TEST REPORT

IEC 60598-2-2

Luminaires - Part 2: Particular requirements

Section 2 - Recessed luminaires

Report reference No.	LCS1602270656S
Tested by(name + signature)	Stone Yang
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Contents	39 pages

Testing laboratory	
Name	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China
Testing location	Same as above
Client	
Name	ECO ENGINEERING AND ENERGY SOLUTIONS
Address	AMMAN-JORDAN
Manufacturer	
Name	Shanghai Wellmax Lighting Industry Co., Ltd.
Address	10F, No.26 Building, No.1000 Jinhai Road, Pudong, Shanghai, China
Test specification	
Standard	IEC 60598-2-2: 2011; IEC 60598-1: 2014; IEC 62031: 2008+A1: 2012; IEC 62493: 2009
Test procedure	Compliance with IEC 60598-2-2: 2011; IEC 60598-1: 2014; IEC 62031: 2008+A1: 2012; IEC 62493: 2009
Non-standard test method	N/A
Test item Description	LED PANEL 40W
Trademark	ECO LIGHTING
Model and/or type reference	LED PANEL 40W
Rating(s)	220-240V~, 50/60Hz, 40W

Test item particulars

Classification of installation and use ……..: Class II

Supply Connection ……...: Connector

Test case verdicts

Test case does not apply to the test object…: N(N/A)

Test item does meet the requirement ……: P(Pass)

Test item does not meet the requirement ….: F(Fail)

Testing

Date of receipt of test item……: February 16, 2016

Date(s) of performance of test……: February 16, 2016 – March 01, 2016

General remarks

This report shall not be reproduced except in full without the written approval of the testing laboratory.

The test results presented in this report relate only to the item tested.

Clause numbers between brackets refer to clauses in IEC 60598-1.

"(see remark #)" refers to a remark appended to the report.

"(see Annex #)" refers to an annex appended to the report.

Throughout this report a comma is used as the decimal separator.

General product information

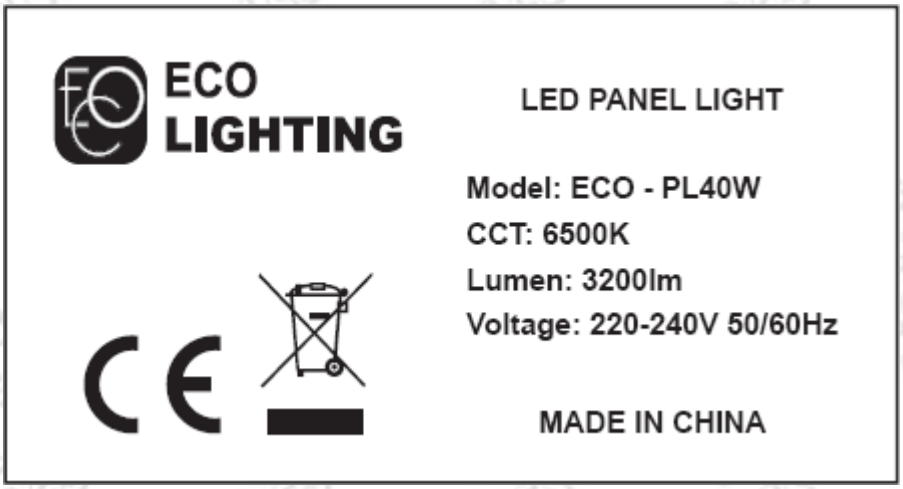
1, All tests were conducted on model LED PANEL 40W.

2, The max. ambient temperature is 45℃.

3, The test report include: Attachment No. 1: Report of IEC 62031.

Attachment No. 2: 2 pages of product photos.

Copy of marking plate



Label testing

Rubbing for 15 s with a piece of cloth soaked with water. And a further 15 s with a piece of cloth soaked with petroleum.

IEC 60598-2-2			
Clause	Requirement - Test	Result - Remark	Verdict
2.1 (0)	**SCOPE (GENERAL INTRODUCTION)**		**P**
2.1 (0.1)	Scope		--
	Information for luminaires design considered	Yes [√] No [ ]	P
	Supply voltage	220-240V~	P
2.1 (0.2)	Normative references		--
2.3 (0.3)	**GENERAL REQUIREMENTS**		**P**
2.3 (0.4)	General test requirements and verification		P
2.4 (1)	**TERMS AND DEFINITIONS**		**P**
2.5 (2)	**CLASSIFICATION**		**P**
2.5 (2.1)	General		--
2.5 (2.2)	Type of protection .....:	Class II	P
2.5 (2.3)	Degree of protection .....:	IP20	P
2.5 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces ……..:	Yes	P
	Luminaire not suitable for direct mounting on normally flammable surfaces ……..:	No	N
2.5 (2.5)	Luminaire for normal use .....:	Yes	P
	Luminaire for rough service .....:	No	N
2.6 (3)	**MARKING**		**P**
2.6 (3.1)	General		--
2.6 (3.2)	Markings on luminaires	See marking label	P
	a)Marking to be observed when replacing lamps or other replaceable components		N
	b)Marking to be observed during installation	The height of symbols more than 5mm, text more than 2mm	P
	c)Marking to be observed after installation		N
	Format of symbols/text	The height of symbols more than 5mm, except for symbols for class II and class III classification minimum of 3 mm, and symbols of not suitable for direct mounting on normally flammable surfaces minimum 25mm; text more than 2mm	P

IEC 60598-2-2			
Clause	Requirement - Test	Result - Remark	Verdict
2.6 (3.3)	Additional information		P
	Language of instructions	In official language	P
2.6 (3.3.1)	Combination luminaires	Not combination luminaire	N
2.6 (3.3.2)	Nominal frequency in Hz		N
2.6 (3.3.3)	Operating temperature	Operating temperature is 45℃	P
2.6 (3.3.4)	Symbol or warning notice		N
2.6 (3.3.5)	Wiring diagram	See the manual	P
2.6 (3.3.6)	Special conditions	No such special conditions	N
2.6 (3.3.7)	Metal halid lamp luminaire – warning		N
2.6 (3.3.8)	Limitation for semi-luminaires		N
2.6 (3.3.9)	Power factor and supply current for supply information		N
2.6 (3.3.10)	Suitability for use indoors		P
2.6 (3.3.11)	Luminaires with remote control	Not such construction	N
2.6 (3.3.12)	Clip-mounted luminaire - warning		N
2.6 (3.3.13)	Specifications of protective shields		N
2.6 (3.3.14)	Symbol for nature of supply	~	P
2.6 (3.3.15)	Rated current of socket outlet	No socket outlet	N
2.6 (3.3.16)	Rough service luminaire	Normal service luminaire	N
2.6 (3.3.17)	Mounting instruction for type Y, Type Z and some type X attachments	Type Y	P
2.6 (3.3.18)	Non-ordinary luminaires with PVC cable		N
2.6 (3.3.19)	Protective conductor current in instruction if applicable		N
2.6 (3.3.20)	Provided with information if not intended to be mounted within arms reach		N
2.6 (3.3.21)	Luminaires with non replaceable and non-user replaceable light source		N
2.6 (3.3.22)	Controllable luminaires		N
2.6 (3.4)	Test with water and petroleum spirit	15s	P
	Legible after test	Labels still be legible, marking labels not be easily removable and no curling.	P
2.7 (4)	**CONSTRUCTION**		**P**
2.7 (4.1)	General		--
2.7 (4.2)	Components replaceable without difficulty		P

