	Test Report issued under the responsibility of: **NCB TÜV SÜD PSB Pte Ltd.** **1 Science Park Drive, 118221 Singapore** **Singapore**	

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

Report Number.....:	085-160428301-000
Date of issue.....:	2017-09-20
Name of Testing Laboratory preparing the Report.....:	TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch 5F, Communication Building, 163 Pingyun Rd, Huangpu Ave. West, Guangzhou, 510656, P.R. China
Applicant's name .....:	Kayhin Electric Appliance Co.,ltd.
Address .....:	No.13, Lianbao Road Hengwei Industrial Zone, Shengfeng, Xiaolan Town 528415 Zhongshan City, Guangdong Province PEOPLE'S REPUBLIC OF CHINA
Test specification:	
Standard.....:	IEC 60598-2-1 (ed.1), am1 used in conjunction with IEC 60598-1 (ed.8)
Test procedure.....:	CB Scheme
Non-standard test method.....:	N/A
Test Report Form No.....:	IEC60598_2_1E
Test Report Form(s) Originator ....:	Intertek Semko AB
Master TRF .....:	2016-04

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

General disclaimer:

The test results presented in this report relate only to the object tested.
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Test item description ..... :	LED Panel Light
Trade Mark ..... :	No trade mark
Manufacturer ..... :	Same as applicant
Model/Type reference ..... :	KH-PL-S025-24W-W-SD, others see model list
Ratings ..... :	110-240V~, 50/60Hz, class II, IP20, RG0 other details see general product information.

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):

☒	**Testing Laboratory:**		
Testing location/ address .....:		TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch 5F, Communication Building, 163 Pingyun Rd, Huangpu Ave. West, Guangzhou, 510656, P.R. China	
Tested by (name, function, signature) .....:		Milo Zhou	
Approved by (name, function, signature)...:		Kenny Chen	

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

Attachment 1: European Group Differences and National Differences of EN 60598-2-1 (2 pages).
Attachment 2: IEC 62031:2008+A1:2012+A2:2014 (9 pages)
Attachment 3: TEST REPORT IEC 60598-1 Australia and New Zealand NATIONAL DIFFERENCES (13 pages)
Attachment 4: Photobiological Assessment according to IEC/TR 62778:2014 (2 pages)
Attachment 5: IEC 61347-1:2015 used conjunction with IEC 61347-2-13:2014/A1:2016 (20 pages)
Attachment 6: TEST REPORT IEC 61347-1 Australia and New Zealand NATIONAL DIFFERENCES (9 pages)
Photo documentations(11 pages)

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
1.These luminaires were found to be complied with the test clauses mentioned above according to standard: IEC 60598-1:2014, IEC 60598-2-1:1979/AMD1:1987. 2. The LED module in this product has been test according to IEC 62031:2008+A1:2012+A2:2014, see attachment 2. 3. The LEDs in this product has been test according to IEC/TR 62778:2014, belong to RG0, see attachment 3. 4. IEC 61347-2-13:2014/A1:2016 and IEC 61347-1:2015 is considered, see attachment 4. 5. Model KH-PL-R025-24W-W-SD were chosen for full test. Construction check was carried out on each models, others considered as reference.	TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch 5F, Communication Building, 163 Pingyun Rd, Huangpu Ave. West, Guangzhou, 510656, P.R. China

Summary of compliance with National Differences:

N/A

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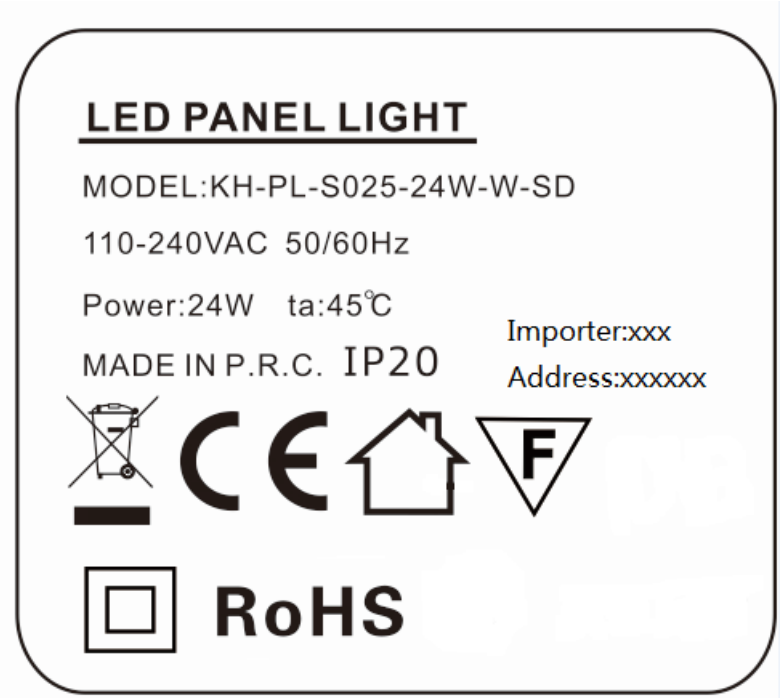
Copy of marking plate:

Luminaire label



The above label is for example only, the other labels will be different in the model name, rated current and rated power, others see model list for details.

Location: Sticks on the luminaires enclosure. (height of WEEE symbol at least 7mm, height of other symbols at least 5mm, height of letters and numerals at least 2mm.)

According to the EU directives which have been aligned with EU NLF (new legislative framework), both of manufacturer and importer's name and address shall be affixed on the product or, where that is not possible, on its packaging or in a document accompanying the product before the product is placed on the EU market.

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Test item particulars .....:	LED panel light
Classification of installation and use.....:	Class II
Supply Connection .....:	Terminal block
Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement..... :	P (Pass)
- test object does not meet the requirement..... :	F (Fail)
Testing ..... :	
Date of receipt of test item..... :	2017-06-10
Date (s) of performance of tests ..... :	2017-06-16 to 2017-09-20

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....:	☐ **Yes** ☒ **Not applicable**

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

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

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General product information:

1. These products were Class II LED luminaires for fixed use only. For other detail see model list.
2. For indoor use only.
3. IP classification: IP20, Ta: 45°C, CCT:2700-6500K
4. Others see model list for details

Model list

No	Model No.	Shape	Input	Rated power	LED Type	Remark
1	KH-PL-R025-15W-W-SD	Round	110-240V~ 50/60Hz	15W	2835	Models have same circuit and PCB layout different in component parameter
2	KH-PL-S025-15W-W-SD	Square		15W	2835	
3	KH-PL-R025-22W-W-SD	Round		22W	2835	
4	KH-PL-S025-22W-W-SD	Square		22W	2835	
5	KH-PL-R025-24W-W-SD	Round		24W	2835	
6	KH-PL-S025-24W-W-SD	Square		24W	2835	

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

1.2 (0)	**GENERAL TEST REQUIREMENTS**		P
1.2 (0.1)	Information for luminaire design considered.....:	Yes ☒ No ☐ Lamp standard:	—
1.2 (0.3)	More sections applicable .....:	Yes ☐ No ☒ Section/s:	—

1.4 (2)	**CLASSIFICATION OF LUMINAIRES**		P
1.4 (2.2)	Type of protection .....:	Class II	P
1.4 (2.3)	Degree of protection .....:	IP20	P
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		P
1.5 (3.3.1)	Combination luminaires		N/A
1.5 (3.3.2)	Nominal frequency in Hz	50/60Hz	P
1.5 (3.3.3)	Operating temperature		N/A
1.5 (3.3.4)	Symbol or warning notice		N/A
1.5 (3.3.5)	Wiring diagram		N/A
1.5 (3.3.6)	Special conditions		N/A
1.5 (3.3.7)	Metal halide lamp luminaire – warning		N/A
1.5 (3.3.8)	Limitation for semi-luminaires		N/A
1.5 (3.3.9)	Power factor and supply current		N/A
1.5 (3.3.10)	Suitability for use indoors	Ta:45°C	P
1.5 (3.3.11)	Luminaires with remote control		N/A
1.5 (3.3.12)	Clip-mounted luminaire – warning		N/A
1.5 (3.3.13)	Specifications of protective shields		N/A
1.5 (3.3.14)	Symbol for nature of supply	~	P

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

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.6 (4.4.5)	Peak pulse voltage		N/A
1.6 (4.4.6)	Centre contact		N/A
1.6 (4.4.7)	Parts in rough service luminaires resistant to tracking		N/A
1.6 (4.4.8)	Lamp connectors		N/A
1.6 (4.4.9)	Caps and bases correctly used		N/A
1.6 (4.4.10)	Light source for lampholder or connection according IEC 60061 not connected another way		N/A
1.6 (4.5)	**Starter holders**		**N/A**
	Starter holder in luminaires other than class II		N/A
	Starter holder class II construction		N/A
1.6 (4.6)	**Terminal blocks**		**P**
	Tails		N/A
	Unsecured blocks		N/A
1.6 (4.7)	**Terminals and supply connections**		**P**
1.6 (4.7.1)	Contact to metal parts		P
1.6 (4.7.2)	Test 8 mm live conductor		P
	Test 8 mm earth conductor		N/A
1.6 (4.7.3)	Terminals for supply conductors		P
1.6 (4.7.3.1)	Welded method and material		N/A
	- stranded or solid conductor		N/A
	- spot welding		N/A
	- welding between wires		N/A
	- Type Z attachment		N/A
	- mechanical test according to 15.6.2		N/A
	- electrical test according to 15.6.3		N/A
	- heat test according to 15.6.3.2.3 and 15.6.3.2.4		N/A
1.6 (4.7.4)	Terminals other than supply connection		P
1.6 (4.7.5)	Heat-resistant wiring/sleeves		N/A
1.6 (4.7.6)	Multi-pole plug		N/A
	- test at 30 N		N/A
1.6 (4.8)	**Switches**		**N/A**
	- adequate rating		N/A
	- adequate fixing		N/A
	- polarized supply		N/A

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IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- compliance with IEC 61058-1 for electronic switches		N/A
1.6 (4.9)	**Insulating lining and sleeves**		**P**
1.6 (4.9.1)	Retainment		P
	Method of fixing.....:	By construction	N/A
1.6 (4.9.2)	Insulated linings and sleeves:		N/A
	Resistant to a temperature > 20 °C to the wire temperature or		N/A
	a) & c) Insulation resistance and electric strength		N/A
	b) Ageing test. Temperature (°C).....:		N/A
1.6 (4.10)	**Double or reinforced insulation**		**P**
1.6 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		P
	Safe installation fixed luminaires		P
	Capacitors and switches		P
	Interference suppression capacitors according to IEC 60384-14		P
1.6 (4.10.2)	Assembly gaps:		P
	- not coincidental		P
	- no straight access with test probe		P
1.6 (4.10.3)	Retainment of insulation:		P
	- fixed		P
	- unable to be replaced; luminaire inoperative		P
	- sleeves retained in position		N/A
	- lining in lampholder		N/A
1.6 (4.10.4)	Protective impedance device		N/A
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		N/A
	Y1 or Y2 capacitors comply with IEC 60384-14		N/A
	Resistors comply with test (a) in 14.1 of IEC 60065		N/A
1.6 (4.11)	**Electrical connections and current-carrying parts**		**P**
1.6 (4.11.1)	Contact pressure		P
1.6 (4.11.2)	Screws:		P
	- self-tapping screws		N/A

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

	- thread-cutting screws		P
1.6 (4.11.3)	Screw locking:		N/A
	- spring washer		N/A
	- rivets		N/A
1.6 (4.11.4)	Material of current-carrying parts		P
1.6 (4.11.5)	No contact to wood or mounting surface		P
1.6 (4.11.6)	Electro-mechanical contact systems		N/A
1.6 (4.12)	**Screws and connections (mechanical) and glands**		**P**
1.6 (4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N/A
	Torque test: torque (Nm); part.....:	0.4, Fixed metal enclosure screw	P
	Torque test: torque (Nm); part.....:	0.4, Fixed bracket screw	P
	Torque test: torque (Nm); part.....:		N/A
1.6 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
1.6 (4.12.4)	Locked connections:		N/A
	- fixed arms; torque (Nm).....:		N/A
	- lampholder; torque (Nm).....:		N/A
	- push-button switches; torque 0,8 Nm.....:		N/A
1.6 (4.12.5)	Screwed glands; force (Nm).....:		N/A
1.6 (4.13)	**Mechanical strength**		**P**
1.6 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm).....:	0.20Nm	P
	- other parts; energy (Nm).....:	0.35Nm	P
	1) live parts		P
	2) linings		N/A
	3) protection		P
	4) covers		P
1.6 (4.13.3)	Straight test finger	30N	P
1.6 (4.13.4)	Rough service luminaires		N/A
	- IP54 or higher		N/A
	a) fixed		N/A
	b) hand-held		N/A
	c) delivered with a stand		N/A

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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/A
1.6 (4.13.6)	Tumbling barrel		N/A
1.6 (4.14)	**Suspensions, fixings and means of adjusting**		**P**
1.6 (4.14.1)	Mechanical load:		P
	A) four times the weight	4xMax.1.3kg	P
	B) torque 2,5 Nm		P
	C) bracket arm; bending moment (Nm) .....:		N/A
	D) load track-mounted luminaires		N/A
	E) clip-mounted luminaires, glass-shelve. Thickness (mm) .....:		N/A
	Metal rod. diameter (mm) .....:		N/A
	Fixed luminaire or independent control gear without fixing devices		N/A
1.6 (4.14.2)	Load to flexible cables		N/A
	Mass (kg) .....:		—
	Stress in conductors (N/mm²) .....:		N/A
	Mass (kg) of semi-luminaire .....:		N/A
	Bending moment (Nm) of semi-luminaire .....:		N/A
1.6 (4.14.3)	Adjusting devices:		N/A
	- flexing test; number of cycles.....:		N/A
	- strands broken .....:		N/A
	- electric strength test afterwards		N/A
1.6 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N/A
1.6 (4.14.5)	Guide pulleys		N/A
1.6 (4.14.6)	Strain on socket-outlets		N/A
1.6 (4.15)	**Flammable materials**		**P**
	- glow-wire test 650°C.....:	See Test Table 1.15 (13.3.2)	P
	- spacing ≥30 mm		N/A
	- screen withstanding test of 13.3.1		N/A
	- screen dimensions		N/A
	- no fiercely burning material		N/A
	- thermal protection		N/A
	- electronic circuits exempted		N/A

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

1.6 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		N/A
	a) construction		N/A
	b) temperature sensing control		N/A
	c) surface temperature		N/A
1.6 (4.16)	**Luminaires for mounting on normally flammable surfaces**		**P**
	No lamp control gear .....:	(compliance with Section 12)	N/A
1.6 (4.16.1)	Lamp control gear spacing:		N/A
	- spacing 35 mm		N/A
	- spacing 10 mm		N/A
1.6 (4.16.2)	Thermal protection:		N/A
	- in lamp control gear		N/A
	- external		N/A
	- fixed position		N/A
	- temperature marked lamp control gear		N/A
1.6 (4.16.3)	Design to satisfy the test of 12.6	(see clause 12.6)	P
1.6 (4.17)	**Drain holes**		**N/A**
	Clearance at least 5 mm		N/A
1.6 (4.18)	**Resistance to corrosion**		**N/A**
1.6 (4.18.1)	- rust-resistance		N/A
1.6 (4.18.2)	- season cracking in copper		N/A
1.6 (4.18.3)	- corrosion of aluminium		N/A
1.6 (4.19)	Ignitors compatible with ballast		N/A
1.6 (4.20)	Rough service vibration		N/A
1.6 (4.21)	**Protective shield**		**N/A**
1.6 (4.21.1)	Shield fitted if tungsten halogen lamps or metal halide lamps		N/A
	Shield of glass if tungsten halogen lamps		N/A
1.6 (4.21.2)	Particles from a shattering lamp not impair safety		N/A
1.6 (4.21.3)	No direct path		N/A
1.6 (4.21.4)	Impact test on shield		N/A
	Glow-wire test on lamp compartment .....:	See Test Table 1.15 (13.3.2)	N/A
1.6 (4.22)	Attachments to lamps not cause overheating or damage		N/A
1.6 (4.23)	Semi-luminaires comply Class II		N/A

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

1.6 (4.24)	**Photobiological hazards**		**P**
1.6 (4.24.1)	No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P)		N/A
1.6 (4.24.2)	Retinal blue light hazard		P
	Class of risk group assessed according to IEC/TR 62778 ..... :	RG0	—
	Luminaires with E_{thr} :		N/A
	a) Fixed luminaires		N/A
	- distance x m, borderline between RG1 and RG2...:		N/A
	- marking and instruction according 3.2.23		N/A
	b) Portable and handheld luminaires		N/A
	- marking according 3.2.23 if RG1 exceeded at 200 mm according to IEC/TR 62778		N/A
	Portable luminaires for children IEC 60598-2-10 and Mains socket outlet nightlights IEC 60598-2-12 not exceed RG1 at 200 mm according to IEC/62778		N/A
1.6 (4.25)	**Mechanical hazard**		**P**
	No sharp point or edges		P
1.6 (4.26)	**Short-circuit protection**		**N/A**
1.6 (4.26.1)	Adequate means of uninsulated accessible SELV parts		N/A
1.6 (4.26.2)	Short-circuit test with test chain according 4.26.3		N/A
	Test chain not melt through		N/A
	Test sample not exceed values of Table 12.1 and 12.2		N/A
1.6 (4.27)	**Terminal blocks with integrated screwless earthing contacts**		**N/A**
	Test according Annex V		N/A
	Pull test of terminal fixing (20 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Pull test of mechanical connection (50 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Voltage drop test, resistance < 0,05 Ω		N/A
1.6 (4.28)	**Fixing of thermal sensing control**		**N/A**
	Not plug-in or easily replaceable type		N/A
	Reliably kept in position		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	No adhesive fixing if UV radiations from a lamp can degrade the fixing		N/A
	Not outside the luminaire enclosure		N/A
	Test of adhesive fixing:		N/A
	Max. temperature on adhesive material (°C) .....:		—
	100 cycles between t min and t max		N/A
	Temperature sensing control still in position		N/A
1.6 (4.29)	**Luminaires with non-replaceable light source**		**N/A**
	Not possible to replace light source		N/A
	Live part not accessible after parts have been opened by hand or tools		N/A
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:		P
	Minimum two fixing means		P
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/A
1.6 (4.31.1)	SELV circuits		P
	Used SELV source		P
	Voltage ≤ ELV		P
	Insulating of SELV circuits from LV supply		N/A
	Insulating of SELV circuits from other non SELV circuits		P
	Insulating of SELV circuits from FELV		N/A
	Insulating of SELV circuits from other SELV circuits		N/A
	SELV circuits insulated from accessible parts according Table X.1		P
	Plugs not able to enter socket-outlets of other voltage systems		N/A
	Socket outlets does not admit plugs of other voltage systems		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

