	P
1.15 (13)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		P
1.15 (13.2.1)	Ball-pressure test ..... :	See Test Table 1.15 (13.2.1)	N
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

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Clause	Requirement + Test	Result - Remark	Verdict

1.7 (11.2)	TABLE I: Creepage distances and clearances							P
	Minimum distances (mm) for a.c. up to 30 kHz sinusoidal voltages							P
	Applicable part of IEC 60598-1 Table 11.1.A*, 11.1.B* and 11.2*							P
	Insulation type **	Measured clearance	Required		Measured creepage	Required		
			clearance	*Table		creepage	*Table	
Distance 1:	B	>1,9	1,5	9	>3,2	2,5	7	
Working voltage (V) .....:					240			—
PTI .....:					< 600 ☒ ≥ 600 ☐			—
Pulse voltage or U_P if applicable (kV) .....:					---			—
Supplementary information: Different polarity								
Distance 2:								
Working voltage (V) .....:								—
PTI .....:					< 600 ☐ ≥ 600 ☐			—
Pulse voltage or U_P if applicable (kV) .....:								—
Supplementary information: Powered by approved SELV controlgear (Max. 58VDC)								

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

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

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Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:							
Distance 3:							
Working voltage (V) .....:							—
Frequency if applicable (kHz) .....:							—
PTI .....:	< 600 ☐ ≥ 600 ☐						—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) .....:							—
Supplementary information:							

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

1.15 (13.2.1)	TABLE: Ball Pressure Test of Thermoplastics		N
Allowed impression diameter (mm) ..... :		2	—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)
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
LED connector	See Annex 1	10	N	0	P
Supplementary information:					

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

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Clause	Requirement + Test	Result - Remark	Verdict

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

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Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 1	TABLE: Critical components information					P
Object / part No.	**Code**	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Plug	B	Chau's Electrical Co., Ltd.	CE-501S	250 V, 16A, IP20	VDE 0620-2-1	VDE 40006607
Alt.	B	NINGBO XUANHUA ELECTRIC CO. LTD.	XH-03B	250 V, 16A, IP20	VDE 0620-2-1	VDE 40019692
Alt.	B	NINGBO XUANHUA ELECTRIC CO. LTD.	XH-03	250 V, 16A, IP20	VDE 0620-2-1	VDE 40019691
Alt.	B	New Square Company Ltd.	NS-20	250 V, 16A	VDE 0620-2-1	VDE 40012985
Alt.	B	Chau's Electrical Co., Ltd.	BS-01	250 V, 10A	BS 1363 Parts 1-5	BSI KM 41436
Alt.	B	Chau's Electrical Co., Ltd.	XH023A	250 V, 10A	BS 1363-1	Intertek ASTA 952
Alt.	B	Chau's Electrical Co., Ltd.	CE-507	250 V, 10A	VDE 0620-2-1	ESTI S+ 20.0208
Supply cord	B	Shenzhen Lilutong Technology Industry Co., Ltd.	H05VV-F	3x1,5mm^2	EN 50525-2-11	VDE 40043199
Alt.	B	Chau's Electrical Co., Ltd.	H05VV-F	3x1,5mm^2	EN 50525-2-11	VDE 40022055
Alt.	B	NINGBO XUANHUA ELECTRIC CO. LTD.	H05VV-F	3x1,5mm^2	EN 50525-2-11	VDE 40016531
Alt.	B	Ningbo Xuanhua Electric Co., Ltd.	H05VV-F	3x1,5mm^2	EN 50525-2-11	VDE 40047946
Alt.	B	NINGBO XUANHUA ELECTRIC CO. LTD.	H05VV-F	3x1,5mm^2	EN 50525-2-11	VDE 40038850
Alt.	B	Dong Guan Ever United	H05VV-F	3x1,5mm^2	EN 50525-2-21	VDE 098629
External output wire	B	Shenzhen Lilutong Technology	H05VV-F	2x1,5mm^2	EN 50525-2-11	VDE 40043199

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Clause	Requirement + Test	Result - Remark	Verdict