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Clause	Requirement - Test	Result - Remark	Verdict
2.7 (4.3)	Wireways smooth and free from sharp edges		P
2.7 (4.4)	Lampholders	No lampholder	N
2.7 (4.4.1)	Integral lampholder		N
2.7 (4.4.2)	Wiring connection		N
2.7 (4.4.3)	Lampholder for end-to-end mounting	No such lampholder	N
2.7 (4.4.4)	Positioning		N
	Lampholders for a fluorescent lamp		N
	- pressure test (N)……..:		N
	After test the lampholder comply with relevant standard sheets and show no damage		N
	After test on signal-capped lampholder the lampholder have not moved form its position and show no permanent deformation		N
	Edison screw or bayonet-capped lampholders		N
	- bending test (Nm)……:		N
	After test the lamholder have not moved from its position and show no permanent deformation		N
2.7 (4.4.5)	Luminaires with ignitor	Not ignitor	N
2.7 (4.4.6)	Centre contact	Not ignitor	N
2.7 (4.4.7)	Parts in rough service luminaires resistant to tracking	Not for rough service	N
2.7 (4.4.8)	Lamp connectors	No lamp connector	N
2.7 (4.4.9)	Caps and bases correctly used		N
2.7 (4.4.10)	Lampholder or connector according to IEC60061		N
2.7 (4.5)	Starter holders	No such parts	N
	Starter holder in luminaries other than Class II		N
	Starter holder Class II construction		N
2.7 (4.6)	Terminal blocks		N
	Tails		N
	Unsecured blocks		N
2.7 (4.7)	Terminals and supply connections		P
	Luminaries type		N

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Clause	Requirement - Test	Result - Remark	Verdict
2.7 (4.7.1)	Taken to prevent metal parts from becoming live due to a detached wire or screw		N
2.7 (4.7.2)	Supply terminals		N
	8 mm test live conductor		N
2.7 (4.7.3)	Terminals for supply cords		N
2.7 (4.7.3.1)	Welding method and material		N
	- stranded or solid wire of copper materials		N
	- spot welding		N
	- welding of wire and plate		N
	- welded connectionsare used in type Z attachments only		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
2.7 (4.7.4)	Terminals other than supply connection		N
	- comply with the requirements of Sections 14 and 15		N
2.7 (4.7.5)	Heat-resistant wiring/sleeves	The external wiring or supply cord is unsuitable for the temperatures reached inside the luminaire	N
2.7 (4.7.6)	Multi-pole plug and socket		N
	- test at 30 N		N
2.7 (4.8)	Switches:		N
	- adequate rating		N
	- adequate fixing		N
	- degree of protection		N
	- polarized supply		N
	- compliance with 61058-1 for electronic switches		N
2.7 (4.9)	Insulating lining and sleeves		N
2.7 (4.9.1)	Reliably retained in position		N
2.7 (4.9.2)	Adequate mechanical, electrical and thermal strength		N
	Resistant to temperature >20℃ to the wire temperature or		N
	a) & c) insulation resistance and electric		N

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Clause	Requirement - Test	Result - Remark	Verdict
	strength		
	b)roast test. Temperature (℃)		N
2.7 (4.10)	Insulation of Class II luminaires		P
2.7 (4.10.1)	No contact, mounting surface - accessible metal parts - wiring of basic insulation		P
	Safe installation fixed luminaires		P
	Capacitors and switches		N
	Interference suppression capacitors according to IEC 60384-14and their connection accordance with 8.6 of IEC60065:2001		N
2.7 (4.10.2)	Assembly gaps:		N
	- not coincidental		N
	- no straight access with test probe		N
2.7 (4.10.3)	Supplementary insulation or reinforced insulation:		N
	- fixed		N
	- unable to be replaced; luminaire inoperative		N
	- sleeves retained in position		N
	- lining in lampholder		N
2.7 (4.10.4)	Protective impedance device		N
	Y1, Y2 capacitors according to IEC 60384-14and their connection accordance with 8.6 of IEC60065		N
2.7 (4.11)	Electrical connections and current-carrying parts		P
2.7 (4.11.1)	Contact pressure		P
2.7 (4.11.2)	Screws:		P
	- Self-tapping screws		P
	- thread-cutting screws		N
2.7 (4.11.3)	Screw locking:		N
	- spring washer		N
	- rivets		N
2.7 (4.11.4)	Material of current-carrying parts	> 50% copper	P
2.7 (4.11.5)	No contact to wood or mounting surface	No wood	P
2.7 (4.11.6)	Electro-mechanical contact systems		P
	-test		P
2.7 (4.12)	Screws and connections (mechanical) and		N

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Clause	Requirement - Test	Result - Remark	Verdict
	glands		
2.7 (4.12.1)	Screw not made of soft metal		P
	Screws made of insulating material	Impair supplementary or reinforced insulation if replacement by a metal screw	N
	Screws used to provide earthing continuity		N
	Fixing screws for ballasts and other components	at least one screw retaining the ballast will have a mechanical and electrical function.	N
	- not considered to be maintenance		N
	Screws of insulating material used in cord anchorages		N
	Torque test: torque (Nm); part ……..…:	Fixed enclosure: 0.6Nm	P
	Torque test: torque (Nm); part ……..…:	Fixed driver: 0.5Nm	P
	Torque test: torque (Nm); part ……..…:		N
2.7 (4.12.2)	Screws transmitting contact pressure and screws		N
	Screw with diameter < 3 mm screw into metal		P
2.7 (4.12.3)	Not used		--
2.7 (4.12.4)	Screwed and other fixed connections between different parts of luminaires		N
	- locked connections; torque (Nm) .....:		N
	- locked lampholder during lamp replacement; torque (Nm) .....:		N
	- push-button switches; torque (Nm) .....:	No such switches	N
2.7 (4.12.5)	Screwed glands; force (N) .....:		N
2.7 (4.13)	Mechanical strength		P
2.7 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm) .....:	0.2Nm, no damage	P
	- other parts; energy (Nm) .....:	0.35Nm, no damage	P
	1) live parts not have become accessible		P
	2) effectiveness of insulating linings and barriers not have been impaired		P
	3) degree of protection	IP20	P
	4) possible to remove and to replace external covers		N
2.7 (4.13.2)	Metal parts enclosing live parts have adequate mechanical strength		P