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

1.7 (11)	**CREEPAGE DISTANCES AND CLEARANCES**		P
1.7 (11.2)	Creepage distances and clearances .....:	See Table 1.7 (11.2)	P
	Impulse withstand category (Normal category II) (Category III Annex U, Table U.1)	Category II ☒ Category III ☐	—

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Clause	Requirement + Test	Result - Remark	Verdict

1.8 (7)	**PROVISION FOR EARTHING**		N/A
1.8 (7.2.1 + 7.2.3)	Accessible metal parts		N/A
	Metal parts in contact with supporting surface		N/A
	Resistance < 0,5 Ω.....:		N/A
	Self-tapping screws used		N/A
	Thread-forming screws		N/A
	Thread-forming screw used in a grove		N/A
	Earth makes contact first		N/A
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
	Protective earthing of the luminaire not via built-in control gear		N/A
1.8 (7.2.2 + 7.2.3)	Earth continuity in joints, etc.		N/A
1.8 (7.2.4)	Locking of clamping means		N/A
	Compliance with 4.7.3		N/A
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
1.8 (7.2.5)	Earth terminal integral part of connector socket		N/A
1.8 (7.2.6)	Earth terminal adjacent to mains terminals		N/A
1.8 (7.2.7)	Electrolytic corrosion of the earth terminal		N/A
1.8 (7.2.8)	Material of earth terminal		N/A
	Contact surface bare metal		N/A
1.8 (7.2.10)	Class II luminaire for looping-in		N/A
	Double or reinforced insulation to functional earth		N/A
1.8 (7.2.11)	Earthing core coloured green-yellow		N/A
	Length of earth conductor		N/A

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

1.9 (15)	**SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS**		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	Separately approved; component list .....:	(see Annex 1)	N/A
	Part of the luminaire .....:	(see Annex 4)	N/A

1.10 (5)	**EXTERNAL AND INTERNAL WIRING**		P
1.10 (5.2)	**Supply connection and external wiring**		**P**
1.10 (5.2.1)	Means of connection.....:	Terminal block	P
	Outdoor luminaire has not PVC insulated external wiring if not class III or SELV ≤ 25 V a.c./60 V d.c. or protected from outdoor environment		N/A
1.10 (5.2.2)	Type of cable.....:		N/A
	Nominal cross-sectional area (mm²).....:		N/A
	Cables equal to IEC 60227 or IEC 60245		N/A
1.10 (5.2.3)	Type of attachment, X, Y or Z		N/A
1.10 (5.2.5)	Type Z not connected to screws		N/A
1.10 (5.2.6)	Cable entries:		P
	- suitable for introduction		P
	- adequate degree of protection		P
1.10 (5.2.7)	Cable entries through rigid material have rounded edges		P
1.10 (5.2.8)	Insulating bushings:		N/A
	- suitably fixed		N/A
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- tubes or guards made of insulating material		N/A
1.10 (5.2.9)	Locking of screwed bushings		N/A
1.10 (5.2.10)	Cord anchorage:		P
	- covering protected from abrasion		P
	- clear how to be effective		P
	- no mechanical or thermal stress		P
	- no tying of cables into knots etc.		P
	- insulating material or lining		P
1.10 (5.2.10.1)	Cord anchorage for type X attachment:		N/A
	a) at least one part fixed		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	b) types of cable		N/A
	c) no damaging of the cable		N/A
	d) whole cable can be mounted		N/A
	e) no touching of clamping screws		N/A
	f) metal screw not directly on cable		N/A
	g) replacement without special tool		N/A
	Glands not used as anchorage		N/A
	Labyrinth type anchorages		N/A
1.10 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment	Type Y	P
1.10 (5.2.10.3)	Tests:		P
	- impossible to push cable; unsafe		P
	- pull test: 25 times; pull (N) .....:	60N	P
	- torque test: torque (Nm).....:	0.15Nm	P
	- displacement ≤ 2 mm		P
	- no movement of conductors		P
	- no damage of cable or cord		P
	- function independent of electrical connection		P
1.10 (5.2.11)	External wiring passing into luminaire		P
1.10 (5.2.12)	Looping-in terminals		N/A
1.10 (5.2.13)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		N/A
1.10 (5.2.14)	Mains plug same protection		N/A
	Class III luminaire plug		N/A
	No unsafe compatibility		N/A
1.10 (5.2.16)	Appliance inlets (IEC 60320)		N/A
	Installation couplers (IEC 61535)		N/A
	Other appliance inlet or connector according relevant IEC standard		N/A

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

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Clause	Requirement + Test	Result - Remark	Verdict
1.10 (5.3.3)	Insulating bushings:		N/A
	- suitable fixed		N/A
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- cables with protective sheath		N/A
1.10 (5.3.4)	Joints and junctions effectively insulated		N/A
1.10 (5.3.5)	Strain on internal wiring		P
1.10 (5.3.6)	Wire carriers		N/A
1.10 (5.3.7)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		N/A
1.11 (8)	**PROTECTION AGAINST ELECTRIC SHOCK**		P
1.11 (8.2.1)	Live parts not accessible		P
	Basic insulated parts not used on the outer surface without appropriate protection		P
	Basic insulated parts not accessible with standard test finger on portable, settable and adjustable luminaires		N/A
	Basic insulated parts not accessible with Ø 50 mm probe from outside, other types of luminaires		P
	Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N/A
	Basic insulation only accessible under lamp or starter replacement		N/A
	Protection in any position		P
	Double-ended tungsten filament lamp		N/A
	Insulation lacquer not reliable		P
	Double-ended high pressure discharge lamp		N/A
	Relevant warning according to 3.2.18 fitted to the luminaire		N/A
1.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N/A
1.11 (8.2.3.a)	Class II luminaire:		P
	- basic insulated metal parts not accessible during starter or lamp replacement		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- basic insulation not accessible other than during starter or lamp replacement		P
	- glass protective shields not used as supplementary insulation		N/A
1.11 (8.2.3.b)	BC lampholder of metal in class I luminaires shall be earthed		N/A
1.11 (8.2.3.c)	SELV circuits with exposed current carrying parts:		N/A
	Ordinary luminaire:		N/A
	- voltage under load (V) .....:		N/A
	- no-load voltage (V) .....:		N/A
	- touch current if applicable (mA) .....:		N/A
	One conductive part insulated if required		N/A
	Other than ordinary luminaire:		N/A
	- nominal voltage (V) .....:		N/A
	Class III luminaire only for connection to SELV		N/A
	Class III luminaire not provided with means for protective earthing		N/A
1.11 (8.2.4)	Portable luminaire have protection independent of supporting surface		N/A
1.11 (8.2.5)	Compliance with the standard test finger or relevant probe		P
1.11 (8.2.6)	Covers reliably secured		P
1.11 (8.2.7)	Luminaire other than below with capacitor > 0,5 μF not exceed 50 V 1 min after disconnection		N/A
	Portable luminaire with capacitor > 0,1 μF (0.25) not exceed 34 V 1 s after disconnection		N/A
	Other luminaires with capacitor > 0,1 μF (0.25) with plug and track adaptors not exceed 60 V 5 s after disconnection	0V	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 (12.3)	Endurance test:		P
	- mounting-position .....:	As in normal use	—
	- test temperature (°C) .....:	55	—

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Clause	Requirement + Test	Result - Remark	Verdict
	- total duration (h) .....:	240	—
	- supply voltage: Un factor; calculated voltage (V)...:	264	—
	- lamp used .....:	LED	—
1.12 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N/A
	- marking legible		P
	- no cracks, deformation etc.		P
1.12 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
1.12 (12.5)	Thermal test (abnormal operation)	(see Annex 2)	P
1.12 (12.6)	Thermal test (failed lamp control gear condition):		P
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		P
	- measured winding temperature (°C): at 1,1 Un ....:		—
	- measured mounting surface temperature (°C) at 1,1 Un .....:		N/A
	- calculated mounting surface temperature (°C) .....:		N/A
	- track-mounted luminaires		N/A
1.12 (12.6.2)	Temperature sensing control		N/A
	- case of abnormal conditions .....:		—
	- thermal link		N/A
	- manual reset cut-out		N/A
	- auto reset cut-out		N/A
	- measured mounting surface temperature (°C).....:		N/A
	- track-mounted luminaires		N/A
1.12 (12.7)	Thermal test (failed lamp control gear in plastic luminaires):		N/A
1.12 (12.7.1)	Luminaire without temperature sensing control		N/A
1.12 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Test method 12.7.1.1 or Annex W .....:		—
	Test according to 12.7.1.1:		N/A
	- case of abnormal conditions .....:		—
	- Ballast failure at supply voltage (V) .....:		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
	Test according to Annex W:		N/A
	- case of abnormal conditions .....:		—
	- measured winding temperature (°C): at 1,1 Un .....:		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un .....:		—
	- calculated temperature of fixing point/exposed part (°C) .....:		—
	Ball-pressure test..... :	See Table 1.15 (13.2.1)	N/A
1.12 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		N/A
	- case of abnormal conditions .....:		—
	- measured winding temperature (°C): at 1,1 Un .....:		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un .....:		—
	- calculated temperature of fixing point/exposed part (°C) .....:		—
	Ball-pressure test.....:	See Table 1.15 (13.2.1)	N/A
1.12 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N/A
	- case of abnormal conditions .....:		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
1.12 (12.7.2)	Luminaire with temperature sensing control		N/A
	- thermal link.....:	Yes ☐ No ☐	—
	- manual reset cut-out.....:	Yes ☐ No ☐	—
	- auto reset cut-out .....:	Yes ☐ No ☐	—
	- case of abnormal conditions .....:		—

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Clause	Requirement + Test	Result - Remark	Verdict
	- highest measured temperature of fixing point/ exposed part (°C): .....:		—
	Ball-pressure test:.....:	See Table 1.15 (13.2.1)	N/A
1.13 (9)	**RESISTANCE TO DUST AND MOISTURE**		P
1.13 (-)	If IP > IP 20 the order of tests as specified in clause 1.12		N/A
1.13 (9.2)	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP.....:	IP 20	—
	- mounting position during test.....:	Normal use	—
	- fixing screws tightened; torque (Nm).....:	--	—
	- tests according to clauses .....:	Clause 9.2.0	—
	- electric strength test afterwards		P
	a) no deposit in dust-proof luminaire		N/A
	b) no talcum in dust-tight luminaire		N/A
	c) no trace of water on current-carrying parts or on insulation where it could become a hazard		N/A
	c.1) For luminaires without drain holes – no water entry		N/A
	c.2) For luminaires with drain holes – no hazardous water entry		N/A
	d) no water in watertight or pressure watertight luminaire		N/A
	e) no contact with live parts (IP 2X)		P
	e) no entry into enclosure (IP 3X and IP 4X)		N/A
	e) no contact with live parts through drain holes and ventilation slots (IP3X and IP4X)		N/A
	f) no trace of water on part of lamp requiring protection from splashing water		N/A
	g) no damage of protective shield or glass envelope		N/A
1.13 (9.3)	Humidity test 48 h	25 °C, 95% 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 .....:		—

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

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Clause	Requirement + Test	Result - Remark	Verdict

	Other than SELV		P
	- between live parts of different polarity.....:	1480V	P
	- between live parts and mounting surface.....:	2960V	P
	- between live parts and metal parts.....:	2960V	P
	- between live parts of different polarity through action of a switch.....:		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts .....:		N/A
	- Insulation bushings as described in Section 5 .....:		N/A
1.14 (10.3)	Touch current or protective conductor current (mA).:	Max.0.023mA	P

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

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Clause	Requirement + Test	Result - Remark	Verdict

1.7 (11.2)	TABLE: Creepage distances and clearances							P
	Minimum distances (mm) for a.c. (50/60 Hz) sinusoidal voltages							P
	Applicable part of IEC 60598-1 Table 11.1* and 11.2*							P
	Insulation type **	Measured clearance	Required		Measured creepage	Required		
			clearance	*Table		creepage	*Table	
Distance 1:	B	>2.6	1.5	11.1*	>2.6	2.5	11.1*	
Distance 2:	B	>2.6	1.5	11.1*	>2.6	2.5	11.1*	
Distance 3:	R	>5.1	3.0	11.1*	>5.1	5.0	11.1*	
Working voltage (V) ..... :					240VAC			—
PTI ..... :					< 600 ☒ ≥ 600 ☐			—
Pulse voltage if applicable (kV) ..... :					--			—
Supplementary information: Minimum values were recorded.								
Remark: 1. Distance 1: Live parts of different polarity; 2. Distance 2: Different polarity of fuse resistor; 3. Distance 3: Live part to metal enclosure								

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

1.15 (13.2.1)	TABLE: Ball Pressure Test of Thermoplastics			P
Allowed impression diameter (mm) .....:		2.0mm		—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)	
Transformer bobbin	--	125	0.93	
Driver PCB	--	125	0.71	
Lampshade		75	0.87	
Input/output block	--	125	1.82	
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

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Clause	Requirement + Test	Result - Remark	Verdict

Transformer bobbin	--	10	No	0	P
Driver PCB	--	10	No	0	P
Input/output block	--	10	No	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
Transformer bobbin	--	No	0	P
Driver enclosure	--	No	0	P
Light cover	--	No	0	P
Lampshade	--	No	0	P
Input/output terminal	--	No	0	P
Driver PCB	--	No	0	P
Any flame or glowing of the sample extinguished within 30 s of withdrawing the glow-wire, and any burning or molten drop did not ignite the underlying parts (Yes/No) .....:				Yes
Supplementary information:				

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

ANNEX 1	TABLE: Critical components information (see CDF)	P

Object / part No.	Code	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity
Driver						
Internal wire	B	Unirise Electric Wire &Cable Co Ltd	H03VVH2-F	2X0.75 mm² 300/300V	IEC/EN 50525-2-11	VDE 40017449

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Driver PCB	B	KINGBOARD LAMINATES HOLDINGS LTD	KB-6160	1.2MM, V-0, 130℃	UL 94	UL E123995
VDR MOV	B	SHAANXI HUAXING ELECTRONICS GROUP CO.,LTD	MYG20G07K561	AC 350 - 680 V, T85	IEC/EN 61051-1 IEC/EN 61051-2	VDE 40018747
X-Capacitor X1/X2	B	DONGGUAN CITY JURCC ELECTRONICS CO LTD	MPX/MKP	275V/305V/310V, 110℃	UL 60384-14	UL E343072
Y-Capacitor Y1/Y2	B	Jyh Chung Electronic Co.Ltd	JD	400V, 125℃	UL 60384-14	VDE 137027
Fuse	B	DONGGUAN CHEVRON ELECTRONIC TECHNOLOGY CO LTD	3TP series	Rated voltage:250V AC 1A/2A	UL 248-1	UL E358589
Transformer	B	Zhongshan ZhiWei Electronic Technology Co., Ltd	Edr2809	Type:Edr2809 Lp:1mH 15W NP1:(1-2)2UEWΦ0.23*1P*26TS Ns:(6-10)TIWΦ0.25*1P*19TS NP2:(2-3)2UEWΦ0.23*1P*20TS Nf:(4-5)2UEWΦ0.21*1P*26TS Type:Edr2809 Lp:0.7mH 22-25W NP1:(1-2)2UEWΦ0.23*1P*26TS Ns:(6-10)TIWΦ0.25*1P*19TS NP2:(2-3)2UEWΦ0.23*1P*20TS Nf:(4-5)2UEWΦ0.21*1P*26TS	IEC/EN 61347-1 IEC/EN 61347-2-13	Tested with appliance
-Transformer primary winding	B	DONG GUAN YIDA INDUSTRIAL CO LTD	QA-1/155	155℃	UL 94	UL E344055

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Clause	Requirement + Test	Result - Remark	Verdict

-Transformer secondary winding	B	DONGGUAN HAOKE ELECTRONICS TECHNOLOGY CO LTD	TIW-B	130℃	UL 94	UL E349887
-Bobbin	B	CHANG CHUN PLASTICS CO LTD	T375HF	V-0, 150℃	UL 94	UL E59481
L1 winding	B	DONG GUAN YIDA INDUSTRIAL CO LTD	QA-1/155	155℃	UL 94	UL E344055
Driver enclosure	B	SABIC Japan LLC	V4760(a2)	V-0, 130°C	UL 94	UL E207780
Luminaire						
Terminal block	B	MPM Moulages Plastiques du Midi 10 Boulevard de Joffrery - Z.I. 31605 MURET FRANKREICH	BMA 2215	Rated voltage: 250 V Rated current: 10 A	IEC/EN 60598-1	VDE 40035410
lampshade	B	CHI MEI CORPORATION	PG-383(+)	HB	UL94; UL746	UL E56070
LED chip	B	Zhongshan Yu Ming Photoelectric Technology	2835	VF:2.8-3.4V IF:60mA 3000K-6500K	IEC TR 62778	Test with appliance