Alt.	B	NINGBO XUANHUA ELECTRIC CO. LTD.	H05VV-F	2x1,5mm^2	EN 50525-2-11	VDE 40016531
Alt.	B	Ningbo Xuanhua Electric Co., Ltd.	H05VV-F	2x1,5mm^2	EN 50525-2-11	VDE 40047946
Alt.	B	NINGBO XUANHUA ELECTRIC CO. LTD.	H05VV-F	2x1,5mm^2	EN 50525-2-11	VDE 40038850
Alt.	B	Dong Guan Ever United	H05VV-F	2x1,5mm^2	EN 50525-2-21	VDE 098629
Alt.	B	Chau's Electrical Co., Ltd.	H05VV-F	2x1,5mm^2	EN 50525-2-11	VDE 40022055
External diming wire	B	DONGGUAN CITY DHE WIRE & CABLE CO LTD	21996	3x22AWG,105°C	EN 61347-1 EN 61347-2-13	UL E343712 + tested with appliance
Alt.	B	GUANGDONG HAERKN NEW ENERGY CO LTD	21996	3x22AWG,105°C	EN 61347-1 EN 61347-2-13	UL E300956 + tested with appliance
Alt.	B	SUZHOU YONGHAO CABLE CO LTD	21996	3x22AWG,105°C	EN 61347-1 EN 61347-2-13	UL E313065+ tested with appliance
Alt.	B	DONGGUAN NISTAR TRANSMITTING TECHNOLOGY CO INC	21996	3x22AWG,105°C	EN 61347-1 EN 61347-2-13	UL E214184+ tested with appliance
Appliance inlet	B	SHENZHEN LILUT ONG CONNECTOR CORP LTD	LLT-M19-20003M2001	20A, 400V	EN 61984	POCE test report No. POCE191224013ACS
Appliance outlet	B	SHENZHEN LILUT ONG CONNECTOR CORP LTD	LLT-M19-20003M3001	20A, 400V	EN 61984	POCE test report No. POCE191224021QCS
Dimming connector	B	SHENZHEN LILUT ONG CONNECTOR CORP LTD	LLT-M12	20A, 400V	EN 61984	ZCT test report No. ZCT1402190B-LVD-01

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Clause	Requirement + Test	Result - Remark	Verdict

LED driver	B	Lumlux Corp	LDP1K0T054HE	Input: 120-240V~ (277V~ for North America), 50/60Hz, Max. 10,3A; Output: 27-54VDC, 19A, Max. 58VDC, 1000W; Independent, SELV, IP65, ta:55°C, tc:90°C	EN 61347-1 EN 61347-2-13	Waltek test report No. WTU20N12097157L
LED connector	C	AVX Ltd	00-9296-001-202-906	100V, 7A min	EN 60598-1 EN 60598-2-1	UL E90723 + tested with appliance
Black plastic cover	C	E I DUPONT DE NEMOURS & CO INC	FR50(+)(f1)	5VA min., RTI 115 ºC	EN 60598-1 EN 60598-2-1	UL E41938 + tested with appliance
White LED	C	LUMILEDS	L130-4080HA30000B1	IF: 480mA; VF: 2,71V; CCT: 4000K	IEC 62471 IEC/TR 62778	Tested with appliance
Red LED	C	OSRAM	GH CSSRM3.24	IF: 700mA; VF: 2,1V	IEC 62471	Tested with appliance
Alt.	C	OSRAM	GH CSSRM4.24	IF: 700mA; VF: 2,0V	IEC 62471	Tested with appliance

Supplementary information:

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

The codes above have the following meaning:

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

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

C - Integrated component tested together with the appliance

D - Alternative component

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

ANNEX 2	TABLE: Thermal tests of Section 12		P
	Type reference ..... :	ZEUS 1000W XTREME PPFD CO2	—
	Lamp used..... :	Integral LED module	—
	Lamp control gear used..... :	LDP1K0T054HE	—
	Mounting position of luminaire ..... :	Acc. to user manual	—
	Supply wattage (W)..... :	983	—
	Supply current (A) ..... :	4,06	—
	Temperatures in test 1 - 4 below are corrected for ta (°C) ..... :	40	—
	- abnormal operating mode ..... :	---	—
1.12 (12.4)	- test 1: rated voltage ..... :	---	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current ..... :	1,06x240V=254,4V	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :	---	—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :	---	—
1.12 (12.5)	- test 4: 1,1 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current ..... :	---	—

Temperature measurements (°C)