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Clause	Requirement - Test	Result - Remark	Verdict
2.7 (4.13.3)	Straight test finger with a force of 30 N	metal parts not touch live parts, not be excessively deformed and continue to meet the requirements of Section 11	P
2.7 (4.13.4)	Rough service luminaires	Normal service luminaires	N
	IP 54 or higher		N
	a) fixed rough service luminaires and portable rough service luminaires (not hand-held)		N
	b) hand-held luminaires		N
	c) luminaires delivered with a stand		N
	d) luminaires for temporary installations and suitable for mounting on a stand		N
2.7 (4.13.5)	Not used		--
2.7 (4.13.6)	Plug-ballast/transformers and mains socket-outlet-mounted luminaires		N
	Tumbling barrel test		N
	- sample does not exceed 250 g	50 times	N
	- sample exceeds 250 g	25 times	N
2.7 (4.14)	Suspensions, fixings and means of adjustment		N
2.7 (4.14.1)	Adequate factors of safety		P
	Test A) four times the weight.....:	4x2.72Kg	P
	- suspended or fixed luminaire		N
	- external parts fixed to the luminaire		N
	Test B) for rigid suspension luminaires: torque 2.5 Nm.....:		N
	Test C) for rigid suspension brackets: bracket arm; force (N) .....:		N
	a) for heavy-duty brackets		N
	b) for light-duty brackets	10N for support translucent cover	N
	D) for load track-mounted luminaires		N
	E) for clip-mounted luminaires:		N
2.7 (4.14.2)	Load to flexible cables:	No flexible cable	N
	mass (kg) .....:		N
	stress in conductors (N/mm²) .....:		N
	Mass (kg) of semi-luminaires .....:		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Bending moment (Nm) of semi-luminaires :		N
2.7 (4.14.3)	Adjusting devices:	No adjusting devices	N
	a) adjusting devices and means of adjustment		N
	- flexing test; number of cycles .....:		N
	- not more than 50 % of the strands in a conductor are broken		N
	- insulation resistance and high-voltage tests afterwards		N
	b) luminaires with a means of adjustment intended to be installed within arm's reach		N
	c) luminaires intended to be mounted within arm's reach		N
2.7 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors	No such tubes	N
2.7 (4.14.5)	Guide pulleys	No such construction	N
2.7 (4.14.6)	Plug-ballast/transformers and mains socket-outlet-mounted luminaires	Not such unit	N
2.7 (4.15)	Flammable materials:		P
	- glow-wire test 650℃		P
	- spacing ≥ 30 mm		N
	- screen withstanding test of 13.3.1		N
	- screen dimensions	Spacing from heated parts min 3mm	N
	- no fiercely burning material		N
	- thermal protection		N
	- electronic circuits exempted		N
2.7 (4.15.2)	Luminaires made of thermoplastic material		N
	a) construction		N
	b) temperature sensing control		N
	c) surface temperature		N
2.7 (4.16)	Luminaires for mounting on normally flammable surfaces		P
	Lamp control gear		N
2.7 (4.16.1)	Lamp control gear shall spacing:		N
	- spacing 10 mm		N
	- spacing 35 mm		N
2.7 (4.16.2)	Thermal protection:	No such component	N
	- external		N

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Clause	Requirement - Test	Result - Remark	Verdict
	-fixed position		N
	- class P" thermally protected ballast/transformer,		N
	- temperature declared thermally protected ballast/transformer,		N
2.7 (4.16.3)	Design to satisfy the test of 12.6		N
2.7 (4.17)	Drain holes	No drain holes	N
	Clearance at least 5 mm		N
2.7 (4.18)	Resistance to corrosion:		N
2.7 (4.18.1)	- more than IPX1 luminaires		N
2.7 (4.18.2)	- season cracking in copper		N
2.7 (4.18.3)	- corrosion of aluminium		N
2.7 (4.19)	Ignitors	No ignitors used	N
2.7 (4.20)	Rough service vibration .....:	No such appliance	N
2.7 (4.21)	Protective shield		N
2.7 (4.21.1)	Shield fitted		N
	Shield of glass if tungsten halogen lamps		N
2.7 (4.21.2)	Particles from a shattering lamp not impair safety		N
2.7 (4.21.3)	No direct path		N
2.7 (4.21.4)	Impact test on shield		N
	Glow-wire test on lamp compartment		N
2.7 (4.22)	Attachments to lamps		N
2.7 (4.23)	Semi-luminaires comply with Class II	No semi-luminaires	N
2.7 (4.24)	Photobiological hazards		N
2.7 (4.24.1)	UV radiation		N
2.7 (4.24.2)	Retinal blue light hazard		N
2.7 (4.25)	Mechanical hazard	No sharp points or edges	P
2.7 (4.26)	Short-circuit protection		N
2.7 (4.26.1)	uninsulated accessible SELV parts		N
2.7 (4.26.2)	Short circuit test		N
2.7 (4.26.3)	Test chain according to figure 29		N
2.7 (4.27)	Terminal blocks with integrated screwless earthing contacts		N
2.7 (4.28)	Fixing of thermal sensing controls		N
2.7 (4.29)	Luminaire with non replaceable light source		N
2.7 (4.30)	Luminaires with non-user replaceable light		N

IEC 60598-2-2			
Clause	Requirement - Test	Result - Remark	Verdict
	sources		
2.7 (4.31)	Insulation between circuits		N
2.7 (4.31.1)	SELV circuits		N
2.7 (4.31.2)	FELV circuits		N
2.7 (4.31.3)	Other circuits		N
2.7 (4.32)	Overvoltage protective devices		N
2.8 (11)	**CREEPAGE DISTANCES AND CLEARANCES**		**P**
	Working voltage (V) .....:	220-240V~	P
	Voltage form	Sinusoidal [√] Non-sinusoidal [ ]	P
	PTI	< 600 [√] ≥ 600 [ ]	P
	Impusle withstand category (normal category II) (category III annex U)		
	Rated pulse voltage (kV) .....:		N
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm) .....:	LED Driver: CE Approve LED module: Class III Parts	P
	(2) Current-carrying parts and accessible parts: cr (mm); cl (mm) .....:	LED Driver: CE Approve LED module: Class III Parts	P
	(3) Parts becoming live due to breakdown of basic insulation and metal parts: cr (mm); cl (mm) .....:		N
	(4) Outer surface of cable where it is clamp and metal parts: cr (mm); cl (mm) .....:		N
	(5)not used		N
	(6) Current-carrying parts and supporting surface: cr (mm); cl (mm) .....:	LED Driver: CE Approve LED module: Class III Parts	P
2.9 (7)	**PROVISION FOR EARTHING**		**N**
2.9 (7.2.1 + 7.2.3)	Accessible Metal parts		N
	metal parts in contact with supporting surface		N
	Resistance < 0.5 Ω		N
	Self-tapping screws used		N
	Thread-forming screws		N
	Thread-forming screws used in a grove		N
	Earth marks contact first		N

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Clause	Requirement - Test	Result - Remark	Verdict
2.9 (7.2.2 +7.2.3)	Earth continuity in joints etc.		N
2.9 (7.2.4)	Locking of clamping means		N
	Compliance with 4.7.3		N
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N
2.9 (7.2.5)	Earth terminal integral part of Connector socket		N
2.9 (7.2.6)	Earth terminal adjacent to mains terminals		N
2.9 (7.2.7)	Electrolytic corrosion of the earth terminal		N
2.9 (7.2.8)	Material of earth terminal		N
	Contact surface bare metal		N
2.9 (7.2.10)	Class II luminaire for looping-in		N
	Double or reinforced insulation to functional earth		N
2.9 (7.2.11)	Earthing core coloured green-yellow		N
	Length of earth conductor		N
2.10 (14)	**SCREW TERMINALS**		**N**
	Separately approved: component list	See annex 1	N
	Part of the luminaire		N
2.10 (15)	**SCREWLESS TERMINALS and electrical connections**		**N**
	Separately approved: component list	See annex 1	N
	Part of the luminaire		N
2.11 (5)	**EXTERNAL AND INTERNAL WIRING**		P
2.11 (5.2)	Supply connection and other external wiring		P
2.11 (5.2.1)	Means of connection.....:	Connector	P
2.11 (5.2.2)	Type of supply cord.....:	2X0.75mm²	P
	Nominal cross-section area (mm^2)		P
	Cables equal to IEC 60227 and IEC 60245		P
2.11 (5.2.3)	Type of attachment, X ,Y or Z		P
2.11 (5.2.5)	Type Z not connected to screws		N
2.11 (5.2.6)	Cable entries		P
	- suitable for introduction		P
	- adequate degree of protection		P