The codes above have the following meaning:
A - The component is replaceable with another one, also certified, with equivalent characteristics
B - The component is replaceable if authorised by the test house
C - Integrated component tested together with the appliance
D - Alternative component

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

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		P
	Type reference ..... :	KH-PL-R025-24W-W-SD	—
	Lamp used..... :	LED	—
	Lamp control gear used ..... :	--	—
	Mounting position of luminaire..... :	As normal use	—
	Supply wattage (W) ..... :	26.4W	—
	Supply current (A)..... :	0.11A	—
	Calculated power factor ..... :	--	—
	Table: measured temperatures corrected for ta = 40 °C:		P
	- abnormal operating mode..... :	S/C output of driver S/C one LED	—
	- test 1: rated voltage ..... :	--	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage..... :	1.06x240V=254.4V	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :	--	—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage..... :	1.1×240V=264V	—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :	--	—

Temperature measurements, (°C)

Part	Clause 12.4 – normal				Clause 12.5 – abnormal	
	test 1	test 2	test 3	limit	test 4	limit
LED driver						
Input wire of driver	--	45.4	--	90	--	--
Output wire of driver	--	46.3	--	90	--	--
CX1	--	76.3	--	110	--	--
CX2	--	77.5	--	110	--	--
T1 winding	--	88.5	--	130	--	--
T1 bobbin	--	78.2	--	150	--	--
Y-capacitor(CY1)	--	80.8	--	125	--	--
Y-capacitor(CY2)	--	80.8	--	125	--	--
E-capacitor	--	81.1	--	105	--	--

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

Driver PCB near transformer	--	72.3	--	130	--	--
Enclosure	--	46.0	--	130	--	--
Luminaire						
Internal wire (near LED)	--	61.3	--	90	--	--
Accessible enclosure	--	65.6	--	90	--	--
Mounting surface	--	45.8	--	90	45.4	130
PCB of LED module	--	82.4	--	130	--	--
LED source cathode	--	85.9	--	Ref	--	--
Lighted object (0.1m)	--	49.9	--	90	46.8	175
Top surface above lamp enclosure(test box for recessed luminaire)	--	52.1	--	90	51.7	130
Side surface above lamp enclosure(test box for recessed luminaire)	--	48.3	--	90	46.7	130
Supplementary information: Abnormal operation can be covered by normal operation.						

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

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

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

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

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Clause	Requirement + Test	Result - Remark	Verdict

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

(15.6.3.1) (15.6.3.2)	**TABLE: Contact resistance test / Heating tests**									N/A
	Voltage drop (mV) after 1 h									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Voltage drop of two inseparable joints									N/A
	Voltage drop after 10th alt. 25th cycle									N/A
	Max. allowed voltage drop (mV).....:									—
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									N/A
	Max. allowed voltage drop (mV).....:									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Continued ageing: voltage drop after 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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Attachment No.1

IEC60598_2_1D - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 60598-2-1 **EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES** Luminaires Part 2: Particular requirements Section 1: Fixed general purpose luminaires	
Differences according to.....:	EN 60598-2-1:1989 used in conjunction with EN 60598-1:2015
Annex Form No. .....:	EU_GD_IEC60598_2_1D
Annex Form Originator .....:	OVE
Master Annex Form.....:	2015-04
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	CENELEC COMMON MODIFICATIONS (EN)	—

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

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

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

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Attachment No.1

IEC60598_2_1D - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

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

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

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Attachment No.2

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

4	**GENERAL REQUIREMENTS**		**P**
4.4	Integral modules tested assembled in the luminaire		P
4.5	Independent modules complies with requirements in IEC 60598-1		N/A

5	**GENERAL TEST REQUIREMENTS**		**P**
5.5	SELV-operated LED modules comply with Annex I of IEC 61347-2-13	(see Annex 1)	P
	General conditions for tests in Annex A	(see Annex A)	P

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

7	**MARKING**		**N/A**
7.1	**Mandatory markings for built-in or independent modules**		N/A
	a) mark of origin		N/A
	b) model number, type reference		N/A
	c1) constant voltage module; rated supply voltage and supply frequency		N/A
	c2) constant current module; rated supply current and supply frequency		N/A
	d) nominal power		N/A
	e) indication of connections, wiring diagram		N/A
	f) value of t_c and place on the module		N/A
	g) *E*thr if required		N/A
	h) symbol for built-in modules		N/A
	i) heat transfer temperature t_d		N/A
	j) power for heat-conduction P_d		N/A
	k) working voltage for insulation		N/A
7.2	**Location of marking**		N/A
	- marking of a), b), c) and f) on the modules		N/A
	- marking of d), e), g), h), i) and j) on the modules or data sheet		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- marking of k) in manufactures literature		N/A
	- integral modules a) to g) in literature		N/A
7.3	**Durable and legibility of marking**		N/A
	- marking of a), b), c) and f) legible after test with water		N/A
	- marking of d) to j) inspection of compliance		N/A
8	**TERMINALS**		**N/A**
	Screw terminals according section 14 of IEC 60598-1:		N/A
	Separately approved; component list		N/A
	Part of the luminaire		N/A
	Screwless terminals according section 15 of IEC 60598-1:		N/A
	Separately approved; component list		N/A
	Part of the luminaire		N/A
	Connectors according IEC 60838-2-2:		N/A
	Separately approved; component list		N/A
9 (9)	**PROVISION FOR PROTECTIVE EARTHING**		**N/A**
- (9.1)	**Provisions for protective earthing**		N/A
	Terminal complying with clause 8		N/A
	Locked against loosening and not possible to loosen by hand		N/A
	Not possible to loosen clamping means unintentionally on screwless terminals		N/A
	Earthing via means of fixing		N/A
	Earthing terminal only used for the earthing of the control gear		N/A
	All parts of material minimizing the danger of electrolytic corrosion		N/A
	Made of brass or equivalent material		N/A
	Contact surface bare metal		N/A
- (9.2)	**Provision for functional earthing**		N/A
	Comply with clause 8 and 9.1		N/A
- (9.3)	**Earth contact via the track on the printed board**		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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/A
- (9.4)	**Earthing of built-in lamp controlgear**		N/A
	Earth by means of fixing to earthed metal of luminaire in compliance of 7.2 of IEC 60598-1		N/A
	Earthing terminal only for earthing the built-in controlgear		N/A
- (9.5)	**Earthing via independent controlgear**		N/A
- (9.5.1)	Earth connection to other equipment		N/A
	Looping or through connection, conductor min. 1,5 mm² and of copper or equivalent		N/A
	Protective earthing wires in line with 5.3.1.1 and clause 7		N/A
- (9.5.2)	Earthing of the lamp compartments powered via the independent lamp controlgear		N/A
	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/A
	Output earthing terminal marked as in 7.1 t) of IEC 61347-1		N/A
10 (10)	**PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS**		**N/A**
- (10.1)	Controlgear protected against accidental contact with live parts		N/A
- (A2)	The current flowing between the part concerned and earth is measured and does not exceed 0,7 mA (peak) or 2 mA d.c. ..... :		N/A
- (A2)	For frequencies above 1 kHz, the current does not exceed 0,7 mA (peak) multiplied by the value of the frequency in kilohertz or 70 mA (peak) ..... :		N/A
- (A3)	The voltage between the part concerned and any accessible part is measured and does not exceed 34 V (peak) ..... :		N/A
- (10.1)	Lacquer or enamel not used for protection or insulation		N/A
	Adequate mechanical strength on parts providing protection		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
- (10.2)	Capacitors > 0,5 μF: voltage after 1 min (V): < 50 V ..... :		N/A
- (10.3)	Controlgear providing SELV		P
	Accessible conductive parts are insulated from live parts by double or reinforced insulation in SELV controlgear		P
	No connection between output circuit and the body or protective earthing circuit		P
	No possibility of connection between output circuit and the body or protective earthing circuit through other conductive parts		P
	SELV outputs separated by at least basic insulation		P
	ELV conductive parts insulated as live parts		N/A
	Tests according Annex L of IEC 61347-1		P
- (10.4)	Accessible conductive parts in SELV circuits		N/A
	Output voltage under load ≤ 25 V r.m.s. or ≤ 60 V d.c.		N/A
	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/A
	One conductive part is insulated if output voltage or current exceeding the values above and withstand test voltage 500 V		N/A
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		N/A
	Y1 or Y2 capacitors comply with IEC 60384-14		N/A
	Resistors comply with test (a) in 14.1 of IEC 60065		N/A
11 (11)	**MOISTURE RESISTANCE AND INSULATION**		**P**
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (MΩ):		P
	For basic insulation ≥ 2 MΩ .....:	>500MΩ	P
	For double or reinforced insulation ≥ 4 MΩ .....:		N/A
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

12 (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	500V	P
	Working voltage > 50 V ≤ 1000 V, test voltage (V):		N/A
	Basic insulation, 2U + 1000 V		N/A
	Supplementary insulation, 2U + 1000 V		N/A
	Double or reinforced insulation, 4U + 2000 V		N/A
	No flashover or breakdown		P
	Solid or thin sheet insulation for double or reinforced insulation fulfil the requirements in Annex N in IEC 61347-1		N/A

13 (14)	**FAULT CONDITIONS**		**P**
- (14)	When operated under fault conditions the controlgear:		P
	- does not emit flames or molten material		P
	- does not produce flammable gases		P
	- protection against accidental contact not impaired		P
	Thermally protected controlgear does not exceed the marked temperature value		N/A
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected	(see appended table)	P
- (14.1)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (except between live parts and accessible metal parts)	(see appended table)	P
	Creepage distances on printed boards less than specified in clause 16 in Part 1 provided with coating according to IEC 60664-3		N/A
- (14.2)	Short-circuit or interruption of semiconductor devices	(see appended table)	P
- (14.3)	Short-circuit across insulation consisting of lacquer, enamel or textile	(see appended table)	N/A
- (14.4)	Short-circuit across electrolytic capacitors	(see appended table)	P
- (14.5)	After the tests has been carried out on three samples:		P
	The insulation resistance ≥ 1 MΩ ..... :	>500MΩ	P
	No flammable gases		P

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Clause	Requirement + Test	Result - Remark	Verdict
	No accessible parts have become live		P
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
- (14.6)	Relevant fault condition tests with high-power supply		N/A
13.2	**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/A
	No fire, smoke or flammable gas is produced		P
	Molten material does not ignite tissue paper, spread below the module		P
15	**CONSTRUCTION**		**P**
	Wood, cotton, silk, paper and similar fibrous material not used as insulation		P
16 (16)	**CREEPAGE DISTANCES AND CLEARANCES**		**N/A**
- (16)	Creepage and distances and clearances in compliance with IEC 61347-1	(see appended table)	N/A
	Insulating lining of metallic enclosures		N/A
	Basic insulation on printed boards tested according to clause 14		N/A
	Distances subjected to both sinusoidal voltage as non-sinusoidal pulses not less than value in Table 16		N/A
	Creepage distances not less than minimum clearance		N/A
16 (-)	Conductive accessible parts in compliance with applicable parts of IEC 60598-1	See main report for details.	N/A
17 (17)	**SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS**		**P**
	Cl. 17 refer to Cl. 17 of IEC 61347-1 which refer to Cl. 4.11 and 4.12 of 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/A
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
(4.11.3)	Screw locking:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- spring washer		N/A
	- rivets		N/A
(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/A
(4.12)	**Mechanical connections and glands**		N/A
(4.12.1)	Screws not made of soft metal		N/A
	Screws of insulating material		N/A
	Torque test: torque (Nm); part.....:		N/A
	Torque test: torque (Nm); part.....:		N/A
	Torque test: torque (Nm); part.....:		N/A
(4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
(4.12.4)	Locked connections:		N/A
	- fixed arms; torque (Nm).....:		N/A
	- lampholder; torque (Nm).....:		N/A
	- push-button switches; torque 0,8 Nm.....:		N/A
(4.12.5)	Screwed glands; force (Nm).....:		N/A
18 (18)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		**P**
- (18.1)	Ball-pressure test .....:	See main report for details.	P
- (18.3)	Glow-wire test (650°C) .....:	See Test Table 18 (18.3)	N/A
- (18.4)	Needle-flame test (10 s) .....:	See main report for details.	P
- (18.5)	Proof tracking test .....:	See Test Table 18 (18.5)	N/A
19 (19)	**RESISTANCE TO CORROSION**		**N/A**
	- test according 4.18.1 of IEC 60598-1		N/A
	- adequate varnish on the outer surface		N/A
20	**INFORMATION FOR LUMINAIRE DESIGN**		**N/A**
	Information in Annex D (informative)		—
21	**HEAT MANAGEMENT**		**N/A**
21.1	**General**		N/A
	Exchangeability is safeguarded by cap or base		N/A
21.2	**Heat-conducting foil and paste**		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Heat-conducting foil delivered with the module if necessary		N/A
22	**PHOTOBIOLOGICAL SAFETY**		**P**
22.1	**UV radiation**		N/A
	Luminous radiation not exceed 2mW/klm		N/A
22.2	**Blue light hazard**		P
	Assessed according to IEC TR 62778		P
22.3	**Infrared radiation**		N/A
	Requirements for infrared radiation when required		N/A
A	**ANNEX A - TESTS**		**P**
	All tests performed in accordance with the advice given in Annex H of IEC 61347-1, if applicable		P

13 (14)	**TABLE: tests of fault conditions**	**P**
Part	**Simulated fault**	**Hazard**
S/C one LED	One LED no work, other LEDs normal.	NO
O/C one LED	One LED no work, other LEDs normal.	NO

16 (16)	**TABLES: Creepage distances and clearances**	N/A
Table 3	**Minimum distances (mm) for a.c. (50/60 Hz) sinusoidal voltages**	N/A

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

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Required basic insulation		0,2	0,8	1,5	3	4	5,5
Measured		--	--	--	--	--	--
Required supplementary insulation		-	0,8	1,5	3	4	5,5
Measured		--	--	--	--	--	--
Required reinforced insulation		-	1,6	3	6	8	11
Measured		--	--	--	--	--	--
Table 4	**Minimum distances (mm) for non-sinusoidal pulse voltages**						
Rated pulse voltage (peak kV)	2,0	2,5	3,0	4,0	5,0	6,0	8,0
Required clearances	1,0	1,5	2	3	4	5,5	8
Measured	--	--	--	--	--	--	--
Rated pulse voltage (peak kV)	10	12	15	20	25	30	40
Required clearances	11	14	18	25	33	40	60
Measured	--	--	--	--	--	--	--
Rated pulse voltage (peak kV)	50	60	80	100	-	-	-
Required clearances	75	90	130	170	-	-	-
Measured	--	--	--	--	-	-	-

ANNEX 1	**SELV-operated LED modules**	P
	Requirements not applicable to the evaluated product.	—

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Attachment No.3

AS/NZS 60598.1:2017			
Clause	Requirement - Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 60598-1
Australia and New Zealand NATIONAL DIFFERENCES

Luminaires

Part 1: General requirements and tests

Differences according to .....: AS/NZS 60598.1:2017 compared to IEC 60598-1:2014

	National Differences		—
Table 3.1	1 Second column, second row, delete Item 3.2.21.		P
	2 Third column, second row, add the following new item:		P
	3.2.21 The relevant symbol for luminaires not suitable for covering with thermally insulating material.		P
3.2.3	Delete the text ‘, if other than 25 °C’.		P
3.2.12	At the end of the Clause, insert the following text:		N/A
	In Australia, luminaires for household use and similar with supply cords that are not fitted with a plug shall be marked with a cord tag with the symbol for “must be installed by a licensed electrician”. (Refer to Figure ZZ1.)		N/A
3.2.23	At the end of the Clause, insert the following text:		N/A
	The additional information shall include the symbol "Do not stare at the operating light source" (see Figure 1) along with an explanation of the symbol.		N/A
3.3.7	Delete Clause and replace with the following		N/A
	Luminaires for use with metal halide lamps shall be provided with instructions that state the substance of the following:		N/A
	To avoid potential unsafe lamp failure, the luminaire shall be switched off for at least 10 minutes at least once a week. In addition, the luminaire shall be operated: — complete with its protective shield; or — with a double jacketed lamp.		N/A
3.3.18	Delete the text ‘, i.e. for indoor use only’.		N/A
3.3.21	Delete the text ‘Caution, risk of electric shock’ and the symbol.		N/A
3.3.101 and 3.3.102 (new)	After Clause 3.3.22, add new Clauses 3.3.101 and 3.3.102 as follows:		N/A