Part	Ambient	Cl. 12.4 – normal				Cl. 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Supply cord	40	---	48,4	---	90	---	---
tc	40	---	62,0	---	90	---	---
LED output wire	40	---	50,7	---	90	---	---
Dimming wire	40	---	48,2	---	105	---	---
Metal enclosure	40	---	71,1	---	Ref.	---	---
LED board	40	---	72,0	---	Ref.	---	---
Mounting surface (flammable surface)	40	---	41,5	---	90	---	---
Surface illuminated by lamp(0.1m)	40	---	46,3	---	90	---	---
Supplementary information:							

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

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

ANNEX 3	**Screw terminals (part of the luminaire)**		N
(14)	**SCREW TERMINALS**		N
(14.2)	Type of terminal.....:		—
	Rated current (A).....:		—
(14.3.2.1)	One or more conductors		N
(14.3.2.2)	Special preparation		N
(14.3.2.3)	Terminal size		N
	Cross-sectional area (mm²).....:		—
(14.3.3)	Conductor space (mm).....:		N
(14.4)	Mechanical tests		N
(14.4.1)	Minimum distance		N
(14.4.2)	Cannot slip out		N
(14.4.3)	Special preparation		N
(14.4.4)	Nominal diameter of thread (metric ISO thread).....:	M	N
	External wiring		N
	No soft metal		N
(14.4.5)	Corrosion		N
(14.4.6)	Nominal diameter of thread (mm).....:		N
	Torque (Nm).....:		N
(14.4.7)	Between metal surfaces		N
	Lug terminal		N
	Mantle terminal		N
	Pull test; pull (N).....:		N
(14.4.8)	Without undue damage		N

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

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

(15.6.2.1)	Pull test spring-type terminals or welded connections (4 samples); pull (N) .....:		N
(15.6.2.2)	Pull test pin or tab terminals (4 samples); pull (N) .....:		N
(15.6.3)	Electrical tests		N
	Tests according 15.6.3.1 + 15.6.3.2 in IEC 60598-1		N

(15.6.3.1) (15.6.3.2)	**TABLE: Contact resistance test / Heating tests**									N
	Voltage drop (mV) after 1 h									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Voltage drop of two inseparable joints									
	Voltage drop after 10th alt. 25th cycle									
	Max. allowed voltage drop (mV) .....:									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Voltage drop after 50th alt. 100th cycle									
	Max. allowed voltage drop (mV) .....:									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Continued ageing: voltage drop after 10th alt. 25th cycle									
	Max. allowed voltage drop (mV) .....:									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Continued ageing: voltage drop after 50th alt. 100th cycle									
	Max. allowed voltage drop (mV) .....:									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
Supplementary information:										

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EU Group Differences			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 5	**CENELEC COMMON MODIFICATIONS (EN 60598-1:2015+A1:2018 and EN 60598-2-1:1989)**	**P**

1.5 (3)	MARKING		N
1.5 (3.3.101)	For luminaires not supplied with terminal block: Adequate warning on the package		N

1.6 (4)	CONSTRUCTION		N
1.6 (4.11.6)	Electro-mechanical contact systems		N

1.10 (5)	EXTERNAL AND INTERNAL WIRING		P
1.10 (5.2.1)	Connecting leads		N
	- without a means for connection to the supply		N
	- terminal block specified		N
	- relevant information provided		N
	- compliance with 4.6, 4.7.1, 4.7.2, 4.10.1, 11.2, 12 and 13.2 of Part 1		N
1.10 (5.2.2)	Cables equal to EN 50525		P
	Replace table 5.1 – Supply cord		P

1.12 (12)	ENDURANCE TESTS AND THERMAL TESTS		P
1.12 (12.4.2c)	Thermal test (normal operation) see footnote c to table 12.2 relating to unsleeved fixed wiring		P

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

ZC	ANNEX ZC, NATIONAL DEVIATIONS (EN)		N
(4 & 5)	FR: Shuttered socket-outlets 10/16A		N

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

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EN IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 6	**LED modules for general lighting – Safety specifications** **EN IEC 62031:2020**	**P**