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Clause	Requirement - Test	Result - Remark	Verdict
2.11 (5.2.7)	Cable entries through rigid material have rounded edges	Not cable entries	N
2.11 (5.2.8)	Insulating bushings in class II luminaires, in settable and adjustable luminaires or in portable luminaires other than those for wall mounting:		N
	- suitably fixed		N
	- material in bushings		N
	- material not likely to deteriorate		N
	- tubes or guard made of insulating material		N
2.11 (5.2.9)	Bushing locking of screw bushings	No such component	N
2.11 (5.2.10)	Cord anchorage:		P
	- covering protected from abrasion		P
	- clear how to be effective		P
	- no mechanical or thermal stress		N
	- no tying of cables into knots etc.		P
	- insulating material or lining		P
2.11 (5.2.10.1)	Cord anchorage for type X attachment cord		N
	a) at least one part fixed		N
	b) types of cable		N
	c) no damaging of the cable		N
	d) whole cable can be mounted		N
	e) no touching of clamping screws		N
	f) metal screw not directly on cable		N
	g) replacement without special tool		N
	Glands not used as anchorage		N
	Labyrinth type anchorage		N
2.11 (5.2.10.2)	Adequate cord anchorages for type Y and type Z attachments		P
2.11 (5.2.10.3)	Tests:		P
	- impossible to push cable; unsafe		N
	- pull test: 25 times; pull (N)	60N	P
	- torque test: torque (Nm)		P
	- displacement ≤ 2 mm	1.2mm	P
	- no movement of conductors		P
	- no damage of cable or cord		P
2.11 (5.2.11)	External wiring passing into luminaire		P

IEC 60598-2-2			
Clause	Requirement - Test	Result - Remark	Verdict
2.11 (5.2.12)	Looping-in terminals	Not looping-in appliance	N
2.11 (5.2.13)	Wire ends not tinned		N
	Wire ends tinned: no cold flow		P
2.11 (5.2.14)	Mains plug same protection	Not plug	N
	Class III luminaire plug		N
2.11 (5.2.16)	Appliance inlets (IEC 60320)	No appliance inlet	N
	Appliance couplers of class II type		N
2.11 (5.2.17)	No standardized in interconnecting cables assembled		N
2.11 (5.2.18)	Used plug in accordance with		N
	- IEC 60083		N
	- other standard		N
2.11 (5.3)	Internal wiring	20AWG	P
2.11 (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.....:		N
	Green-yellow for earth only		N
2.11 (5.3.1.1)	Internal wiring connected directly to fixed wiring		N
	Cross-Sectional area (mm^2)		N
	Insulation thickness		N
	Extra insulation added where necessary		N
2.11 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limited device		N
	Adequate cross-section area and insulation thickness		N
2.11 (5.3.1.3)	Double or reinforced insulation for class II		P
2.11 (5.3.1.4)	Conductors without insulation	Not used	N
2.11 (5.3.1.5)	SELV current-carrying parts		P
2.11 (5.3.1.6)	Insulation thickness other than PVC or rubber		N
2.11 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		N
	Joints, raising/lowering devices		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Telescopic tubes etc.		N
	No twisting over 360^0		P
2.11 (5.3.3)	Insulating bushings on class II luminaires, in settable and adjustable luminaires, or in portable luminaires other than those for wall mounting,		N
	- suitable fixed		N
	- material in bushings		N
	- material not likely to deteriorate		N
	- cables with protective sheath		N
2.11 (5.3.4)	Joints and Junctions effectively insulated		N
2.11 (5.3.5)	Strain on internal wiring		N
2.11 (5.3.6)	Wire carriers		N
2.11 (5.3.7)	Wire ends not tinned		N
	Wire ends tinned: no cold flow		N
2.12 (8)	**PROTECTION AGAINST ELECTRIC SHOCK**		P
2.12 (8.2.1)	Live parts not accessible with standard test finger		P
	Basic insulated parts not used on the outer surface without appropriate protection		P
	Basic insulated parts not accessible with standard test finger on portable and adjustable luminaires		N
	Basic insulated parts not accessible with ⌀50mm probe from outside, within arms reach, on wall-mounted luminaires		P
	Lamp and startholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N
	Basic insulation only accessible under lamp or starter replacement		N
	Double-ended tungsten filament lamp		N
	Insulation lacquer not reliable		N
	Double-ended high pressure discharge lamp		N
	Relevant warming according to 3.2.18 fitted to the luminaire		N
2.12 (8.2.2)	Portable luminaire adjusted in most unfavourable position	Fixed luminaire	N
2.12 (8.2.3 a)	Class II luminaire:		P

IEC 60598-2-2			
Clause	Requirement - Test	Result - Remark	Verdict
	- basic insulated metal parts not accessible during starter or lamp replacement		P
	- basic insulated not accessible other than during starter or lamp replacement		N
	- glass protective shields not used as supplementary insulation	No such parts	N
2.12 (8.2.3b)	BC lampholder of metal in class I luminaires shall be earthed		N
2.12 (8.2.3c)	Class III luminaires with expose SELV parts:		N
	Ordinary luminaire :		N
	- touch current		N
	- no-load voltage		N
	- other than ordinary luminaire:		N
	- nominal voltage		N
2.12 (8.2.4)	Portable luminaire:	Fixed luminaire	N
	- protection independent of supporting surface		N
	- terminal block completely covered		N
2.12 (8.2.5)	Compliance with the standard test finger or relevant probe		P
2.12 (8.2.6)	Covers reliably secured		N
2.12 (8.2.7)	Discharging of capacitors >0.5 µF		N
	Portable plug connected luminaire with capacitor		N
	Discharge device on or within capacitor		N
	Discharge device mounted separately		N
2.13 (12)	**ENDURANCE TEST AND THERMAL TEST**		P
2.13 (12.3)	Endurance test:		P
	- mounting-position .....:	Mounting ceiling	P
	- test temperature (℃) .....:	55℃	P
	- total duration (h) .....:	240hrs. Totally 10 cycles, each 24h	P
	- supply voltage: Un factor; calculated voltage (V) .....:	1.1x240V	P
	- lamp used .....:	LED lamp	P
2.13 (12.3.2)	After endurance test:		P
	- no part unserviceable		P

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Clause	Requirement - Test	Result - Remark	Verdict
	- luminaire not unsafe		P
	- no damage to track system		N
	- marking legible		P
	- no cracks, deformation etc.		P
2.13 (12.4)	Thermal test (normal operation)	(see table 12.4)	P
2.13 (12.5)	Thermal test (abnormal operation)		N
	Short-circuit of starter contacts		N
	Lamps removed and not replaced		N
2.13 (12.6)	Thermal test (failed lamp control gear condition):		N
2.13 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A)		N
	- case of abnormal conditions .....:		N
	- electronic ballast		N
	- measured winding temperature (°C): at 1.1 Un		N
	- measured mounting surface temperature (°C): at 1.1 Un .....:		N
	- calculated mounting surface temperature(°C)		N
	- track-mounted luminaires		N
2.13 (12.6.2)	Temperature sensing control:		N
	- manual reset cut-out		N
	- auto reset cut-out		N
	- track-mounted luminaires		N
2.13 (12.7)	Thermal test (failed ballast or transformer in plastic luminaires):		N
2.13 (12.7.1)	Luminaire without temperature sensing control		N
2.13 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		N
	Test method 12.7.1.1 or Annex V		N
	Test according to 12.7.1.1:		N
	- case of abnormal conditions		N
	- Ballast failure at supply voltage (V)		N
	- Components retained in place after the test		N
	- Test with standard test finger after the test		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Test according to Annex V:		N
	- case of abnormal conditions		N
	- measured winding temperature (℃): at 1.1 Un.. :		N
	- measured temperature of fixing point/exposed part (℃): at 1.1Un.....:		N
	- calculated temperature of fixing point/exposed part (℃) .....:		N
	Ball-pressure test:		N
	- part tested; temperature (℃)..... :		N
	- part tested; temperature (℃)..... :		N
2.13 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		--
	- case of abnormal conditions		N
	- measured winding temperature (℃): at 1.1 Un.. .....:		N
	- measured temperature of fixing point/exposed part (℃): at 1.1 Un..... :		N
	- calculated temperature of fixing point/ exposed part (℃) ..... :		N
	Ball-pressure test:		N
	- part tested; temperature (℃)..... :		N
	- part tested; temperature (℃)..... :		N
2.13 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N
	- case of abnormal conditions		N
	- Components retained in place after the test		N
	- Test with standard test finger after the test		N
2.13 (12.7.2)	Luminaire with temperature sensing control		N
	- thermal link		N
	- manual reset cut-out		N
	- auto reset cut-out		N
	- case of abnormal conditions		N
	- highest measured temperature of fixing point/exposed part (℃):..... :		N
	Ball-pressure test:		N
	- part tested; temperature (℃)..... :		N