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Attachment No.3

AS/NZS 60598.1:2017			
Clause	Requirement - Test	Result - Remark	Verdict
3.3.101	The instructions shall contain details of the components in the luminaire that require replacement as part of a maintenance program		N/A
3.3.102	The instructions for luminaires, including for remotes or other accessories containing coin/button cell batteries and batteries designated R1, shall include the safety warnings below. Equipment containing one or more coin/button cell/R1 batteries shall have the safety warnings in the instructions accompanying the equipment. The safety warnings are not required where these batteries are not intended to be replaced or are only accessible after damaging the equipment. The safety warnings shall be as follows: – CAUTION: Do not ingest battery—Chemical burn hazard [or equivalent wording]. – [The remote control supplied with] this product contains a coin/button cell battery. If the coin/button cell battery is swallowed, it can cause severe internal burns in just 2 hours and can lead to death. – Keep new and used batteries away from children. – If the battery compartment does not close securely, stop using the product and keep it away from children. – If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention. NOTE 1 Coin/button cell batteries are small, single cell devices having a diameter greater than their height. NOTE 2 Battery designations are specified in IEC 60086-2.		N/A
4.7.2	Delete the first paragraph and replace with the following:		N/A
	Terminals shall be located or shielded in such a way that, if a wire of a stranded conductor escapes from a terminal when the conductors are fitted, there is no risk of contact between live parts and metal parts that can be touched with the standard test finger, nor shall it be possible to touch a live free wire with the standard test finger when the luminaire is fully assembled for use or open for the replacement of replaceable light sources or starters.		N/A
4.8	After the third paragraph, insert the following text:		N/A

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AS/NZS 60598.1:2017			
Clause	Requirement - Test	Result - Remark	Verdict
	Switches shall comply with AS/NZS 3133, the AS/NZS 60669 series or AS/NZS 61058.1. Switches that indicate an off position shall have contacts with an air break and comply with AS/NZS 3133, AS/NZS 60669.1 or AS/NZS 61058.1.		N/A
	Fourth paragraph, delete the text 'IEC 61058-1' and replace with 'AS/NZS 60669.2.1 or IEC 61058-1 classified for 10,000 operating cycles'.		N/A
4.10.4	First paragraph, delete the last sentence and replace with the following:		P
	If the working voltage does not exceed the rated voltage of the capacitor, accessible conductive parts separated from live parts by double or reinforced insulation, as above, may be bridged by a single Y1 capacitor with qualification approval as specified in IEC 60384-14.		P
4.14.6	After the first paragraph, insert the following text:		N/A
	A fixed socket-outlet complying with AS/NZS 3112 or AS/NZS 60884.1 is used for the following test.		N/A
4.32	At the end of the Clause, insert the following text:		N/A
	Metal oxide varistors shall comply with the requirements of AS/NZS 3100 for metal oxide varistors incorporated in accessories. NOTE The test and assessment is conducted on any circuits connected between phases (between actives and between actives and neutral) and circuits connected between phases and earth (actives-to-earth and neutral-to-earth).		N/A
4.101 (new)	After Clause 4.32, add new Clauses as follows:		N/A
4.101.1	**Small batteries**		N/A

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AS/NZS 60598.1:2017			
Clause	Requirement - Test	Result - Remark	Verdict
	Batteries that fit wholly within the small parts cylinder as specified in Clause 5.2 of ISO 8124-1 shall not be removable without the aid of a tool. Luminaires intended for children under the age of three, or parts of such luminaries that contain batteries, shall not fit wholly within the small parts cylinder as specified in Clause 5.2 of ISO 8124-1. For luminaires or parts of luminaires containing batteries that fit wholly within the small parts cylinder as specified in Clause 5.2 of ISO 8124-1, the batteries shall not be accessible without the aid of a tool. Compliance is checked by inspection and by the following test. A force is applied without jerks for 10 s in the most unfavourable direction to parts likely to be weak. The force is as follows: – push force, 50 N; – pull force; 30 N; – if the shape of the part is such that the fingertips cannot easily slip off, 50 N; – if the projection of the part that is gripped is less than 10 mm in the direction of removal, 30 N. The push force is applied by test probe 11 of IEC 61032. The pull force is applied by a suitable means, such as a suction cup, so that the test results are not affected. While the force is being applied, the test fingernail of Figure 7 of AS/NZS 60335.1 is inserted in any aperture or joint with a force of 10 N. The fingernail is then slid sideways with a force of 10 N but is not twisted or used as a lever. If the shape of the part is such that an axial pull is unlikely, the pull force is not applied but the test fingernail is inserted in any aperture or joint with a force of 10 N and is then pulled for 10 s by means of the loop with a force of 30 N in the direction of removal. If the part is likely to be twisted, the following torque is applied at the same time as the pull or push force: – 2 Nm, for major dimensions up to 50 mm. – 4 Nm, for major dimensions over 50 mm. This torque is also applied when the test fingernail is pulled by means of the loop. If the projection of the part that is gripped is less than 10 mm, the torque is reduced by 50 %. NOTE The types and dimensions of batteries are specified in IEC 60086-2.		N/A

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AS/NZS 60598.1:2017			
Clause	Requirement - Test	Result - Remark	Verdict
4.101.2	**Battery compartment fasteners**		N/A
	If screws or similar fasteners are used to secure a door or cover providing access to the battery compartment, the screw or similar fastener shall be captive to ensure that it remains with the door, cover or equipment. Compliance is checked by inspection and by the following test. A force of 20 N is applied to the screw or similar fastener without jerks for a duration of 10 s in any direction.		N/A
5.2.1	Delete the first paragraph and replace with the following:		P
	Luminaires shall be provided with only one of the following means of connection and isolation to the supply. Fixed luminaires: – device for the connection of luminaires; – terminals; – plug for engagement with socket-outlets; – connecting leads (tails) in accordance with Clause 4.6 requirements; – supply cord; – supply cord and plug; – adapter for engagement with supply tracks; – appliance inlet; – installation coupler; – luminaire coupler. Portable luminaires: – supply cord with plug; – appliance inlet; – inlet plug complying with AS/NZS 3120. Track-mounted luminaires: – adaptor; – connector.	Terminal block	P
	Delete the second and third paragraphs.		P
	After Note 3, insert the following text:		P

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Attachment No.3

<table>
<tr><th colspan="4">AS/NZS 60598.1:2017</th></tr>
<tr><td>Clause</td><td>Requirement - Test</td><td>Result - Remark</td><td>Verdict</td></tr>
<tr><td></td><td>In Australia, non-portable luminaires with a supply cord shall be fitted with a plug complying with AS/NZS 3112 or a coupler complying with the relevant standard, except where the luminaire has markings and instructions that comply with Clause 3.2.12, in which case, a plug or coupler is not required.
For other than portable luminaires a plug is not required if the luminaire has markings and instructions in accordance with Clause 3.2.12.
The plug portion of a luminaire with integral pins shall comply with the relevant requirements of AS/NZS 3112.
NOTE 4 PVC-insulated connection cords should not be used with outdoor luminaires in cold alpine locations.</td><td></td><td>P</td></tr>
<tr><td>5.2.2</td><td>Delete the first paragraph and replace with the following:
Supply cords used as a means of connection to the supply, when supplied by the luminaire manufacturer, shall be at least equal in their mechanical and electrical properties to those specified in IEC 60227 and IEC 60245, as indicated in Table 5.1, or in AS/NZS 3191, and shall be capable of withstanding, without deterioration, the highest temperature to which they may be exposed under normal conditions of use.</td><td></td><td>P</td></tr>
<tr><td></td><td>Delete the fourth paragraph and replace with the following:
To provide adequate mechanical strength, the nominal cross-sectional area of the conductors shall be not less than:
— 0,75 mm^2;
— 1,0 mm^2 for portable rough service luminaires.</td><td></td><td>P</td></tr>
<tr><td></td><td colspan="2">Delete Table 5.1 and replace with the following:</td><td>P</td></tr>
<tr><td></td><td>Table 5.1 — Supply cord
<table>
<tr><th>Luminaire</th><th>Rubber</th><th>PVC</th><th>No insulation</th></tr>
<tr><td>Ordinary class I luminaires</td><td>60245 IEC 51S [c]</td><td>60227 IEC 52 [c]</td><td></td></tr>
<tr><td>Ordinary class II luminaires</td><td>60245 IEC 53 [c]</td><td>60227 IEC 52 [c]</td><td></td></tr>
<tr><td>Luminaires which are other than ordinary class I and II</td><td>60245 IEC 57 [c]</td><td>60227 IEC 53 [ac]</td><td></td></tr>
<tr><td>Portable rough service luminaires</td><td>60245 IEC 66 [c]</td><td>PVC insulated and sheathed heavy duty flexible cord</td><td></td></tr>
<tr><td>Class III or with SELV circuits luminaires (up to 25 V a.c./60 V d.c.)</td><td colspan="2"></td><td>Un-insulated conductor [b]</td></tr>
<tr><td>Class III or with SELV circuits luminaires (above 25 V a.c./60 V d.c.), including 50 V a.c./120 V d.c.</td><td colspan="2">Unsheathed basic insulated conductor</td><td></td></tr>
</table>
[a] For indoor use only.
[b] AS/NZS 3000 may restrict the use of un-insulated conductors in certain special installations.
[c] For supply voltages greater than 250 V, higher voltage grade cables and cords than those given in the above table may be necessary.</td><td></td><td>P</td></tr>
</table>

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Clause	Requirement - Test	Result - Remark	Verdict
5.2.16	At the end of the Clause, insert the following text:		N/A
	Class II luminaires for fixed wiring incorporating an appliance coupler shall not have means to allow further luminaires to be connected by cascading including connection by looping-in. Luminaire couplers incorporated with the luminaire shall comply with IEC 61995-1. Luminaires incorporating installation couplers may have means to allow further luminaires to be connected by cascading provided the through wiring is rated for the current rating of the installation coupler.		N/A
5.2.18	Delete Clause and replace with the following:		N/A
	All portable luminaires with a supply cord shall be fitted with a plug complying with AS/NZS 3112. Other luminaires with a supply cord shall be fitted with a plug complying with AS/NZS 3112, unless they have the warning specified by Clause 3.2.12.		N/A
5.3.1	Delete the third paragraph and replace with the following:		N/A
	making protective earth connections only. Functional earth connections shall not be made by wires coloured green, yellow or green/yellow combination. NOTE 101 Internal wires of other colours are not precluded from making protective earthing connections.		N/A
5.3.1.3	Delete Clause and replace with the following:		N/A
	In class II luminaires, where the internal wiring has a live conductor and the wiring insulation may touch accessible metal parts under normal operating conditions, the insulation, at least at the places of contact, shall comply with the requirements for double or reinforced insulation, e.g. by applying sheathed cables or sleeves.		N/A
7.2.11	Delete the third paragraph and replace with the following:		N/A
	All conductors, whether internal or external, coloured green, yellow or green/yellow combination, shall only be connected to an earthing terminal.		N/A
8.2.1	Delete the first two paragraphs including Note 1 and replace with the following:		P

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Clause	Requirement - Test	Result - Remark	Verdict
	Luminaires shall be so constructed that their live parts and basic insulation are not accessible when the luminaire has been installed and wired as in normal use. Live parts shall not be accessible when the luminaire is opened as necessary for user cleaning or maintenance, or for replacement of lamps, replaceable light sources or (replaceable) starters, even if the operation cannot be achieved by hand. Luminaires with non-replaceable light sources are subjected to the tests of Clause 4.29 prior to applying the tests and inspections of Section 8 of this Standard. NOTE 1 Examples of parts with basic insulation are cables intended for internal wiring, controlgear for building-in, etc. This does not apply to the non-current-carrying parts of lamp caps that comply with the relevant IEC safety standard.		P
	Delete the ninth paragraph beginning with 'Covers in fixed luminaires that cannot be removed…'		P
9.2	After Note 1, insert the following new Note:		N/A
	NOTE 101 A designation of IPX7 or IPX8 is considered unsuitable for exposure to water jets (designated by IPX5 or IPX6) and may not comply with requirements for second numeral 5 or 6 unless it is dual coded.		N/A
10.3	Delete the second row beginning with 'Class I luminaires rated up to and including 16 A…'.		N/A
	First column, third row, delete the word 'Metal'.		N/A
12.1	First column, first row, delete the text—		P
	'Case (of capacitor, starting device, electronic ballast or convertor, etc.)' and replace with the following: 'Case (of control gear, capacitor, starting device, electronic ballast or convertor, etc.)'		P
	Add the following new Note after Table 12.1:		P

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Clause	Requirement - Test	Result - Remark	Verdict
	NOTE 101 Luminaire manufacturers should consider the maximum ambient air temperature in the vicinity of components such as starting devices and electronic ballasts or converters. Component performance specifications advise manufacturers to mark or supply life data as maximum ambient air temperature based on 50,000 h. This t-life is often marked as ta and is the temperature of the air in the vicinity of the component and is not related to the luminaire ta. As such, luminaire manufacturers should measure air temperature in the vicinity of such components, within the luminaire, as even those complying with their tc point measurements can still fail prematurely if t-life is exceeded.		P
13.3	Delete Clause and replace with the following:		P
	Resistance to flame and ignition		P
	Parts of non-metallic material shall be resistant to flame and ignition. For materials other than ceramic, compliance is checked by the tests of 13.3.1 and 13.3.2, and 13.3.3 as appropriate. This requirement does not apply to decorative trims, knobs, wiring insulation and other parts not likely to be ignited or to propagate flames from inside the luminaire. This Clause applies to all parts, including components, even if they have been tested to their own IEC or equivalent standard.		P
13.3.1	Parts of non-metallic material supporting connections that could become an ignition source, and parts of non-metallic material within a distance of 3 mm of such connections, shall withstand the glow wire test. Welded connections, soldered connections on printed circuit boards and other connections carrying less than 0.2 A during normal operation are not considered to be an ignition source. The test apparatus, test procedure and criteria shall be those specified in AS/NZS 60695.2.11. The glow wire is heated to 750 °C and applied to one test sample for 30 s.	Transformer bobbin, Driver enclosure, Light cover, Input/output terminal	P

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Clause	Requirement - Test	Result - Remark	Verdict
13.3.2	All other parts of non-metallic material which do not support connections that could become an ignition source, but provide protection against electric shock or maintain creepage and clearances, shall withstand the glow wire test. The test apparatus, test procedure and criteria shall be those specified in AS/NZS 60695.2.11. The glow wire is heated to 650 °C and applied to one test sample for 30 s.	Lampshade	P
13.3.3	During the application of the glow wire test of Clause 13.3.1 and 13.3.2, if a flame is produced that persists for longer than 2 s, the luminaire is further tested as follows: The needle-flame test of AS/NZS 60695.11.5 is applied to non-metallic parts that encroach within the envelope of a vertical cylinder having a diameter of 20 mm and a height of 50 mm above the point of application of the glow wire. Parts shielded by a barrier that meets the needle-flame test of AS/NZS 60695.11.5 are not tested. NOTE This requires the needle flame to be applied to all parts likely to be impinged upon by the glow-wire flame within the hypothetical envelope of a vertical cylinder positioned above the point of application of the glow-wire. This applies to all parts unless there is a barrier that passes the needle-flame test and is within the cylinder and would protect the part from the glow-wire flame.	No flame	N/A

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AS/NZS 60598.2.2:2016			
Clause	Requirement - Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 60598-2-1 Australia and NewZealand NATIONAL DIFFERENCES Luminaires Part 2: Particular requirements Section One – Fixed general purpose luminaires	
Differences according to .....:	AS/NZS 60598.2.1:2014/Amdt1:2016 Compared to IEC 60598-2-1(ed.1);am1
Attachment Form No.....:	AU_NZS_ND_IEC60598_2_1C
Attachment Originator .....:	TÜV SÜD
Master Attachment.....:	2015-10
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6	**MARKING**		—
	LED luminaires with G5 or G13 lampholders shall be marked with the following warning: WARNING: NOT FOR USE WITH ANY FLUORESCENT LAMP – FOR USE ONLY WITH TYPE X LED LAMPS In the warning, 'X' shall be replaced by 'A' or 'B' to denote Type A or Type B, as appropriate. The warning label shall be durable and the font size shall be a minimum of 5mm for letters and numbers and 5mm for symbols and shall be visible during lamp replacement. NOTE: Manufacturers should specify minimum requirements for the operations of their lamps, including spacing, enclosure design and temperature limitations.		N/A
7	**CONSTRUCTION**		—
	LED luminaires with G5 and G13 lampholders shall include a fuse to protect a fluorescent lamp that is inadvertently installed: Each fuse shall – (a) be of the 150V HRC type; (b) have a 2.0A max. quick-acting type rating; and (c) be used to protect a maximum of two lamps.		N/A

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AS/NZS 60598.2.2:2016			
Clause	Requirement - Test	Result - Remark	Verdict

13	**ENDURANCE TESTS AND THERMAL TESTS**		—
	Luminaires with an IP classification greater than IP20 shall be subjected to the relevant tests of Clauses 12.4, 12.5 and 12.6 of Section 12 of AS/NZS 60598.1 after the test(s) of Clause 9.2 but before the test(s) of Clause 9.3 of Section 9 of AS/NZS 60598.1 specified in Clause 14 of this Standard.		N/A
14	**RESISTANCE TO DUST AND MOISTURE**		—
	For luminaires with an IP classification greater than IP20 the order of the tests specified in Section 9 of AS/NZS 60598.1 shall be as specified in Clause 13 of this Standard.		N/A
APPENDIX A	**SAFETY REQUIREMENTS FOR DOUBLE-CAPPED LED LAMPS (Normative)**		N/A

ANNEX 2	**TABLE: Temperature measurements, thermal tests of Section 12**		P
	Type reference ..... :	KH-PL-R025-24W-W-SD	—
	Lamp used ..... :	LED	—
	Lamp control gear used ..... :	--	—
	Mounting position of luminaire ..... :	As normal use	—
	Supply wattage (W) ..... :	26.4W	—
	Supply current (A) ..... :	0.11A	—
	Calculated power factor ..... :	--	—
	Table: measured temperatures corrected for ta = 40 °C:		P
	- abnormal operating mode ..... :	S/C output of driver S/C one LED	—
	- test 1: rated voltage ..... :	--	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage ..... :	1.06x240V=254.4V	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :	--	—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage ..... :	1.1×240V=264V	—

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AS/NZS 60598.2.2:2016			
Clause	Requirement - Test	Result - Remark	Verdict

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

Temperature measurements, (°C)

Part	Clause 12.4 – normal				Clause 12.5 – abnormal	
	test 1	test 2	test 3	limit	test 4	limit
LED driver						
Input wire of driver	--	45.4	--	90	--	--
Output wire of driver	--	46.3	--	90	--	--
CX1	--	76.3	--	110	--	--
CX2	--	77.5	--	110	--	--
T1 winding	--	88.5	--	130	--	--
T1 bobbin	--	78.2	--	150	--	--
Y-capacitor(CY1)	--	80.8	--	125	--	--
Y-capacitor(CY2)	--	80.8	--	125	--	--
E-capacitor	--	81.1	--	105	--	--
Driver PCB near transformer	--	72.3	--	130	--	--
Enclosure	--	46.0	--	130	--	--
Luminaire						
Internal wire (near LED)	--	61.3	--	90	--	--
Accessible enclosure	--	65.6	--	90	--	--
Mounting surface	--	45.8	--	90	45.4	130
PCB of LED module	--	82.4	--	130	--	--
LED source cathode	--	85.9	--	Ref	--	--
Lighted object (0.1m)	--	49.9	--	90	46.8	175
Top surface above lamp enclosure(test box for recessed luminaire)	--	52.1	--	90	51.7	130
Side surface above lamp enclosure(test box for recessed luminaire)	--	48.3	--	90	46.7	130
Supplementary information: Abnormal operation can be covered by normal operation.						