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

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

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EN IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	- marking of other applicable items in 6.2 on the modules or in data sheet, leaflet or website		N
6.5	**Marking of integral LED modules**		**P**
	- information in 6.2 a) to g) in data sheet, leaflet or website		P
6.6	**Durable and legibility of marking**		**P**
	- marking on the LED module legible after test with water		P
	- marking not on the LED module legible		N
7	**TERMINALS**		**N**
7.1	**Integral terminals**		**N**
	Screw terminals comply with section 14 of IEC 60598-1	(see Annex 3)	N
	Screwless terminals comply with section 15 of IEC 60598-1	(see Annex 4)	N
7.2	**Terminals other than integral terminals**		**N**
	Separately approved; component list	(see Annex 2)	N
	Ratings suit the conditions		N
	Satisfy additional relevant requirements of this standard		N
8 (9)	**EARTHING**		**N**
- (9.1)	**Provisions for protective earthing**		**N**
	Terminal complying with clause 8		N
	Locked against loosening and not possible to loosen by hand		N
	Not possible to loosen clamping means unintentionally on screwless terminals		N
	Earthing via means of fixing		N
	Earthing terminal only used for the earthing of the control gear		N
	All parts of material minimizing the danger of electrolytic corrosion		N
	Made of brass or equivalent material		N
	Contact surface bare metal		N
	Test according 7.2.3 of IEC 60598-1		N
- (9.2)	**Provision for functional earthing**		**N**

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EN IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	Comply with clause 8 and 9.1		N
	Functional earth insulated from live parts by double or reinforced insulation		N
- (9.3)	**Lamp controlgear with conductors for protective earthing by tracks on printed circuit board**		**N**
	Test with a current of 25 A between earthing terminal and each of the accessible metal parts; measured resistance (Ω) at ≥ 10 A according 7.2.3 of IEC 60598-1: < 0,5 Ω .....:		N
- (9.4)	**Earthing of built-in lamp controlgear**		**N**
	Earth by means of fixing to earthed metal of luminaire in compliance of 7.2 of IEC 60598-1		N
	Earthing terminal only for earthing the built-in controlgear		N
- (9.5)	**Earthing via independent controlgear**		**N**
- (9.5.1)	Earth connection to other equipment		N
	Looping or through connection, conductor min. 1,5 mm² and of copper or equivalent		N
	Protective earthing wires in line with 5.3.1.1 and clause 7		N
- (9.5.2)	Earthing of the lamp compartments powered via the independent lamp controlgear		N
	Test with a current of 25 A between input and output earth terminals; measured resistance (Ω) between earthing terminal and each of the accessible metal parts at ≥ 10 A according 7.2.3 of IEC 60598-1: < 0,5 Ω .....:		N
	Output earthing terminal marked as in 7.1 t) of IEC 61347-1		N

9 (10)	**PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS**		**N**
- (10.1)	Controlgear protected against accidental contact with live parts		N
- (A2)	Voltage measured with 50 kΩ	(see Annex A)	N
- (A3)	Voltage > 35 V peak or > 60 V d.c. or protective impendance device	(see Annex A)	N
- (10.1)	Lacquer or enamel not used for protection or insulation		N
	Adequate mechanical strength on parts providing protection		N
- (10.2)	Capacitors > 0,5 μF: voltage after 1 min (V): < 50 V .....:		N

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EN IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
- (10.3)	Controlgear providing SELV		N
	Accessible conductive parts are insulated from live parts by double or reinforced insulation in SELV controlgear		N
	No connection between output circuit and the body or protective earthing circuit		N
	No possibility of connection between output circuit and the body or protective earthing circuit through other conductive parts		N
	SELV outputs separated from earth by at least basic insulation		N
	ELV conductive parts insulated as live parts		N
	Tests according Annex L of IEC 61347-1		N
- (10.4)	Accessible conductive parts in SELV circuits		N
	Output voltage under load ≤ 25 V r.m.s. or ≤ 60 V d.c.		N
	If output voltage > 25 V r.m.s. or > 60 V d.c.; No load output ≤ 35 V peak or ≤ 60 V d.c and touch current does not exceed 0,7 mA (peak) or 2 mA d.c. .....:		N
	One conductive part is insulated if output voltage or current exceeding the values above and withstand test voltage 500 V		N
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		N
	Y1 or Y2 capacitors comply with IEC 60384-14		N
	Resistors comply with test (a) in 14.1 of IEC 60065		N
10 (11)	**MOISTURE RESISTANCE AND INSULATION**		**P**
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (MΩ):		P
	For basic insulation ≥ 2 MΩ .....:	>100MΩ	P
	For double or reinforced insulation ≥ 4 MΩ .....:		N
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		N