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Clause	Requirement - Test	Result - Remark	Verdict
	- part tested; temperature (℃)..... :		N
2.14 (9)	**RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE**		**P**
2.14 (9.2)	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP .....:	IP20	P
	- mounting position during test .....:		N
	- fixing screws tightened; torque (Nm) .....:		N
	- tests according to clauses .....:		N
	- electric strength		N
	a) no deposit in dust-proof luminaire		N
	b) no talcum in dust-tight luminaire		N
	c) no trace of water on current-carrying parts or SELV parts or where it could become a hazard		N
	d) i) For luminaires without drain holes – no water entry		N
	d) ii) For luminaires with drain holes – no hazardous water entry		N
	e) no water in watertight luminaire		N
	f) no contact with live parts (IP 2X)	IP20	P
	f) no entry into enclosure (IP 3X and IP 4X)		N
	f) no contact with live parts (IP3X and IP4X)		N
	g) no trace of water on part of lamp requiring protection from splashing water		N
	h) no damage of protective shield or glass envelope		N
2.14 (9.3)	Humidity test 48h	Relative humidity 93%, temperature 25℃, 48h, followed by hi-pot test	P
2.15 (10)	**INSULATION RESISTANCE AND ELECTRIC STRENGTH**		P
2.15 (10.2.1)	Insulation resistance test:		P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø.....:		P
	Insulation resistance:		P
	SELV:		--
	- between current-carrying parts of different polarity..... :		N

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Clause	Requirement - Test	Result - Remark	Verdict
	- between current-carrying parts and mounting surface ..... :		N
	- between current-carrying parts and metal parts of the luminaire ..... :	100MΩ, limit: 1 MΩ	P
	Other than SELV:		
	- between live parts of different polarity .....:	LED Driver: CE Approve	P
	- between live parts and mounting surface.:	100MΩ, limit: 4 MΩ	P
	- between live parts and accessible parts.. :	100MΩ, limit: 4 MΩ	P
	- between live parts of different polarity through action of a switch ..... :		N
2.15 (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):		P
	SELV:		--
	- between current-carrying parts of different polarity..... :		N
	- between current-carrying parts and mounting surface ..... :		N
	- between current-carrying parts and metal parts of the luminaire ..... :	500Vac, no breakdown	P
	Other than SELV:		--
	- between live parts of different polarity .....:	LED Driver: CE Approve	P
	- between live parts and mounting surface.....:	2960Vac, no breakdown	P
	- between live parts and accessible parts..:	2960Vac, no breakdown	P
	- between live parts of different polarity through action of a switch ..... :		N
2.15 (10.3)	Touch current (mA) .....:	0.05mA<0.7mA	P
	Protective conductor current (mA) .....:		N
2.16 (13)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		P
2.16 (13.2.1)	Ball-pressure test:		P
	- part tested; temperature (°C) .....:	Translucent cover, 75°C, 0.8mm	P
	- part tested; temperature (°C) .....:	DC connector: 125℃, 1.5mm	P

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Clause	Requirement - Test	Result - Remark	Verdict
	- part tested; temperature (°C) .....:		N
2.16 (13.3.1)	Needle flame test (10 s):		P
	- part tested .....:	DC connector, Translucent cover	P
2.16 (13.3.2)	Glow-wire test:		P
	- part tested .....:	Translucent cover, DC connector, 650°C, no burning	P
2.16 (13.4.2)	Tracking test: part tested .....:		N
Annex A	**TEST TO ESTABLISH WHETHER A CONDUCTIVE PART MAY CAUSE AN ELECTRIC SHOCK**		P
A.2	Voltage not exceed 35 V a.c. peak or 60 V ripple free d.c.	4.1V	P
A.3	Touch-current not exceed:		P
	- for a.c.: 0,7 mA (peak);	0.005mA	P
	- for d.c.: 2,0 mA		N
Annex B	**TEST LAMP**		N
Annex C	**ABNORMAL CIRCUIT CONDITIONS**		N
	a) Short-circuit of starter contacts		N
	b) Lamp rectification		N
	c) Lamps removed and not replaced		N
	d) One electrode of lamp open-circuited		N
	e) Lamp will not start, but both electrodes are intact		N
	f) Blockage of the motor(s) contained in the luminaire		N
Annex D	**DRAUGHT-PROOF ENCLOSURE**		N
Annex E	**DETERMINATION OF WINDING TEMPERATURE RISES BY THE INCREASE—IN-RESISTANCE METHOD**		N
Annex F	**TEST FOR RESISTANCE TO STRESS CORROSION OF COPPER AND COPPER ALLOYS**		N
Annex G	**MEASUREMENT OF TOUCH CURRENT AND PROTECTIVE CONDUCTOR CURRENT**		N
	CENELEC COMMON MODIFICATIONS (EN)		--

IEC 60598-2-2			
Clause	Requirement - Test	Result - Remark	Verdict
3	**MARKING**		**--**
3.3.301	Adequate warning on the package		--
5	**EXTERNAL AND INTERNAL WIRING**		--
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
5.2.2	Cables equal to HD21 S2 or HD22 S2		N
ZB	**ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)**		N
3.3	DK: power supply cord with label		N
	IT: warning label on Class 0 luminaire		N
4.5.1	DK: socket-outlets		N
5.2.1	CY, DK, FI, SE, GB: type of plug		N
ZC	**ANNEX ZC, NATIONAL DEVIATIONS (EN)**		N
4&5	FR: Shuttered socket-outlets 10/16A		N
13.3	GB: Requirements according to United Kingdom Building Regulation		N
13.3.2	FR: Glow-wire test 850℃ alt. 750℃ for luminaries in premises open to public or 960℃ for luminaries in emergency exits		N

Tables

	ANNEX 1: components					**P**
object/part No.	Code	manufacturer/trademark	type/model	technical data	standard	mark(s) of conformity
Translucent cover	B	CHI MEI CORPORATION	PC-110(+)	110℃, V-2	UL 94	E56070 Test with appliance
DC wire	B	YUEQING CITY KEDAJA TELECOMMUNICATION CABLE CO LTD	1007	20AWG, 105℃	UL 758	E190670
DC Connector	B	Suzhou Industrial Park Exceedconn Technology Co.,Ltd	KB-02	20AWG, 300V	IEC 60598-2-2	Test with appliance
LED PCB	B	Shenzhen-Yi Circuit Co., Ltd	RH-04	V-0, 130℃	UL 746 UL 94	UL
LED Driver	B	Nourmix	RS040-YA1000A	PRI:100-240V 50/60Hz SEC: 39-42V, 1A	IEC 61347-2-13	--