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Attachment No.4

IEC TR 62778:2014			
Clause	Requirement + Test	Result - Remark	Verdict

7	**MEASUREMENT INFORMATION FLOW**		**P**
7.1	**Basic flow**		**P**
	'Law of conservation of luminance' applied		P
	Use of only true luminance/radiance values		P
	In case of luminaire: The light source is operated in the luminaire under similar conditions as when tested as a component		P
	In case E_{thr} value for RG2 was established the peak value was derived from angular light distribution		N/A
7.2	**Conditions for the radiance measurement**		**P**
	Standard condition applied (200mm distance, 0,011rad field of view)		P
	Non-standard condition applied		N/A
7.3	**Special cases (I): Replacement by a lamp or LED module of another type**		**N/A**
	Light source is a white light source		N/A
	Evaluation done based on highest luminance		N/A
	Evaluation done based on CCT value		N/A
7.4	**Special cases (II): Arrays and clusters of primary light sources**		**N/A**
	LED package is evaluated as	☐ RG0 unlimited ☐ RG1 unlimited	N/A
	E_{thr} of LED package applies to array		N/A
8	**RISK GROUP CLASSIFICATION**		**P**
	Risk group achieved:		P
	-.. Risk Group 0 unlimited		P
	-.. Risk Group 1 unlimited		N/A
	- E_{thr} ..... (lx): Distance to reach RG1 ..... (m):		N/A

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Attachment No.4

IEC TR 62778:2014			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: Spectroradiometric measurement		**P**
	Measurement performed on:	☐ **LED package** ☐ **LED module** ☐ **Lamp** ☒ **Luminaire**	
	Model number.....	KH-PL-R025-24W-W-SD	
	Test voltage (V).....	240V	—
	Test current (mA).....	-	—
	Test frequency (Hz)	50Hz	—
	Ambient, t (°C)	25	—
	Measurement distance	☒ 20 cm ☐ ... cm	—
	Source size	☒ Non-small ☐ Small : .... mm	—
	Field of view	☐ 100 mrad ☒ 11 mrad ☐ 1,7 mrad (for small sources)	—

Item	Symbol	Units	Result	Remark
Correlated colour temperature	CCT	K	6500K	
x/y colour coordinates			/	
Blue light hazard radiance	L_B	$W/(m^2 \cdot sr^1)$	9.116	
Blue light hazard irradiance	E_B	W/m^2	/	
Luminance	L	cd/m^2	$1.15x10^4$	
Illuminance	E	lx	/	
Supplementary information:				

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Attachment No. 5

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

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

6 (6)	**CLASSIFICATION**		**P**
	Built-in controlgear .....:	Yes ☒ No ☐	—
	Independent controlgear .....:	Yes ☐ No ☒	—
	Integral controlgear .....:	Yes ☐ No ☒	—
6 (-)	Auto-wound controlgear .....:	Yes ☐ No ☒	—
	Separating controlgear .....:	Yes ☐ No ☒	—
	Isolating controlgear .....:	Yes ☐ No ☒	—
	SELV controlgear .....:	Yes ☒ No ☐	—

7 (7)	**MARKING**	N/A

8 (10)	**PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS**		**P**
- (10.1)	Controlgear protected against accidental contact with live parts		P
- (A2)	Voltage measured with 50 kΩ	(see Annex A)	P
- (A3)	Voltage > 35 V peak or > 60 V d.c. or protective impendance device	(see Annex A)	P
- (10.1)	Lacquer or enamel not used for protection or insulation		P
	Adequate mechanical strength on parts providing protection		P

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IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
- (10.2)	Capacitors > 0,5 μF: voltage after 1 min (V): < 50 V .....:	See main report	P
- (10.3)	**Controlgear providing SELV**		P
	Accessible conductive parts are insulated from live parts by double or reinforced insulation in SELV controlgear		P
	No connection between output circuit and the body or protective earthing circuit		N/A
	No possibility of connection between output circuit and the body or protective earthing circuit through other conductive parts		N/A
	SELV outputs separated by at least basic insulation		N/A
	ELV conductive parts insulated as live parts		N/A
	Tests according Annex L of IEC 61347-1		P
- (10.4)	**Accessible conductive parts in SELV circuits**		P
	Output voltage under load ≤ 25 V r.m.s. or ≤ 60 V d.c.		P
	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/A
	One conductive part is insulated if output voltage or current exceeding the values above and withstand test voltage 500 V		P
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		P
	Y1 or Y2 capacitors comply with IEC 60384-14		P
	Resistors comply with test (a) in 14.1 of IEC 60065		N/A

9 (8)	**TERMINALS**		**P**
	Screw terminals according section 14 of IEC 60598-1:		**P**
	Separately approved; component list	(see Annex 1)	P
	Part of the controlgear	(see Annex 2)	N/A
	Screwless terminals according section 15 of IEC 60598-1:		N/A
	Separately approved; component list	(see Annex 1)	N/A

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IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Part of the controlgear	(see Annex 3)	N/A

10 (9)	**PROVISION FOR PROTECTIVE EARTHING**		**N/A**
- (9.1)	**Provisions for protective earthing**		**N/A**
	Terminal complying with clause 8		N/A
	Locked against loosening and not possible to loosen by hand		N/A
	Not possible to loosen clamping means unintentionally on screwless terminals		N/A
	All parts of material minimizing the danger of electrolytic corrosion		N/A
	Made of brass or equivalent material		N/A
	Contact surface bare metal		N/A
	Test according 7.2.3 of IEC 60598-1		N/A
- (9.2)	**Provision for functional earthing**		**N/A**
	Comply with clause 8 and 9.1		N/A
	Functional earth insulated from live parts by double or reinforced insulation		N/A
- (9.3)	**Lamp controlgear with conductors for protective earthing by tracks on printed circuit board**		**N/A**
	Test with a current of 25 A between earthing terminal or earthing contact 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/A
- (9.4)	**Earthing of built-in lamp controlgear**		N/A
	Earth by means of fixing to earthed metal of luminaire in compliance of 7.2 of IEC 60598-1		N/A
	Earthing terminal only for earthing the built-in controlgear		N/A
- (9.5)	**Earthing via independent controlgear**		**N/A**
- (9.5.1)	Earth connection to other equipment		N/A
	Looping or through connection, conductor min. 1,5 mm² and of copper or equivalent		N/A
	Protective earthing wires in line with 5.3.1.1 and clause 7 of IEC 60598-1		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
- (9.5.2)	Earthing of the lamp compartments powered via the independent lamp controlgear		N/A
	Test with a current of 25 A between input and output earth terminals; measured resistance (Ω) between earthing terminal or earthing contact and each of the accessible metal parts at ≥ 10 A according 7.2.3 of IEC 60598-1: < 0,5 Ω .....:		N/A
	Output earthing terminal marked as in 7.1 t) of IEC 61347-1		N/A
11 (11)	**MOISTURE RESISTANCE AND INSULATION**		**P**
- (11)	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance:		P
	For basic insulation ≥ 2 MΩ .....:	>500MΩ	P
	For double or reinforced insulation ≥ 4 MΩ .....:	>500MΩ	P
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		P
12 (12)	**ELECTRIC STRENGTH**		**P**
- (12)	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V		N/A
	Working voltage ≤ 50 V, test voltage 500 V		N/A
	Working voltage > 50 V ≤ 1000 V, test voltage (V):		P
	Basic insulation, 2U + 1000 V	1480V	P
	Supplementary insulation, 2U + 1000 V		N/A
	Double or reinforced insulation, 4U + 2000 V	2960V	P
	No flashover or breakdown		P
	Solid or thin sheet insulation for double or reinforced insulation fulfil the requirements in Annex N in IEC 61347-1		P
14 (14)	**FAULT CONDITIONS**		**P**
- (14.1)	When operated under fault conditions the controlgear:		P
	- does not emit flames or molten material		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- does not produce flammable gases		P
	- protection against accidental contact not impaired		P
	Thermally protected controlgear does not exceed the marked temperature value		P
	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)	P
- (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/A
- (14.5)	Short-circuit across electrolytic capacitors	(see appended table)	P
14 (-)	Reversed voltage polarity if d.c. supplied control gear	(see appended table)	N/A
- (14.6)	After the tests has been carried out on three samples:		P
	The insulation resistance ≥ 1 MΩ .....:	>500 MΩ	P
	No flammable gases		P
	No accessible parts have become live		P
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
- (14.7)	Relevant fault condition tests with high-power a.c. supply		—
14 (-)	Temperature declared thermally protected lamp controlgear fulfil requirements in Annex C		P

15 (-)	**TRANSFORMER HEATING**		**P**
15.1	**General**		**P**
	Transformer comply with clause L.6 and L.7 of IEC 61347-1		P
	Output voltage of SELV controlgear not exceed limits in 10.4 of IEC 61347-1 during the test of 15.1 and 15.2		P
15.2 (-)	**Normal operation**		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Comply with clause L.6 of IEC 61347-1		P
15.3 (-)	**Abnormal operation**		P
	Comply with clause L.7 of IEC 61347-1		P
	Double LED modules or equivalent load connected in parallel to the output terminals of constant voltage type		N/A
	Double LED modules or equivalent load connected in parallel to the output terminals of constant current type		P
15 (-)	During and at the end of the tests no defect impairing safety, nor any smoke or flammable gases produced		P
16 (15)	**CONSTRUCTION**		**P**
- (15.1)	**Wood, cotton, silk, paper and similar fibrous material**		**P**
	Wood, cotton, silk, paper and similar fibrous material not used as insulation		P
- (15.2)	**Printed circuits**		**P**
	Printed circuits used as internal connections complies with clause 14		P
- (15.3)	**Plugs and socket-outlets used in SELV or ELV circuits**		**N/A**
	No dangerous compatibility between output socket-outlet and a plug for socket-outlets for input circuit in relation to installation rules, voltages and frequencies		N/A
	Plugs and socket-outlets for SELV comply with IEC 60906-3 and IEC 60884-2-4		N/A
	Plugs and socket-outlets for SELV ≤ 3 A, ≤ 25 V r.m.s. or ≤ 60 V d.c. and ≤ 72 W comply with IEC 60906-3 and IEC 60884-2-4 or:		N/A
	- plugs not able to enter socket-outlets of other standardised system		N/A
	- socket-outlets not admit plugs of other standardised system		N/A
	- socket-outlets without protective earth		N/A
- (15.4)	**Insulation between circuits and accessible parts**		P
- (15.4.2)	SELV circuits		P
	Source used to supply SELV circuits:		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- safety isolating transformer in accordance with relevant part 2 of IEC 61558		P
	- controlgear providing SELV in accordance with relevant part 2 of IEC 61347		P
	- another source		N/A
	Voltage in the circuit not higher than ELV		P
	SELV circuits insulated from LV by double or reinforced insulation		P
	SELV circuits insulated from non SELV circuits by double or reinforced insulation		N/A
	SELV circuits insulated from FELV circuits by supplementary insulation		N/A
	SELV circuits insulated from other SELV circuits by basic insulation		N/A
	SELV circuits insulated from accessible conductive parts according Table 6 in 15.4.5		N/A
- (15.4.3)	FELV circuits		N/A
	Source used to supply FELV circuits:		N/A
	- separating transformer in accordance with relevant part 2 of IEC 61558		N/A
	- separating controlgear providing basic insulation between input and output circuits in accordance with relevant part 2 of IEC 61347		N/A
	- another source		N/A
	- source in circuits separated by the LV supply by basic insulation		N/A
	Voltage in the circuit not higher than ELV		N/A
	FELV circuits insulated from LV supply by at least basic insulation		N/A
	FELV circuits insulated from other FELV circuits if functional purpose		N/A
	FELV circuits insulated from accessible conductive parts according Table 6 in 15.4.5		N/A
	Plugs and socket-outlets for FELV system comply with:		N/A
	- plugs not able to enter socket-outlets of other voltage systems		N/A
	- socket-outlets not admit plugs of other voltage systems		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- socket-outlets have a protective conductor contact		N/A
- (15.4.4)	Other circuits		N/A
	Insulation between circuits other than SELV or FELV and accessible conductive parts in according Table 6 in 15.4.5.		N/A
- (15.4.5)	Insulation between circuits and accessible conductive parts		N/A
	Accessible conductive parts insulated from active parts of electric circuits by insulating according Table 6		N/A
	Requirements for Class II construction with equipotential bonding for protection against indirect contact with live parts:		N/A
	- all conductive parts are connected together		N/A
	- conductive parts are reliably connected together according test of IEC 60598-1 cl. 7.2.3		N/A
	- conductive parts comply with requirements of Annex A in case of insulation fault		N/A

17 (16)	**CREEPAGE DISTANCES AND CLEARANCES**		**P**
- (16)	Creepage distances and clearances according to 16.2 and 16.3		P
	Controlgears providing SELV comply with additional requirements in Annex L		P
	Insulating lining of metallic enclosures		N/A
	Controlgear protected against pollution comply with Annex P	(see Annex P)	N/A
- (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/A
	Creepage distances according to Table 8	(see appended table)	N/A
- (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/A
	Clearances distances for basic or supplementary insulation according to Table 10	(see appended table)	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Clearances distances for reinforced insulation according to Table 11	(see appended table)	P
18 (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)		P
(4.11)	**Electrical connections**		**P**
(4.11.1)	Contact pressure		P
(4.11.2)	Screws:		N/A
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
(4.11.3)	Screw locking:		N/A
	- spring washer		N/A
	- rivets		N/A
(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/A
(4.12)	**Mechanical connections and glands**		**P**
(4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N/A
	Torque test: torque (Nm); part ..... :	See main report	P
	Torque test: torque (Nm); part ..... :	--	N/A
	Torque test: torque (Nm); part ..... :	--	N/A
(4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
(4.12.4)	Locked connections:		N/A
	- fixed arms; torque (Nm)..... :	--	N/A
	- lampholder; torque (Nm)..... :	--	N/A
	- push-button switches; torque 0,8 Nm..... :	--	N/A
(4.12.5)	Screwed glands; force (Nm) ..... :	--	N/A
19 (18)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		**P**
- (18.1)	Ball-pressure test ..... :	See Test Table 19 (18.1)	P
- (18.2)	Test of printed boards ..... :	See Test Table 19 (18.2)	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
- (18.3)	Glow-wire test ..... :	See Test Table 19 (18.3)	P
- (18.4)	Needle flame test ..... :	See Test Table 19 (18.4)	P
- (18.5)	Tracking test ..... :	See Test Table 19 (18.5)	N/A

20 (19)	**RESISTANCE TO CORROSION**		N/A
	- test according 4.18.1 of IEC 60598-1		N/A
	- adequate varnish on the outer surface		N/A

21 (-)	**MAXIMUM WORKING VOLTAGE (U_{out}) IN ANY LOAD CONDITION**		**N/A**
	Not exceed declared maximum working voltage U_{out} in any load condition		N/A

14	**TABLE: tests of fault conditions**	**P**
Part	Simulated fault	Hazard
Model: KH-PL-R025-24W-W-SD		
S/C Output	Unit circuit protected immediately, it can operate after fault condition removed.	~~YES~~/NO
O/C Output	Unit circuit protected immediately, it can operate after fault condition removed.	~~YES~~/NO
C1	Abnormal work, it can operate after fault condition removed.	~~YES~~/NO
D3	Abnormal work, it can operate after fault condition removed.	~~YES~~/NO
D5	Unit circuit protected immediately, it can operate after fault condition removed.	~~YES~~/NO
D7	Unit circuit protected immediately, it can operate after fault condition removed.	~~YES~~/NO
Q1(S-D)	Unit circuit protected immediately, it can operate after fault condition removed.	~~YES~~/NO
Q1(G-D)	Fuse opened immediately, cannot operate after fault condition removed.	~~YES~~/NO
Q1(S-G)	Unit circuit protected immediately, it can operate after fault condition removed.	~~YES~~/NO
U1(VCC-GND)	Unit circuit protected immediately, it can operate after fault condition removed.	~~YES~~/NO
Remark: S/C means short circuit, O/C means open circuit.		