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EN IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

11 (12)	**ELECTRIC STRENGTH**		**P**
	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V	500V	P
	Working voltage ≤ 50 V, test voltage 500 V		N
	Working voltage > 50 V ≤ 1000 V, test voltage (V):		N
	Basic insulation, 2U + 1000 V		N
	Supplementary insulation, 2U + 1000 V		N
	Double or reinforced insulation, 4U + 2000 V		N
	No flashover or breakdown		P
	Solid or thin sheet insulation for double or reinforced insulation fulfil the requirements in Annex N in IEC 61347-1		N

12 (14)	**FAULT CONDITIONS**		**P**
- (14.1)	When operated under fault conditions the controlgear:		P
	- does not emit flames or molten material		P
	- does not produce flammable gases		P
	- protection against accidental contact not impaired		P
	Thermally protected controlgear does not exceed the marked temperature value		N
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected	(see appended table)	P
- (14.2)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (after any reduction in 14.2 - 14.5)	(see appended table)	N
- (14.3)	Short-circuit or interruption of semiconductor devices	(see appended table)	P
- (14.4)	Short-circuit across insulation consisting of lacquer, enamel or textile	(see appended table)	N
- (14.5)	Short-circuit across electrolytic capacitors	(see appended table)	N
	Short-circuit or interruption of SPDs	(see appended table)	N
- (14.6)	After the tests has been carried out on three samples:		P
	The insulation resistance ≥ 1 MΩ .....:	>100MΩ	P
	No flammable gases		P
	No accessible parts have become live		P

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EN IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
- (14.7)	Relevant fault condition tests with high-power a.c. supply and in turn to a d.c. supply		—
12.2	**Overpower condition**		**P**
	Module withstands overpower condition >15 min.		P
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		N
	No fire, smoke or flammable gas is produced		P
	Molten material does not ignite tissue paper, spread below the module		P
14 (15)	**CONSTRUCTION**		**P**
- (15.1)	**Wood, cotton, silk, paper and similar fibrous material**		**P**
	Wood, cotton, silk, paper and similar fibrous material not used as insulation		P
- (15.2)	**Printed circuits**		**P**
	Printed circuits used as internal connections complies with clause 14		P
15 (16)	**CREEPAGE DISTANCES AND CLEARANCES**		**P**
- (16.1)	**General**		P
	Creepage distances and clearances according to 16.2 and 16.3		P
	Controlgears providing SELV comply with additional requirements in Annex L		N
	Insulating lining of metallic enclosures		N
	Controlgear protected against pollution comply with Annex P		N
- (16.2)	**Creepage distances**		P
- (16.2.2)	Minimum creepage distances for working voltages		P
	Creepage distances according to Table 7	(see appended table)	P
- (16.2.3)	Creepage distances for working voltages with frequencies above 30 kHz		N
	Creepage distances according to Table 8	(see appended table)	N
- (16.3)	**Clearances**		P
- (16.3.2)	Clearances for working voltages		P
	Clearances distances according to Table 9	(see appended table)	P
- (16.3.3)	Clearances for ignition voltages and working voltages with higher frequencies		N

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EN IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	Clearances distances for basic or supplementary insulation according to Table 10		N
	Clearances distances for reinforced insulation according to Table 11		N
16 (17)	**SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS**		**P**
	Screws, current-carrying parts and connections in compliance with IEC 60598-1 (clause numbers between parentheses refer to IEC 60598-1)		—
(4.11)	**Electrical connections**		**P**
(4.11.1)	Contact pressure		P
(4.11.2)	Screws:		N
	- self-tapping screws		N
	- thread-cutting screws		N
(4.11.3)	Screw locking:		N
	- spring washer		N
	- rivets		N
(4.11.4)	Material of current-carrying parts		P
(4.11.5)	No contact to wood or mounting surface		P
(4.11.6)	Electro-mechanical contact systems		N
(4.12)	**Mechanical connections and glands**		**N**
(4.12.1)	Screws not made of soft metal		N
	Screws of insulating material		N
	Torque test: torque (Nm); part ..... :		N
	Torque test: torque (Nm); part ..... :		N
	Torque test: torque (Nm); part ..... :		N
(4.12.2)	Screws with diameter < 3 mm screwed into metal		N
(4.12.4)	Locked connections:		N
	- fixed arms; torque (Nm)..... :		N
	- lampholder; torque (Nm)..... :		N
	- push-button switches; torque 0,8 Nm ..... :		N
(4.12.5)	Screwed glands; force (Nm) ..... :		N
17 (18)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		**N**
- (18.1)	Ball-pressure test ..... :	See Test Table 17 (18.1)	N
- (18.2)	Test of printed boards ..... :	See Test Table 17 (18.2)	N
- (18.3)	Glow-wire test (650°C) ..... :	See Test Table 17 (18.3)	N