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 authorized by the test house

C – Integrated component tested together with the appliance

D – Alternative component

	ANNEX 2: temperature measurements, thermal tests of Section 12		P
	Type reference …….....:	LED PANEL 40W	P
	Lamp used ……..…….....:	LED lamp	P
	Lamp control gear used…….....:	LED lamp controlgear	P
	Mounting position of luminaire……..…..:	See user manual	P
	Supply wattage (W) …… ……...:	42.9W	P
	Supply current (A) ……..…..…..:		P
	Calculated power factor……..:		P
	Table: measured temperatures corrected for ta = 45℃：		P
	- abnormal operating mode……..……..……..:		N
	- test 1: rated voltage……..……..……:		N
	- test 2: 1,06 times rated voltage or 1,05 times Rated wattage ……..……..……:	1.06x240V	P
	- test 3: Load on wiring to socket-outlet, 1.06 times voltage or 1,05 times wattage ….....:	--	N
	- test 4: 1,1 times rated voltage or 1,05 times Rated wattage ….....:		N

Tables

	Through wiring or looping-in wiring loaded by a current of A during the test …….....:		N

Temperature(℃) of part	Clause 12.4 – normal				Clause 12.5 – abnormal	
	Test 1	Test 2	Test 3	Limits	Test 4	Limit
Input wire near LED	--	76.9	--	80	--	--
LED PCB	--	85.6	--	130	--	--
DC connector	--	55.1	--	Ref	--	--
Translucent cover near LED	--	71.6	--	Ref.	--	--
tc of LED driver	--	74.7	--	80	--	--
Mounting surface	--	54.6	--	90	--	--
Ambient	--	45.0	--	--	--	--

	ANNEX 3: screw terminals (part of the luminaire)		**--**
14	**SCREW TERMINALS**		**--**
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) .....:		N
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).....:		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

Tables

	ANNEX 4: screwless terminals (part of the luminaire)		**--**
15	**SCREWLESS TERMINALS**		**--**
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
15.5.1	Terminals internal wiring		N
15.5.1.1	Pull test spring-type terminals (4 N, 4 samples)		N
15.5.1.2	Pull test pin or tab terminals (4 N, 4 samples)		N
	Insertion force not exceeding 50 N		N
15.5.2	Permanent connections: pull-off test (20 N)		N
15.6	Electrical tests		--
	Voltage drop (mV) after 1 h (4 samples).....:		N
	Voltage drop of two inseparable joints		N
	Number of cycles .....:		N
	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
15.7	Terminals external wiring		N
	Terminal size and rating		N
15.8.1	Pull test spring-type terminals (4 samples); pull (N)		N
	Pull test pin or tab terminals (4 samples); pull (N)		N
15.9	Contact resistance test		N
	Voltage drop (mV) after 1 h		N

Tables

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)										

ANNEX 5 EMF			
	The tested product also complies to the requirements of IEC 62493: 2009		--
	Limit……..0.85	Measured max.:……0.00012	P

Attachment No.1

TEST REPORT

IEC 62031 LED modules for general lighting - Safety specifications

Report reference No.....:	See report IEC 60598-2-2
Tested by(name + signature).....:	See report IEC 60598-2-2
Approved by(name +signature).....:	See report IEC 60598-2-2
Date of issue .....:	See report IEC 60598-2-2
Contents.....:	See report IEC 60598-2-2
Testing laboratory	
Name .....:	See report IEC 60598-2-2
Address.....:	See report IEC 60598-2-2
Testing location .....:	See report IEC 60598-2-2
Client	
Name .....:	See report IEC 60598-2-2
Address .....:	See report IEC 60598-2-2
Manufacturer	
Name .....:	See report IEC 60598-2-2
Address .....:	See report IEC 60598-2-2
Test specification	
Standard.....:	IEC 62031: 2008+A1: 2012
Test procedure .....:	Compliance with IEC 62031: 2008+A1: 2012
Non-standard test method .....:	N/A
Test item Description.....:	See report IEC 60598-2-2
Trademark .....:	See report IEC 60598-2-2
Model and/or type reference .....:	See report IEC 60598-2-2
Rating(s).....:	See report IEC 60598-2-2

IEC 62031			
Clause	Requirement - Test	Result - Remark	Verdict
4	**General requirements**		**---**
4.1	Modules shall be so designed and constructed that in normal use (see manufacturer's instruction) they operate without danger to the user or surroundings:		P
4.2	For LED modules, all electrical measurements, unless otherwise specified, shall be carried out at voltage limits (min/max), current limits (min/max) or power limits (min/max) and minimum frequency, in a draught-free room at the temperature limits of the allowed range specified by the manufacturer. Unless the manufacturer indicates the most critical combination, all combinations (min/max) of voltage/current/power and temperature shall be tested.		P
4.3	For self-ballasted LED modules, the electrical measurements shall be carried out at the tolerance limit values of the marked supply voltage.		N
4.4	Integral modules not having their own enclosure shall be treated as integral components of luminaires as defined in IEC 60598-1, Clause 0.5. They shall be tested assembled in the luminaire, and as far as applicable with the present standard.		P
4.5	Independent modules shall comply, in addition to this standard, with the requirements of relevant clauses of IEC 60598-1, where these requirements are not already covered in this standard.		N
4.6	If the module is a factory sealed unit, it shall not be opened for any tests. In the case of doubt based on the inspection of the module and the examination of the circuit diagram, and in agreement with the manufacturer or responsible vendor, such specially prepared modules shall be submitted for testing so that a fault condition can be simulated.	Unsealed	N
5	**General test requirements**		---
5.1	Tests according to this standard are type tests		P
5.2	Unless otherwise specified, the tests are carried out at an ambient temperature of 10 ℃ to 30℃		P

IEC 62031			
Clause	Requirement - Test	Result - Remark	Verdict
5.3	Unless otherwise specified, the type test is carried out on one sample consisting of one or more items submitted for the purpose of the type test.		P
5.4	If the light output has detectably changed, the module shall not be used for further tests.		P
5.5	For SELV-operated LED modules, the requirements of IEC 61347-2-13, Annex I, apply additionally.		N
6	**CLASSIFICATION**		---
	Independent .....:		N
	Built-in .....:		N
	Integral .....:		P
7	**MARKING**		---
7.1	Mandatory marking for built-in or independent modules		N
	a) Mark of origin (trade mark, manufacturer's name or name of the responsible vendor/supplier).	See page 3	N
	b) Model number or type reference of the manufacturer.	See page 3	N
	c) Either the -rated supply voltage(s), or voltage range, supply frequency or/and -rated supply current(s) or current range, supply frequency (the supply current may be given in the manufacturer's literature) or/and –rated input power, or power range.	See page 3	N
	d) Nominal power.		N
	e) Indication of position and purpose of the connections where it is necessary for safety. In case of connecting wires, a clear indication shall be given in a wiring diagram.		N
	f) Value of tc. If this relates to a certain place on the LED module, this place shall be indicated or specified in the manufacturer's literature.		N
	g) For eye protection, see requirements of IEC 62471.		N
	h) Built-in modules shall be marked in order to separate them from independent modules. The mark shall be located on the packaging or on the module itself.		N
7.2	Location of marking		---