17 (16)	**TABLE: clearance and creepage distance measurements (mm) (See main report)**						**P**
Applicable part of IEC 61347-1 Table 7 – 11*							
Distances	**Insulation type ****	**Measured clearance**	**Required**		**Measured creepage**	**Required**	
			clearance	***Table**		**creepage**	***Table**
Distance 1:	-	-	-	-	-	-	-

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Clause	Requirement + Test	Result - Remark	Verdict

19 (18.1)	TABLE: Ball Pressure Test (See main report)		P
Allowed impression diameter (mm) .....:		2.0mm	—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)
-	-	-	-

19 (18.2)	TABLE: Test of printed boards				N/A
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (s)	Ignition of specified layer Yes/No	Duration of burning (s)	Verdict
-	-	-	-	-	-
Supplementary information: N/A					

19 (18.3)	TABLE: Glow-wire test (See main report)			P
Glow wire temperature.....:		650°C		—
Object/ Part No./ Material	Manufacturer/ trademark	Ignition of specified layer Yes/No	Duration of burning (s)	Verdict
-	-	-	-	-

19 (18.4)	TABLE: Needle-flame test (See main report)				P
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (s)	Ignition of specified layer Yes/No	Duration of burning (s)	Verdict
-	-	-	-	-	-

19 (18.5)	TABLE: Proof tracking test				N/A
Test voltage PTI .....:					—
Object/ Part No./ Material	Manufacturer/ trademark	Withstand 50 drops without failure on three places or on three specimens			Verdict
-	-	-	-	-	-

(A)	ANNEX A - TEST TO ESTABLISH WHETHER A CONDUCTIVE PART IS A LIVE PART WHICH MAY CAUSE AN ELECTRIC SHOCK		P
(A.1)	Comply with A.2 or A.3		P

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Clause	Requirement + Test	Result - Remark	Verdict
(A.2)	Voltage ≤ 35 V peak or ≤ 60 V d.c .....:	<60Vdc	P
(A.3)	If voltage measured according Clause A.2 exceeds the limit value; touch current does not exceed 0,7 mA (peak) or 2 mA d.c. .....:	Max. 0.023mA	P
	Comply with Annex G.2 of IEC 60598-1		P

(C)	**ANNEX C – PARTICULAR REQUIREMENTS FOR ELECTRONIC LAMP CONTROLGEAR WITH MEANS OF PROTECTION AGAINST OVERHEATING**		P
(C3)	**GENERAL REQUIREMENTS**		P
(C3.1)	Thermal protection means integral with the convertor, protected against mechanical damage		P
	Renewable only by means of a tool		N/A
	If function depending on polarity, for cord-connected equipment protection means in both leads		N/A
	Thermal links comply with IEC 60691		N/A
	Electrical controls comply with IEC 60730-2-3		N/A
(C3.2)	No risk of fire by breaking (clause C7)		N/A
(C5)	**CLASSIFICATION**		P
	a) automatic resetting type		—
	b) manual resetting type		—
	c) non-renewable, non-resetting type		—
	d) renewable, non-resetting type		—
	e) other type of thermal protection; description ...:	Electric circuit design	—
(C6)	**MARKING**		N/A
(C6.1)	Symbol for temperature declared thermally protected ballasts		N/A
(C6.2)	Declaration of the type of protection provided		N/A
(C7)	**LIMITATION OF HEATING**		P
(C7.1)	**Preselection test:**		P
	Test sample placed for at least 12 h in an oven having temperature (t_c - 5) K		P
	No operation of the protection device		P
(C7.2)	**Functioning of protection means:**		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Normal operation of the sample in a test enclosure according to Annex D at an ambient temperature such that (t_c +0; -5) °C is obtained		P
	No operation of the protection device		N/A
	Introducing of the most onerous test condition determined during test of clause 14.2 to 14.5		N/A
	Output of windings connected to the mains supply short-circuited, and other part of the controlgear operated under normal conditions		N/A
	Increasing of the current through the windings continuously until operation of the protection means		N/A
	Continuous measuring of the highest surface temperature		N/A
	Ballasts according to C5 a) or C5 e) operated until stable conditions are achieved		N/A
	Automatic-resetting thermal protectors working 3 times		N/A
	Ballasts according to C5 b) working 6 times		N/A
	Ballasts according to C5 c) and C5) d) working once		N/A
	Highest temperature does not exceed the marked value		N/A
	Any overshoot of 10% over the marked value within 15 min		N/A
	After 15 min value not exceed marked value		N/A
(D)	**ANNEX D – REQUIREMENTS FOR CARRY OUT THE HEATING TESTS OF THERMALLY PROTECTED LAMP CONTROLGEAR**		N/A
	Tests in C7 performed in accordance with Annex D, if applicable		N/A
(F)	**ANNEX F – DRAUGHT-PROOF ENCOSURE**		P
	Draught-proof enclosure in accordance with the description		P
	Dimensions of the enclosure		P
	Other design; description		N/A

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(H)	**ANNEX H - TESTS**		P
	All tests performed in accordance with the advice given in Annex H, if applicable		P

I (L)	**ANNEX I IN THIS PART 2 – PARTICULAR ADDITIONAL REQUIREMENTS FOR SELV D.C. OR A.C. SUPPLIED ELECTRONIC CONTROLGEARS FOR LED MODULES**		P
(L.3)	**Classification**		P
	Class I	Yes ☐ No ☒	—
	Class II	Yes ☒ No ☐	—
	Class III	Yes ☐ No ☒	—
	non-inherently short circuit proof controlgear	Yes ☒ No ☐	—
	inherently short circuit proof controlgear	Yes ☐ No ☒	—
	fail safe controlgear	Yes ☐ No ☒	—
	non-short-circuit proof controlgear	Yes ☐ No ☒	—
(L.4)	**Marking**		P
	Adequate symbols are used		P
(L.5)	**Protection against electric shock**		P
	Comply with clause 9.2 of IEC 61558-1		P
(L.6)	**Heating**		P
	No excessive temperatures in normal use		P
	Value if capacitor t_c marked .....:	See rating label	—
	Winding insulation classified as Class .....:	Class B	—
	Comply with tests of clause 14 of IEC 61558-1 with adjustments		P
(L.7)	**Short-circuit and overload protection**		P
	Comply with tests of clause 15 of IEC 61558-1 with adjustments		P
(L.8)	**Insulation resistance and electric strength**		P
(L.8.1)	Conditioned 48 h between 91 % and 95 %		P
(L.8.2)	Insulation resistance		P
	Between input- and output circuits not less than 5 MΩ .....:	>500 MΩ	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Between metal parts of class II convertors which are separated from live parts by basic insulation only and the body not less than 5 MΩ .....:		N/A
	Between metal foil in contact with the inner and outer surfaces of enclosures of insulating material not less than 2 MΩ .....:	>500 MΩ	P
(L.8.3)	Electric strength		P
	1) Between live parts of input circuits and live parts of output circuits .....:	3000V	P
	2) Over basic or supplementary insulation between:		P
	a) live parts having different polarity .....:	1500V	P
	b) live parts and body if intended to be connected to protective earth .....:		N/A
	c) accessible metal parts and a metal rod of the same diameter as the flexible cable or cord .....:		N/A
	d) live parts and an intermediate metal part .....:		N/A
	e) intermediate metal parts and the body .....:		N/A
	f) each input circuit and all other input circuits ....:		N/A
	3) Over reinforced insulation between the body and live parts .....:	3000V	P
(L.9)	**Construction**		P
(L.9.1)	Transformer comply with 19.12 of IEC 61558-1 and 19 of IEC 61558-2-6		P
	HF transformer comply with 19 of IEC 61558-2-16		P
(L.10)	**Components**		P
	Protective devices comply with 20.6 – 20.11 of IEC 61558-1		P
(L.11)	**Creepage distances, clearances and distances through insulation**		P
	Creepage distances and clearances not less than in Clause 16		P
	Distance through insulation according Table L.5 in IEC 61347-1		P
	1) Basic distance through insulation		N/A
	Required distance (mm) .....:		N/A
	Measured (mm) .....:		N/A
	Supplementary information		N/A
	2) Supplementary distance through insulation		N/A

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Attachment No. 5

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Required distance (mm) .....:		N/A
	Measured (mm) .....:		N/A
	Supplementary information		N/A
	3) Reinforced distance through insulation		P
	Required distance (mm) .....:	0.83	N/A
	Measured (mm) .....:	Enclosure, >0.85mm	P
	Supplementary information		N/A

J (-)	**ANNEX J IN THIS PART 2 – PARTICULAR ADDITIONAL SAFETY REQUIREMENTS FOR A.C., A.C./D.C. OR D.C. SUPPLIED ELECTRONIC CONTROLGEAR FOR EMERGENCY LIGHTING**		N/A
J.1	**General**		N/A
	Intended for centralized emergency power supply	Yes ☐ No ☐	—
J.2	**Marking**		N/A
J.2.1	Mandatory markings		N/A
	a) symbol EL		N/A
	b) rated emergency supply voltage (V)		N/A
J.2.2	Information to be provided if applicable		N/A
	a) Limits of ambient temperature		N/A
	b) Emergency output factor (EOF_X)		N/A
	c) Information if intended for use in luminaires for high-risk task area lighting		N/A
J.3	General notes on tests		N/A
	Length of output cable in tests .....:		N/A
	Load instead of LED lamps/modules.....:		N/A
J.4	Starting conditions		N/A
	Start rated load in emergency mode without adversely affecting the performance		N/A
J.5	Operating condition		N/A
	Comply with the requirements of 7.2 of IEC 62384 at 90% and 110% of rated emergency supply voltage		N/A
J.6	Emergency supply current		N/A
	Emergency supply current not differ more than ±15 %		N/A

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IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Supply of low impedance and low inductance		N/A
J.7	EMC immunity		N/A
	Comply with the requirements of IEC 61547		N/A
J.8	Pulse voltage from central battery systems		N/A
	Withstand pulses according Table J.1		N/A
J.9	Tests for abnormal conditions		N/A
	Comply with the requirements of 12 of IEC 62384		N/A
J.10	Comply with the requirements of 13 of IEC 62384		N/A
J.11	Functional safety (EOF_x)		N/A
	Declared emergency output factor (EOF_x) achieved during emergency operation		N/A

(N)	**ANNEX N: REQUIREMENTS FOR INSULATION MATERIALS USED FOR DOUBLE OR REINFORCED INSULATION**		P
(N.4)	**General requirements**		P
(N.4.1)	Material comply with IEC 60085 and IEC 60216 series		N/A
(N.4.2)	**Solid insulation**		P
	Electric strength test at least 5 kV or 1,35 x test voltage in Table N.1		P
	If not classified according IEC 60085 and IEC 60216 series: Electric strength test increased 10 % of 5,5 kV or 1,5 x test voltage in Table N.1		N/A
(N.4.3)	**Thin sheet insulation**		P
(N.4.3.1)	Thickness and composition of thin sheet insulation		P
	- Inside the ballast and not subjected to handling or abrasion during the production and during maintenance		N/A
	- Non-separated layers: Min. 3 layers and fulfil mandrel test of 150N		N/A
	- Separated layers: Min. 2 layers and each layer fulfil mandrel test of 50N		N/A
	- Separated layers (alternative): Min. 3 layers and 2/3 of the layers fulfil mandrel test of 100N		P
(N.4.3.2)	Mandrel test (electric strength test during mechanical stress)		P
	Electric strength test after mandrel test:		P

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IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	- Non-separated layers: min. 5 kV or 1,35 x test voltage in Table N.1		N/A
	- 2/3 of min. 3 separated layers: min. 5 kV or 1,25 x test voltage in Table N.1		P
	- one of 2 separated layers: min. 5 kV or 1,25 x test voltage in Table N.1		N/A
	No flashover or breakdown occurred		P
(O)	**ANNEX O: ADDITIONAL REQUIREMENTS FOR BUILT-IN ELECTRONIC CONTROLGEAR WITH DOUBLE OR REINFORCED INSULATION**		N/A
(O.6)	**Marking**		N/A
	Marking according clause 7 (7)		N/A
	Special symbol		N/A
	Meaning of the special symbol explained in catalogue		N/A
(O.7)	**Protection against accidental contact with live parts**		N/A
	Requirements of clause 8 (10)	See clause 8	N/A
	Test finger not possible to make contact with basic insulated metal parts		N/A
(O.8)	**Terminals**		N/A
	Clause 9 (8)	See clause 9	N/A
(O.9)	**Provision for earthing**		N/A
	Functional earthing terminals comply with clause 9 of part 1		N/A
	No protective earthing terminal		N/A
(O.10)	**Moisture resistance and insulation**		N/A
	Clause 11 (11)	See clause 11	N/A
(O.11)	**Electric strength**		N/A
	Clause 12 (12)	See clause 12	N/A
(O.13)	**Fault conditions**		N/A
	Clause 14 (14)	See clause 14	N/A
	End of test, between live part and accessible metal parts or external parts of insulating material in contact with the supporting surface comply with dielectric strength test reduced to 35 % of values according Table 1 in part 1		N/A

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IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Insulation resistance according to O.10 between live part and accessible metal parts or external parts of insulating material in contact with the supporting surface not less than 4 MΩ		N/A
(O.14)	**Construction**		N/A
	Clause 17 (15)	See clause 17	N/A
	Accessible metal parts insulated from live parts by double or reinforced insulation		N/A
	Live part insulated from supporting surface in contact with external faces by double or reinforced insulation		N/A
(O.15)	**Creepage distances and clearances**		N/A
	Clause 18 (16)	See clause 18	N/A
	Comply with corresponding values for luminaries in IEC 60598-1		N/A
(O.16)	**Screws, current-carrying parts and connections**		N/A
	Clause 19 (17)	See clause 19	N/A
(O.17)	**Resistance to heat and fire**		N/A
	Clause 20 (18)	See clause 20	N/A
(O.18)	**Resistance to corrosion**		N/A
	Clause 21 (19)	See clause 21	N/A
(P)	**Creepage distances and clearances and distance through isolation (DTI) for lamp controlgear which are protected against pollution by the use of coating or potting**		N/A
(P.1)	**General**		N/A
	P.2 applies if creepage distances less than the minimum in Table 7 and 8		N/A
	P.3 applies if clearance less than the minimum in Table 9, 10 and 11		N/A
(P.2)	**Creepage distances**		N/A
(P.2.2)	Minimum creepage distances for working voltages and rated voltages with frequencies up to 30 kHz (Table P.1)		N/A
	Basic or supplementary insulation:		N/A
	Required creepage.....:		—
	Measured.....:		N/A
	Supplementary information		—

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IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Reinforced insulation:		N/A
	Required creepage .....:		—
	Measured .....:		N/A
	Supplementary information		—
(P.2.3)	Creepage distances for working voltages with frequencies above 30 kHz (Table P.2)		N/A
	Voltage $\hat{U}_{out}$ kV .....:		—
	Frequency .....:		—
	Required distance .....:		—
	Measured .....:		N/A
	Supplementary information		—
(P.2.4)	Compliance with the required creepage distances		N/A
(P.2.4.1)	Compliance in accordance with 16.3.3 and test according P.2.4.2		N/A
(P.2.4.3)	Electrical tests after conditioning		N/A
(P.2.4.3.1)	Insulation resistance and electric strength according Clause 11 and 12		N/A
(P.3)	**Distance through isolation**		N/A
(P.3.4)	Electrical tests after conditioning		N/A
(P.3.4.1)	Insulation resistance and electric strength according Clause 11 and 12		N/A
(P.3.4.2)	Impulse voltage dielectrical test		N/A
	Basic or supplementary insulation:		N/A
	Working/rated voltage .....:		—
	Impulse voltage .....:		N/A
	Supplementary information		—
	Reinforced insulation:		N/A
	Working/rated voltage .....:		—
	Impulse voltage .....:		N/A
	Supplementary information		—

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Attachment No.6

AS/NZS 61347.1:2016			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 61347-1
Australia and New Zealand NATIONAL DIFFERENCES

Lamp controlgear –
Part 1: General and safety requirements

Differences according to .....: AS/NZS 61347.1:2016 compared to IEC 61347-1:2015

ZZ	Appendix ZZ: Variations to IEC 61347-1:2015 for Australia and New Zealand		P
4	GENERAL REQUIREMENTS		P
4.101	Supply connection wiring		P
	Independent lamp controlgeal shall be provided with only one of the following means of connection to the LV supply, the means of connection shall be on the following: a) Device for the connection of controlgears b) Terminals. c) Connecting lead (tails) d) Supply cord and plug e) Adapter for engagement with supply tracks f) Appliance inlet or inlet plug g) Installation coupler h) Luminaire coupler i) Integral pins for insertion into socket outlets	Terminal block	P
	In Australia, Equipment with supply cords which are not fitted with a plug shall be marked with a cord tag with the symbol for “must be installed by a licensed electrician”. (Refer to Figure ZZ1).		N/A
5	General notes on test		P
	For Australia, the rated supply voltage is 240 V/400 V +10%,-6% and for testing according to this Standard, the rated test voltage shall be 240 V/415 V.	110-240VAC	P
7	Marking		P
7.1	In Australia and New Zealand, information, instructions and other texts required by this Standard shall be written in English.		P
	The marking of the rated voltage or rated voltage range shall include 240V for Australia and 230V for New Zealand.		P
	FELV control terminals shall be marked with the warning symbol “Risk of electric shock”		N/A
7.2	Information to be provided, if applicable		N/A
	FELV terminals marked “Risk of electric shock” are not safe to touch		N/A