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EN IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
- (18.4)	Needle-flame test (10 s) ..... :	See Test Table 17 (18.4)	N
- (18.5)	Proof tracking test ..... :	See Test Table 17 (18.5)	N
18	**RESISTANCE TO CORROSION**		**N**
	Comply with requirements according 4.18 of IEC 60598-1		N
20	**HEAT MANAGEMENT**		**N**
20.1	**General**		**N**
	Fulfil clause 20 if replaceable LED module and when heat conducting thermal interface is needed.		N
20.2	**Thermal interface material**		**N**
	Thermal interface material delivered with the module if necessary		N
20.3	**Heat protection**		**N**
	Not impair safety when operated under poor heat-conduction conditions according Annex D		N
22	**PHOTOBIOLOGICAL SAFETY**		**P**
22.1	**UV radiation**		**N**
	Luminous radiation not exceed 2mW/klm		N
22.2	**Blue light hazard**		**P**
	Assessed according to IEC TR 62778	RG1 Unlimited	P
22.3	**Infrared radiation**		**N**
	Requirements for infrared radiation when required		N
A	**ANNEX A - TESTS**		**P**
	All tests performed in accordance with the advice given in Annex H of IEC 61347-1, if applicable		P
12 (14)	**TABLE: tests of fault conditions**		**P**
Part	**Simulated fault**		**Hazard**
One LED	SC: 240V, 4,372A, 1006W. Three LED grains are not bright.		~~YES~~/NO
One LED	OC: 240V, 4,386A, 1009W. One LED grain is not bright.		~~YES~~/NO

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EN 62471			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 7	Photobiological safety evaluated according to standard EN 62471:2006	P

Emission limits for risk groups of continous wave lamps — P

Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	---	---	---	---	---
Near UV	---	E_{UVA}	$W \cdot m^{-2}$	0,33	---	---	---	---	---
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	5,707e1	10000	---	4000000	---
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	0,01*	---	1,0	---	400	---
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	7,028e2	28000/α	---	71000/α	---
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 0,0017≤ α ≤ 0,011	---				
				6000/α 0,011≤ α ≤ 0,1	---				
IR radiation, eye	---	E_{IR}	$W \cdot m^{-2}$	100	---	570	---	3200	---

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

Assessment:

Lamp classification group ☒ Exempt ☐ Low risk ☐ Mod risk

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

Photo Documentation

Model: ZEUS 1000W XTREME PPFD CO2

Photo 1

Description: Over view.