IEC 62031			
Clause	Requirement - Test	Result - Remark	Verdict
	Items a), b), c) and f) of 7.1 shall be marked on the module.		N
	Items d), e), g) and h) of 7.1 shall be marked legible on the module or on the module data sheet.		N
	For integral modules, no marking is required, but the information given in 7.1 a) to g) shall be provided in the technical literature of the manufacturer.		N
7.3	Durability and legibility of marking		N
	Rubbing 15 s water, 15 s petroleum; marking legible		N
8 (14)	**SCREW TERMINALS**		**N**
	Separately approved: component list	See annex 1	N
	Part of the luminaire	See annex 3	N
8 (15)	**SCREWLESS TERMINALS and electrical connections**		**N**
	Separately approved: component list	See annex 1	N
	Part of the luminaire	See annex 4	N

IEC 62031			
Clause	Requirement - Test	Result - Remark	Verdict
9	**PROVISION FOR EARTHING**		**N**
	External metal parts connected to the earth terminal:		N
	- compliance with 7.2.1 in IEC 60598-1		N
	Test with a current of 10 A between earthing terminal and each of the accessible metal parts; measured resistance (Ω): < 0,5 Ω .....:		N
	Protective earth, symbol		N
	Terminal complying with clause 8 in Part 1		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
	Conductors by tracks on printed circuit boards:		N
	- a.c. current of 25 A for 1 min between earthing terminal and accessible metal parts		N
	- compliance with clause 7.2.1 in IEC 60598-1		N
10	**PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS**		**N**
10.1	Ballast protected against accidental contact with live parts		N
A1	Current measured according to EN 60990, figure 4 and clause 7.1: max. 0,7 mA (peak) or 2,0 mA d.c., for f ≥ 1000 Hz max. 70 mA		N
A2	Voltage at 50 kΩ (V): max. 34 V (peak)		N
	Lacquer or enamel not considered to be adequate protection		N
	Adequate mechanical strength on parts providing protection		N
10.2	Capacitors > 0,5 μF: voltage after 1 min (V): < 50 V		N
11	**MOISTURE RESISTANCE AND INSULATION**		**P**

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Clause	Requirement - Test	Result - Remark	Verdict
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (MΩ): ≥ 2 MΩ		P
	The leakage current shall not exceed the values shown in figure 2 when measured in accordance with annex I		N
12	**ELECTRIC STRENGTH**		**P**
	Immediately after clause 11 electric strength test for 1 min		P
	Working voltage ≤ 42 V, test voltage 500 V		N
	Working voltage > 42 V, test voltage (V): 2U + 1000 V	See report IEC 60598-2-2	P
	Reinforced insulation, test voltage (V):	.....	N
	No flashover or breakdown		P
13	**Fault conditions**		**---**
	Windings of ballasts shall have adequate thermal endurance	No such parts	N
13.1	General		N
	When operated under fault conditions the ballast: - does not emit flames or molten material	No such parts	N
	- does not produce flammable gases		N
	- protection against accidental contact not impaired		N
	Thermally protected ballasts does not exceed the marked temperature value	Not thermally protected ballasts	N
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected		N
	Short-circuit of creepage distances and clearances if less than specified in clause 18 (except between live parts and accessible metal parts)		N
	Short-circuit or interruption of semiconductor devices		N
	Short-circuit across insulation consisting of lacquer, enamel or textile		N
	Short-circuit across electrolytic capacitors		N
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite	No ignition	N
13.2	Overpower condition		P

IEC 62031			
Clause	Requirement - Test	Result - Remark	Verdict
	The test shall be started at an ambient temperature as specified in Annex A.		P
	The module shall be switched on and the power monitored (at the input side) and increased until 150 % of the rated voltage, current or power is reached. The test shall be continued until the module is thermally stabilised. A stable condition is reached, if the temperature does not change by more than 5 K in 1 h. The temperature shall be measured in the tc point. The module shall withstand the overpower condition for at least 15 min, the time period of which can lie within the stabilisation period if the temperature change is ≤ 5 K.		P
	If the module contains an automatic protective device or circuit which limits the power, it is subjected to a 15 min operation at this limit. If the device or circuit effectively limits the power over this period, the module has passed the test, provided the compliance (4.1 and last paragraph of 13.2) is fulfilled.		N
	After finalising the overpower mode, the module is operated under normal conditions until thermally being stable.	No damage	P
	A module fails safe if no fire, smoke or flammable gas is produced and if the 15 min overpower condition has been withstood. To check whether molten material might present a safety hazard, a tissue paper, as specified in 4.187 of ISO 4046-4, spread below the module shall not ignite.	No damage	P
15	**Construction**		**P**
	Wood, cotton, silk, paper and similar fibrous material shall not be used as insulation.		P
16	**Creepage distances and clearances**		**P**
	Working voltage (V) .....:	See report IEC 60598-2-2	P
	Voltage form	Sinusoidal [√] Non-sinusoidal [ ]	N
	PTI	< 600 [√] > 600 [ ]	N
	Impulse withstand category (normal category II) (category III annex U)	Normal category II	N
	Rated pulse voltage (kV) .....:		N

IEC 62031			
Clause	Requirement - Test	Result - Remark	Verdict
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm) .....:		N
	(2) Current-carrying parts and accessible parts: cr (mm); cl (mm) .....:	See report IEC 60598-2-2	P
	(3) Parts becoming live due to breakdown of basic insulation and metal parts: cr (mm); cl (mm) .....:		N
	(4) Outer surface of cable where it is clamp and metal parts: cr (mm); cl (mm) .....:		N
	(5)not used		N
	(6) Current-carrying parts and supporting surface: cr (mm); cl (mm) .....:		N
17	**SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS**		**N**
	Electrical connections		N
	Contact pressure	No pressure transmitted to the insulating material	N
	Screws:		N
	- Self-tapping screws		N
	- thread-cutting screws		N
	Screw locking:		N
	- spring washer		N
	- rivets	No rivet provided	N
	Material of current-carrying parts	> 50% copper	N
	No contact to wood or mounting surface	No wood	N
	Electro-mechanical contact systems	No such construction	N
	Mechanical connections and glands		N
	Screw not made of soft metal		N
	Screws of insulating material		N
	Torque test: torque (Nm); part …….....	See report IEC 60598-2-2	N
	Torque test: torque (Nm); part …….....		N
	Screw with diameter < 3 mm screw into metal		N
	Locked connections:		N
	- fixed arms; torque (Nm) .....:		N
	- lampholder; torque (Nm) .....:		N
	- push-button switches; torque (Nm) .....:	No such switches	N
	Screwed glands; force (N) :		N
18	**RESISTANCE TO HEAT, FIRE AND TRACKING**		**---**
18.1	Parts of insulating material retaining live parts in position, ball-pressure test:		N
	- part; test temperature (°C) .....See report IEC 60598-2-2		N
18.2	Printed boards in accordance with IEC 60249-1, 4.3		N

IEC 62031			
Clause	Requirement - Test	Result - Remark	Verdict
18.3	External parts of insulating material preventing electric shock glow-wire test 650 °C	See report IEC 60598-2-2	N
18.4	Parts of insulating material retaining live parts in position, needle-flame test 10 s:		N
	- flame extinguished within 30 s		N
	- no flaming drops igniting tissue paper		N
18.5	Tracking test	Ordinary	N
19	**RESISTANCE TO CORROSION**		**---**
	Rust protection:		P
	-10% solution of ammonium chloride in water		N
	- adequate varnish on the outer surface		P