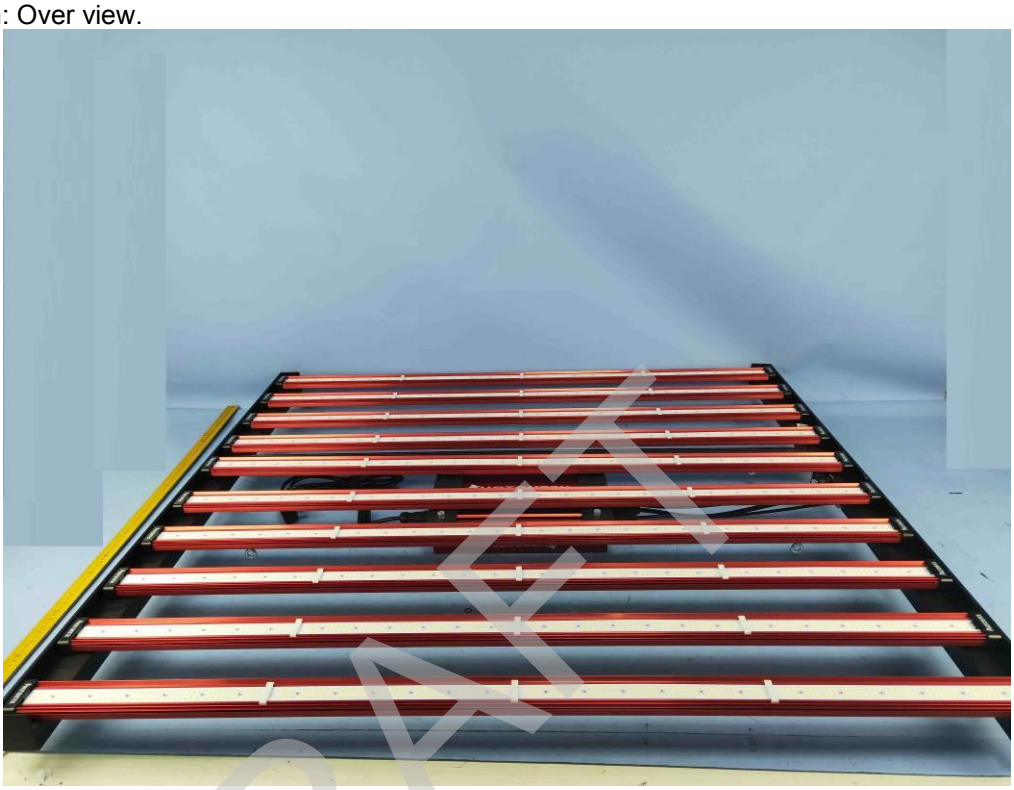

Photo 2

Description: Rear view 1

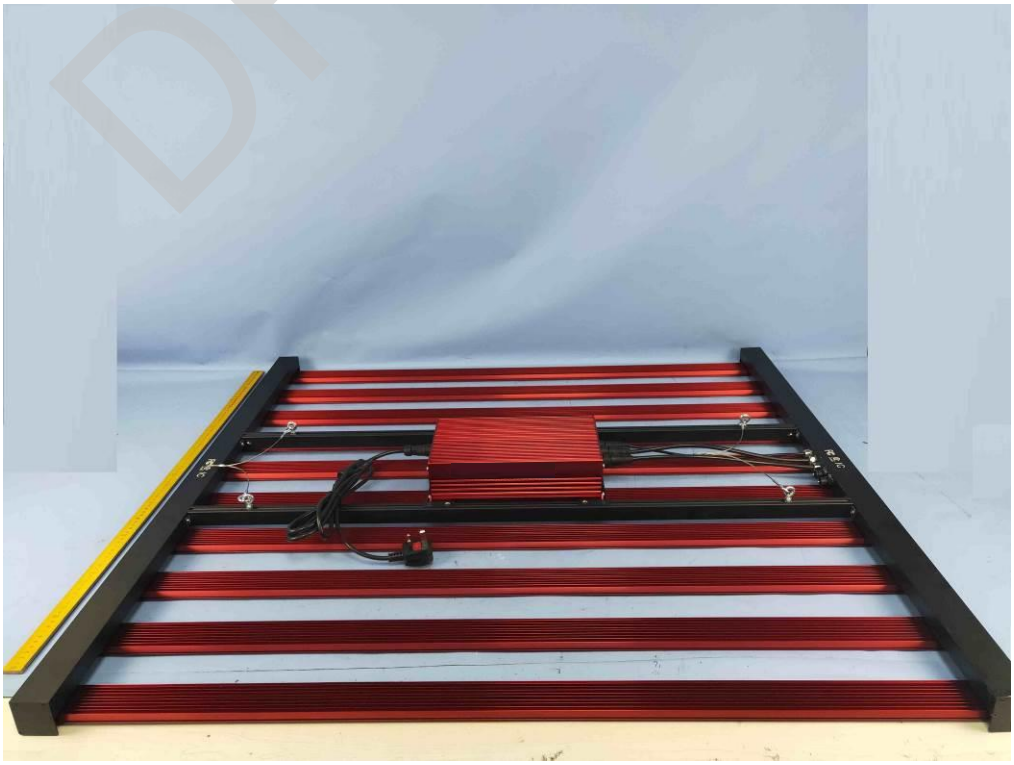

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Photo Documentation

Photo 3

Description: Rear view 2

Photo 4

Description: LED board--magnetically mounted

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Photo Documentation

Photo 5

Description: LED board.

Photo 6

Description: LED board.

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Photo Documentation

Photo 7

Description: LED board – covered with transparent glue

Photo 8

Description: LED driver

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