Tables

Table 11(a)	**Humidity test**			**P**
Test condition:	Temperature	Relative Humidity	Duration	Breakdown (Y/N)
	25°C	93%	48 hours	N

Test points		Measured insulation	Limited insulation
Between	To		
+ & -	Enclosure	10MΩ	1MΩ

Table 11(b)	**Touch current measurement (mA)**			**N**
Condition	Normal		Reverse	
Model No.	ON	OFF	ON	OFF
--	--	--	--	--

Table 12	**Electric strength**		**P**
Test points		Test voltage	Results
Between	To		
+ & -	Enclosure	500Vac	No breakdown

13	**TABLE: tests of fault conditions**		N
Part	Simulated fault	Test result	Hazard
--	--	--	--

16	**TABLE: creepage distances and clearances**						P
	Minimum distances for a.c. (50/60 Hz) sinusoidal voltages						N
RMS working voltage (V) not exceeding		50	150	250	500	750	1000
1 minimum distances between live parts of different polarity. Specify the value measured.		>1.2					
2 minimum distances between live parts and accessible parts which are permanently fixed to the ballast, including screws or devices for fixing covers or fixing the ballast to its support. Specify the value measured.		>1.2					
- required creepage distances (mm), insulation PTI ≥ 600		0,6	1,4	1,7	3	4	5,5
- required creepage distances (mm), insulation PTI < 600		1,2	1,6	2,5	5	8	10
- required clearances (mm)		0,2	1,4	1,7	3	4	5,5
3 minimum distances between live parts and a flat supporting surface or a loose metal cover, if any, if the construction does not ensure that the values under 2 above are maintained under the most unfavourable circumstances							
- required clearances (mm)		2	3,2	3,6	4,8	6	8
	Minimum distances for non-sinusoidal pulse voltages						N

Tables

rated pulse voltage (peak kV)	2,0	2,5	3,0	4,0	5,0	6,0	8,0
required minimum distances, clearances (mm)	1,0	1,5	2	3	4	5,5	8
Specify the value measured							
rated pulse voltage (peak kV)	10	12	15	20	25	30	40
required minimum distances, clearances (mm)	11	14	18	25	33	40	60
Specify the value measured							
rated pulse voltage (peak kV)	50	60	80	100	-	-	-
required minimum distances, clearances (mm)	75	90	130	170	-	-	-
Specify the value measured							

ATTACHMENT 2

Photo Documentation

View:
Model:
LED PANEL
40W

[X]General
[ ]Front
[ ]Rear
[ ]Internal
[ ]Top
[ ]Bottom
[ ]PWB

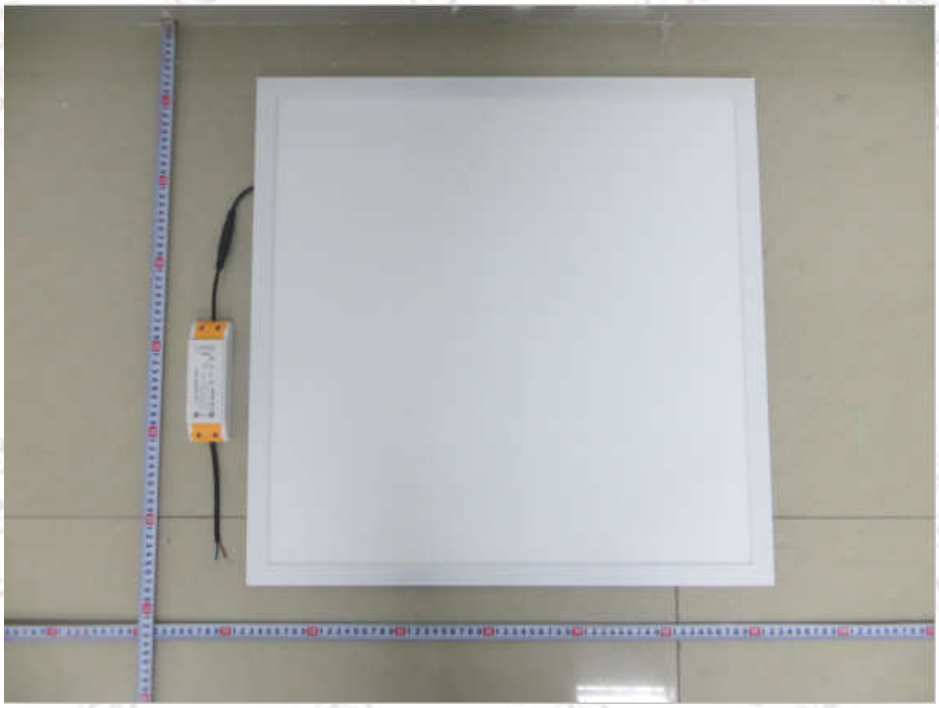

Figure 1

View:

[X]General
[ ]Front
[ ]Rear
[ ]Internal
[ ]Top
[ ]Bottom
[ ]PWB

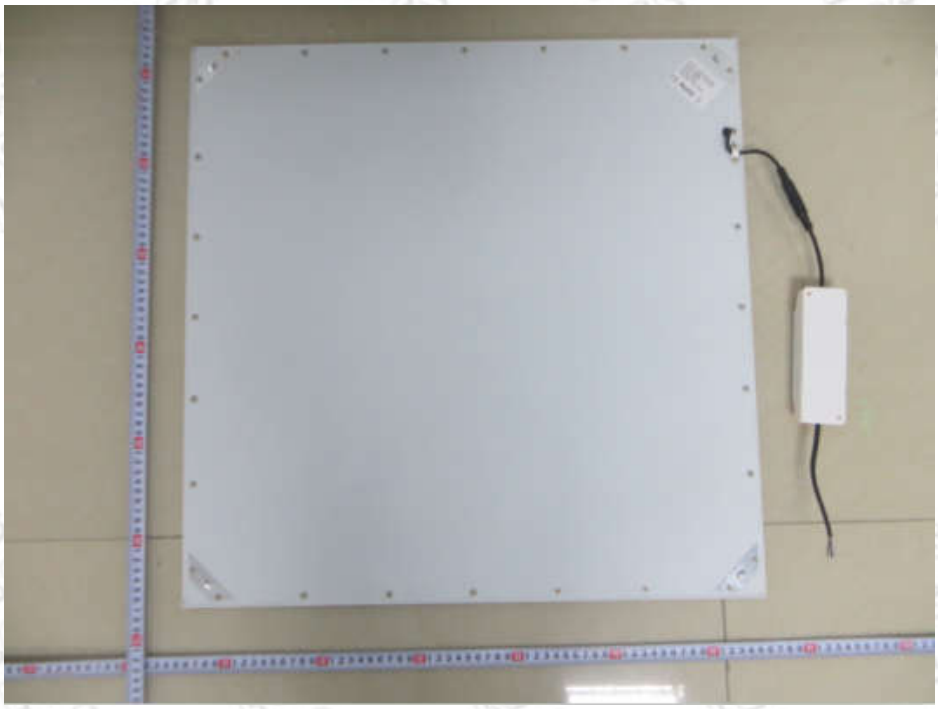

Figure 2

ATTACHMENT 2

Photo Documentation

View:

[ ]General
[ ]Front
[ ]Rear
[X]Internal
[ ]Top
[ ]Bottom
[ ]PWB

Figure 3