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AS/NZS 61347.1:2016			
Clause	Requirement + Test	Result - Remark	Verdict
	Circuit connected to any FELV control terminal shall be insulated for the LV voltage of the controlgear and any terminals connected to the FELV circuit shall be protected against accidental contact.		N/A
15.101	Power factor correction capacitor		N/A
	Power factor correction capacitors incorporated into controlgear shall be of a type to ensure that any capacitor failure results in a failsafe outcome		N/A
	Not less than Type B capacitors with metal body and break action protection in according with IEC 61048 and AS/NZS 61049		N/A
	Capacitors shall have a minimum voltage rating of 250V at temperature rating of 85°C or 280V at temperature rating of 100°C		N/A
	Capacitors likely to be permanently subjected to the supply voltage and used for radio interference suppression or for voltage dividing, shall comply with IEC 60384-14		N/A
18.2	Resistance to flame and ignition		P
18.2.1	Parts of non-metallic material shall be resistant to flame and ignition. For materials other than ceramic, compliance is checked by the test of 18.2.2, 18.2.3, 18.2.4 and 18.2.5 as appropriate. This requirement does not apply to decorative trims, knobs, wiring insulation and other parts not likely to be ignited or to propagate flames from inside the luminaire. This Clause applies to all parts, including components, even if they have been tested to their own standard.		P

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Attachment No.6

AS/NZS 61347.1:2016			
Clause	Requirement + Test	Result - Remark	Verdict
18.2.2	Parts of non-metallic material supporting connections shall withstand the following test: Parts are subject to a test using a nickel-chromium glow-wire. The test apparatus and test procedure shall be those described in AS/NZS 60695.2.10. The glow wire is heated to 750 °C and applied to the test sample for 30 s. For all tests, any flame or glowing of the sample shall extinguish within 30 s of withdrawing the glow-wire, and any burning or molten drop shall not ignite a single layer of tissue paper specified in 4.187 of ISO 4046-4:2002, spread out horizontally 200 mm ± 5 mm below the sample.	See attachment 3	P
18.2.3	All other parts of non-metallic material shall withstand the following test: Parts are subject to a test using a nickel-chromium glow-wire. The test apparatus and test procedure shall be those described in AS/NZS 60695.2.10. The glow wire is heated to 650 °C and applied to the test sample for 30 s. For all tests, any flame or glowing of the sample shall extinguish within 30 s of withdrawing the glow-wire, and any burning or molten drop shall not ignite a single layer of tissue paper specified in 4.187 of ISO 4046-4:2002, spread out horizontally 200 mm ± 5 mm below the sample.	See attachment 3	P

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Attachment No.6

AS/NZS 61347.1:2016			
Clause	Requirement + Test	Result - Remark	Verdict
18.2.4	During the application of the 750 °C glow wire test of Clause 13.3.1, if a flame is produced that persists for longer than 2 s, the luminaire is further tested as follows: The needle-flame test of AS/NZS 60695.11.5 is applied to non-metallic parts that encroach within the envelope of a vertical cylinder having a diameter of 20 mm and a height of 50 mm above the point of application of the glow wire. The needle flame is applied to the test sample for 30 s. Parts shielded by a barrier that meets the needle-flame test of AS/NZS 60695.11.5 are not tested. NOTE This requires the needle flame to be applied to all parts likely to be impinged upon by the glow-wire flame within the hypothetical envelope of a vertical cylinder positioned above the point of application of the glow-wire. This applies to all parts unless there is a barrier that passes the needle-flame test and is within the cylinder and would protect the part from the glow-wire flame. The duration of burning shall not exceed 30 s after removal of the test flame and any burning drop shall not ignite the underlying parts or tissue paper specified in 4.187 of ISO 4046-4:2002, spread out horizontally 200 mm ± 5 mm below the sample. The needle-flame test is not carried out on parts that are made of material classified as V-0 or V-1 according to AS/NZS 60695.11.10. The sample of material classified in accordance with AS/NZS 60695.11.10 shall be no thicker than the relevant part.	No flame	N/A

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Attachment No.6

AS/NZS 61347.1:2016			
Clause	Requirement + Test	Result - Remark	Verdict
18.2.5	PCBs in luminaires shall be subject to the needle-flame test of AS/NZS 60695.11.5. The needle flame shall be applied for 30 seconds to an edge of the PCB at least 10 mm from a corner. The duration of burning shall not exceed 15 s after removal of the needle flame and any burning droplets shall not ignite the tissue paper placed underneath the PCB. The needle-flame test is not carried out on PCBs made of material that is V-0 rated according to AS/NZS 60695.11.10.	PCB rated V-0	P
18.3	Lamp controlgear intended for building into luminaires other than ordinary, independent lamp controlgear, and lamp controlgear having insulation subject to starting voltages with a peak value higher than 1500 V shall be resistant to tracking.		N/A

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Attachment No.6

AS/NZS IEC 61347.2.13:2013			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 61347-2-13
Australia and New Zealand NATIONAL DIFFERENCES

Part 2: Particular requirements:

Section 13 – d.c. or a.c. supplied electronic controlgear for LED modules

Differences according to..... : AS/NZS IEC 61347.2.13:2013 compared to IEC 61347-2-13:2006

ZZ	Appendix ZZ: Variations to IEC 61347-2-13:2006 for Australia and New Zealand		P
4	**GENERAL REQUIREMENTS**		P
	Where the control gear has accessible outputs, the control gear shall be - SELV outputs, and - comply with Annex I		P
	SELV equivalent is not permitted, where		P
	Control gear has accessible outputs		P
	Control gear is classified as independent SELV		N/A
8	**PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS**		P
8.2	Output circuits of SELV control gear with accessible outputs		P
	Output voltage under load ≤ 25 V r.m.s. or ≤ 60 V d.c.		P
	If output voltage > 25 V r.m.s. or > 60 V d.c.		N/A
	a) touch current does not exceed 0,7 mA (peak) or 2 mA d.c. ..... :		N/A
	b) the no load output shall not exceed 33 √2 V peak or 60 V d.c.		N/A
	The requirements are applicable for each of the rated supply voltages.		P
	Control gear with an output greater than the limits above shall have insulated terminals.		N/A
	The touch current is checked by measurement in accordance with Annex G of IEC 60598-1		P
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor	Y1 capacitor	P
	Y1 or Y2 capacitors comply with IEC 60384-14		P
	Resistors comply with test (a) in 14.1 of IEC 60065		N/A

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Attachment No.6

AS/NZS IEC 61347.2.13:2013			
Clause	Requirement + Test	Result - Remark	Verdict
9	**TERMINALS**		N/A
9.1	Direct plug-in control gear		N/A
	Plug-in control gear with pins for direct insertion into a socket-outlet shall comply with Appendix J of AS/NZS 3112:2011.		N/A
16	**ABNORMAL CONDITIONS**		P
16.2	Control gear which are of the constant current output type		P
	d) For control gear with SELV output, the LED modules, or equivalent load for which the control gear is designed, shall continue to be connected in series incrementally to the output terminals until the control gear ceases to operate or the output voltage is stabilized.		P
	During the tests under d), the maximum voltage measured on the output terminal shall not exceed the SELV limits of clause 8.		P

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Attachment No.6

IEC 61347_2_13F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 61347-2-13
STANDARD DIFFERENCES
BETWEEN IEC 61347-2-13:2006 and IEC 61347-2-13:2014; IEC 61347-2-13:2014/AMD1:2016

Part 2: Particular requirements:

Section 13 – d.c. or a.c. supplied electronic controlgear for LED modules

Differences according to..... : IEC 61347-2-13:2006

15	**TRANSFORMER HEATING**		—
	Windings of separating transformer in a SELV-equivalent controlgear fulfil the requirements according to 7.1 and 11.2 of IEC 60065		N/A
15.1	Temperatures do not exceed the changed values of the values in column 2 of Table 3 of IEC 60065, in respect to relevant ambient temperature at t_c, under normal operation		P
15.2	Temperatures do not exceed the changed values of the values in column 3 of Table 3 of IEC 60065, in respect to relevant ambient temperature at t_c, under abnormal conditions of Cl. 16 and fault conditions of Cl. 14		P
	Ambient temperature at t_c ..... :		—

16 (-)	**ABNORMAL CONDITIONS**		—
16.1 (-)	Control gear which are of the constant voltage output type:		N/A
	a) No LED module inserted		N/A
	b) Double LED modules or equivalent load connected to the output terminals		N/A
	c) Output terminal short-circuited (20 cm and 200 cm or declared length)		N/A
	During and at the end of the tests no defect impairing safety, nor any smoke or flammable gases produced		N/A
16.2 (-)	Control gear which are of the constant current output type		P
	a) No LED module connected	(see appended table)	P
	b) Double the LED modules or equivalent load connected in series to the output terminals	(see appended table)	P

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IEC 61347_2_13F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	c) Output terminal short-circuited (20 cm and 200 cm or declared length)	(see appended table)	P
	Maximum output voltage not exceeded		P
	During and at the end of the tests no defect impairing safety, nor any smoke or flammable gases produced		P

16	**TABLE: transformer heating--abnormal condition (See main report)**				P
	Type reference .....:	—			—
	Lamp used .....:	—			—
	Mounting position .....:	—			—
	Test voltage.....:	—			—
temperature rise(K) of part		Test (K)			Limit(K)
Condition:		16.2 a)	16.2 b)	16.2 c)	—
PCB		—	—	—	—
Transformer (T1) coil, class 130 (B)		—	—	—	—
Ambient		—	—	—	—
Remark: 1. Output shutdown immediately for 16.2b) and 16.2c). 2. The temperature rise of components are lower than temperature rise of components at normal heating test, so no temperature rise data are recorded.					

I	**ANNEX I: PARTICULAR ADDITIONAL REQUIREMENTS FOR INDEPENDENT SELV D.C. OR A.C. SUPPLIED ELECTRONIC CONTROLGEAR FOR LED MODULES**	N/A
	Requirements not applicable to the evaluated product.	—

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Photo documentation

Details of: Model from left to right: KH-PL-R025-24W-W-SD, KH-PL-S025-24W-W-SD, all models have same circuit and PCB layout different in driver parameter and shape.

View:

[ ]general

[ ] front

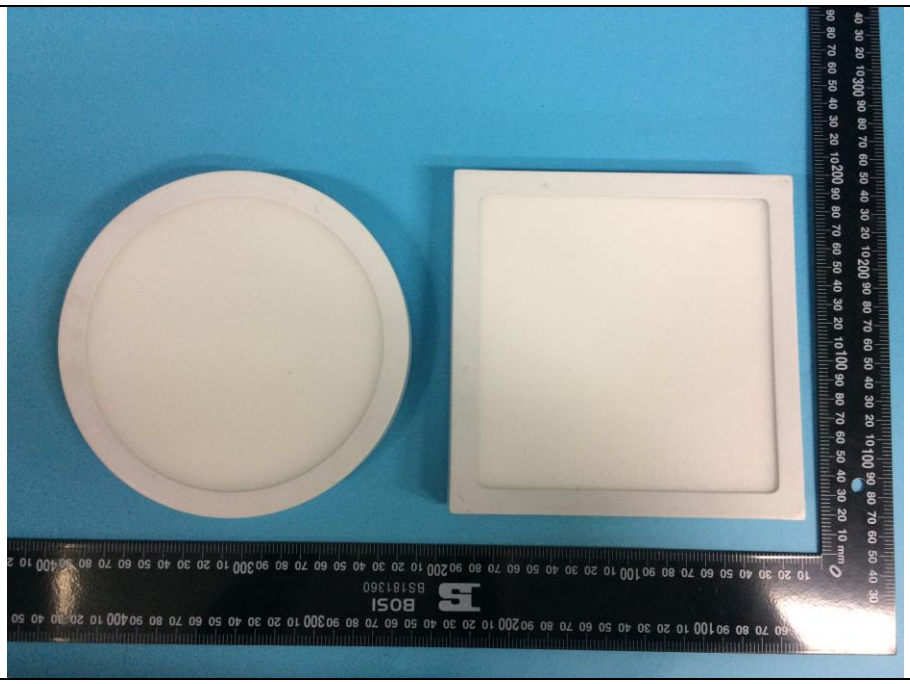
[ ] rear

[ ] right

[ ] left

[ ] top

[ ] bottom



Details of: Representative model: KH-PL-S025-24W-W-SD, general view of product.

View:

[ ]general

[ ] front

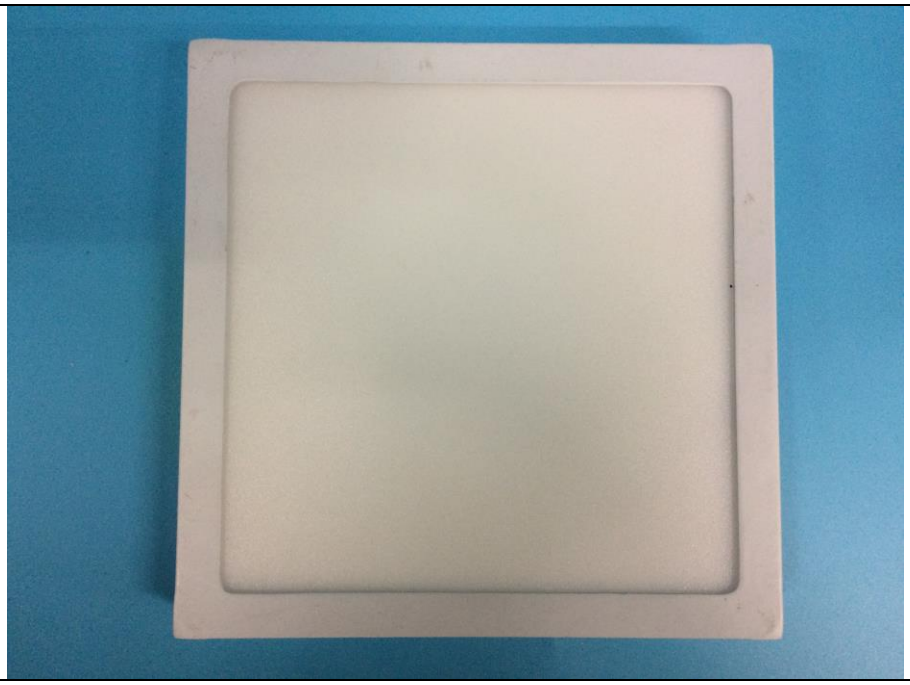
[ ] rear

[ ] right

[ ] left

[ ] top

[ ] bottom



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Details of: Representative model: KH-PL-S025-24W-W-SD, back view of product.

View:

[ ]general

[ ] front

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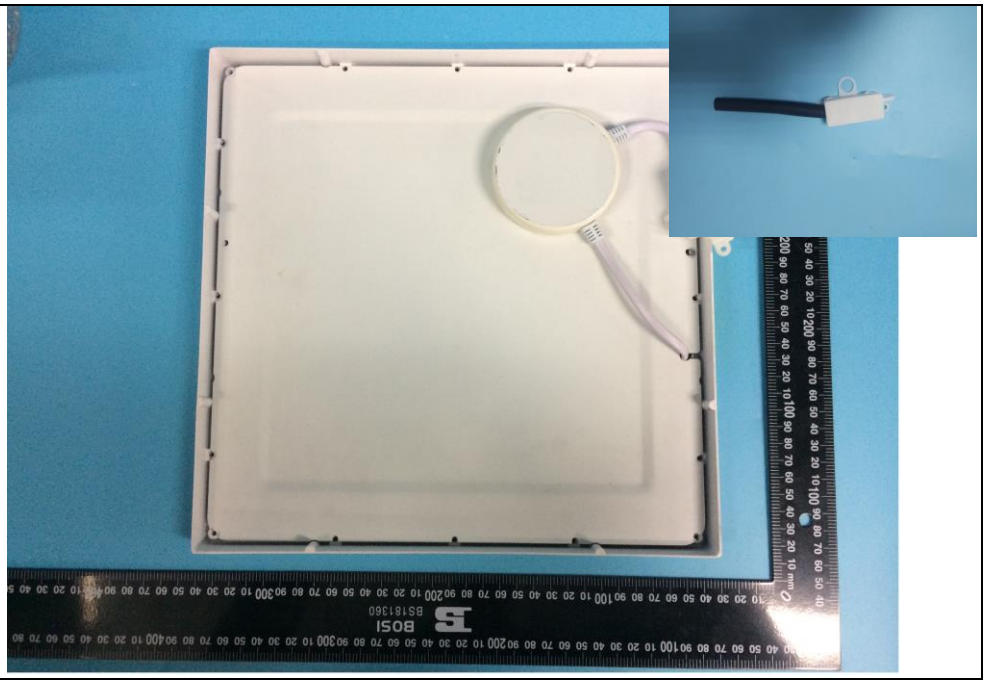

Details of Detail view of terminal block

View:

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[ ] left

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Details of Cord anchorage

View:

[ ]general

[ ] front

[ ] rear

[ ] right

[ ] left

[ ] top

[ ] bottom

Details of LED driver

View:

[ ]general

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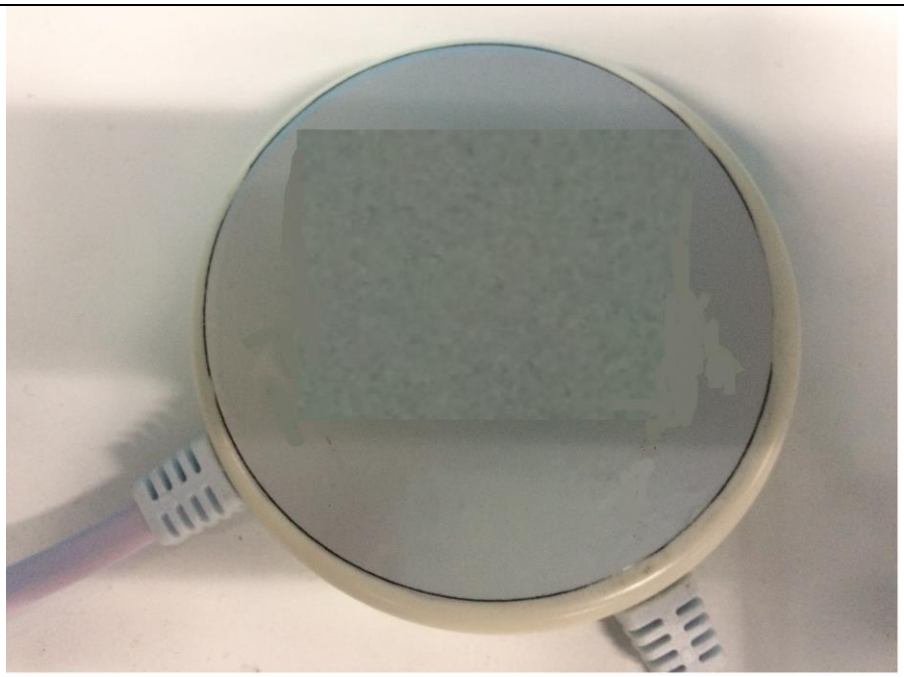

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Details of: Top view of driver PCB

View:

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[ ] front

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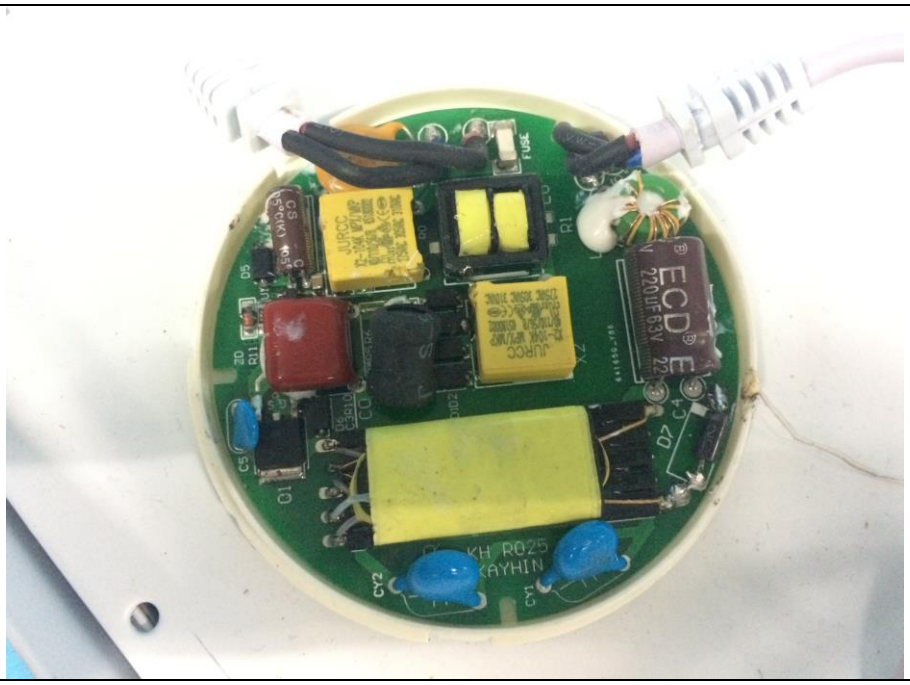

Details of: Bottom view of driver PCB

View:

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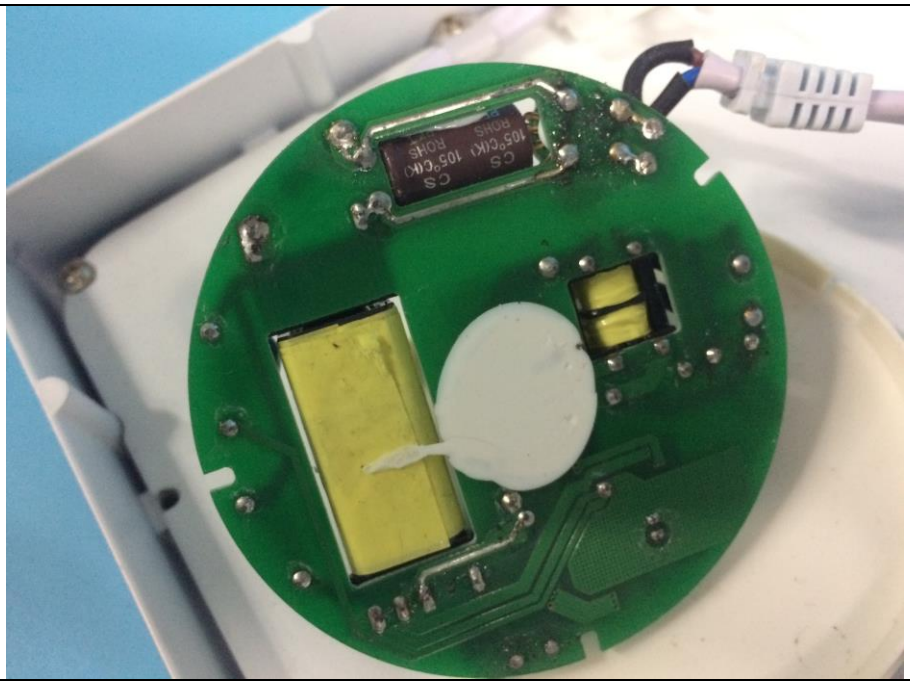

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Details of: Transformer

View:

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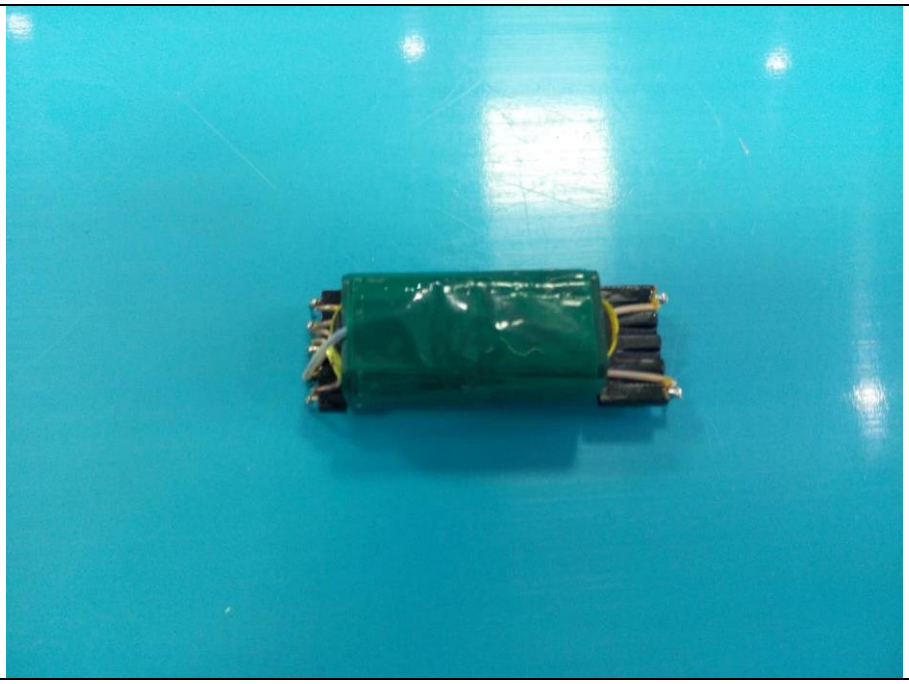

Details of: Transformer

View:

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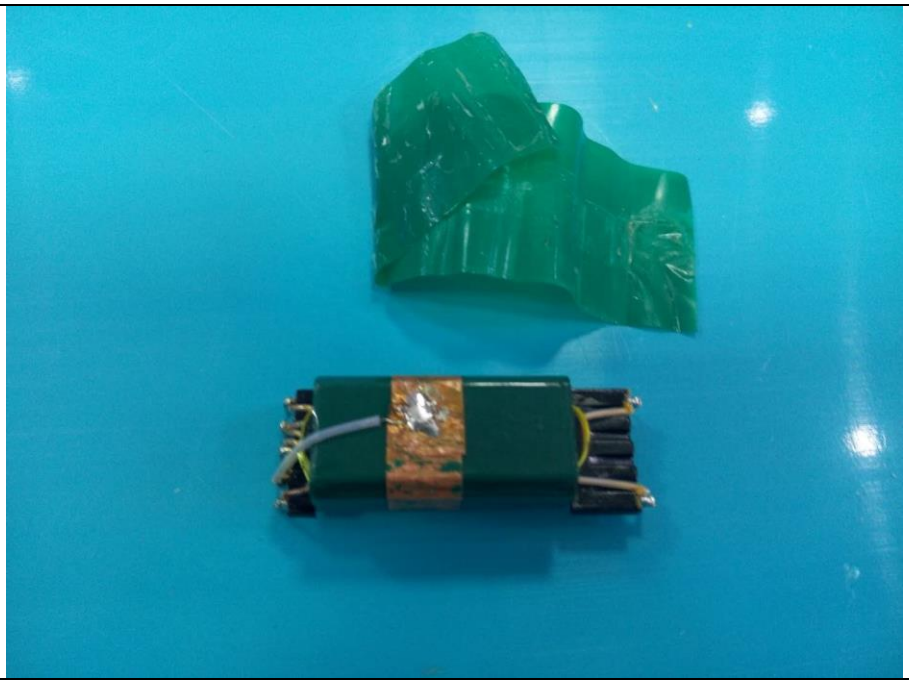

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Details of: Transformer

View:

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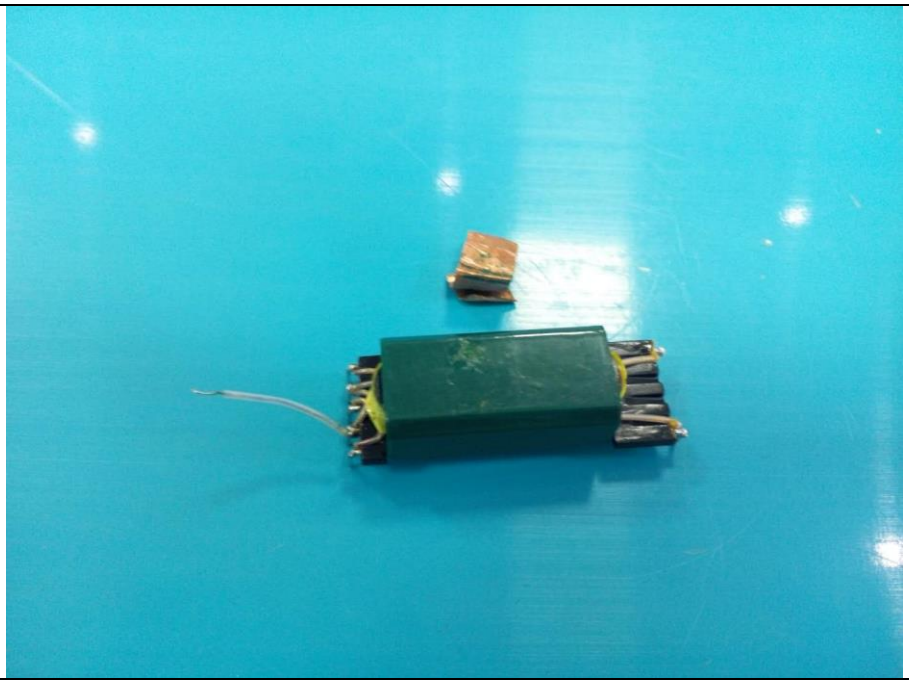

Details of: Transformer

View:

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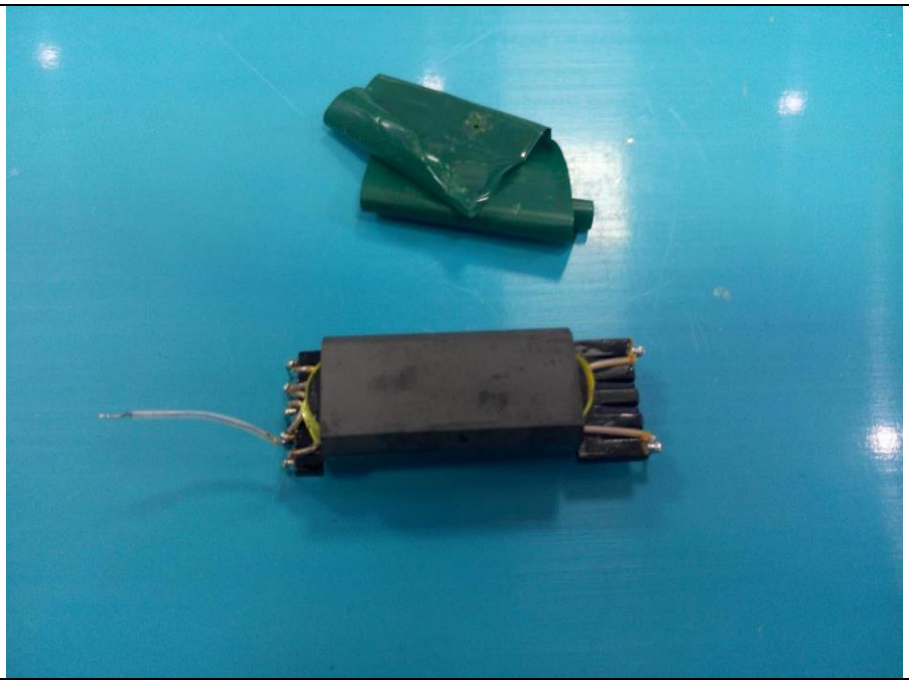

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Details of: Transformer

View:

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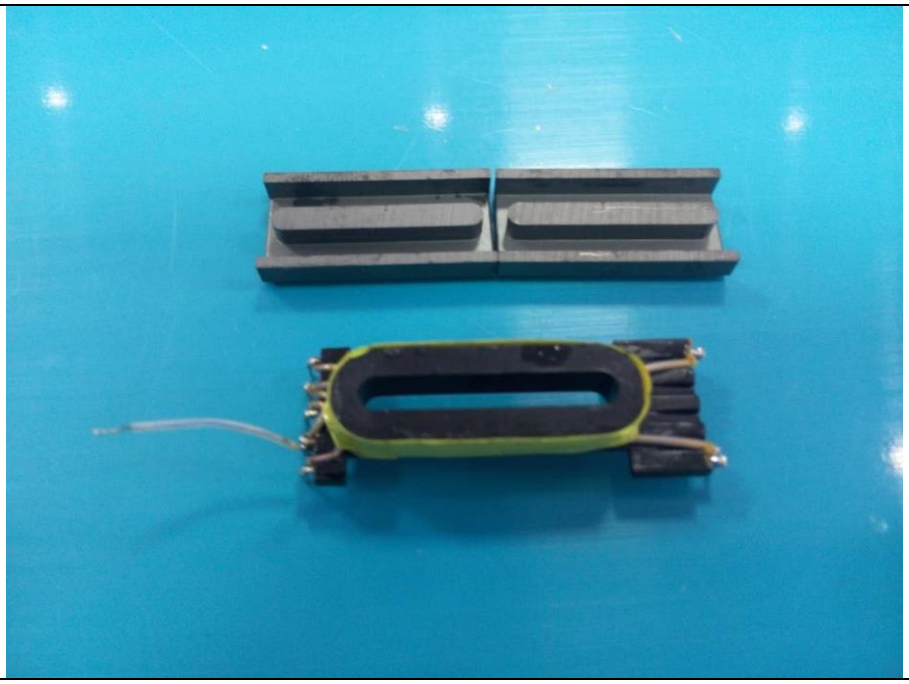

Details of: Transformer

View:

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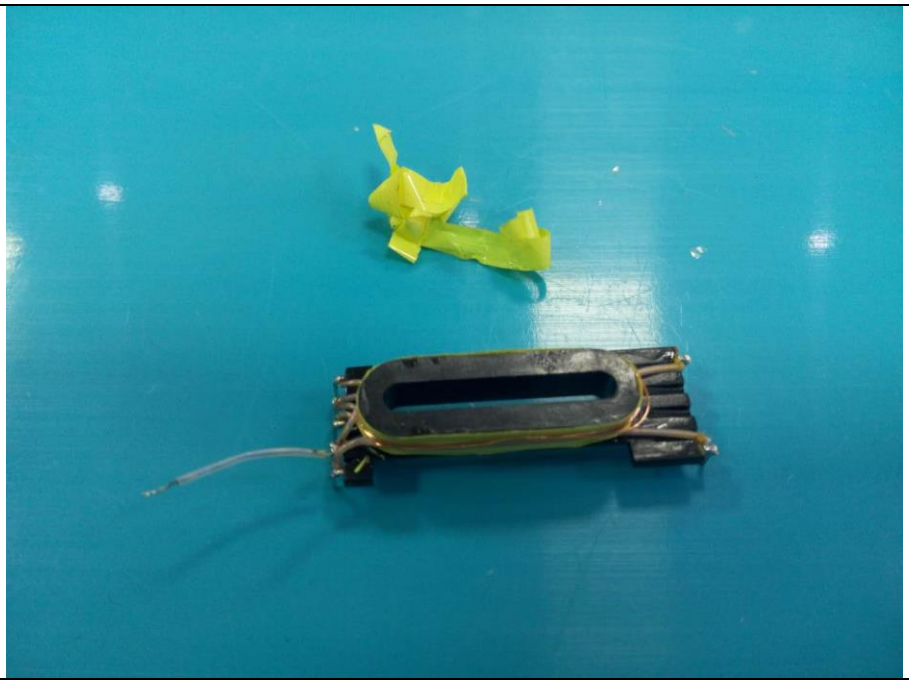

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Details of: Transformer

View:

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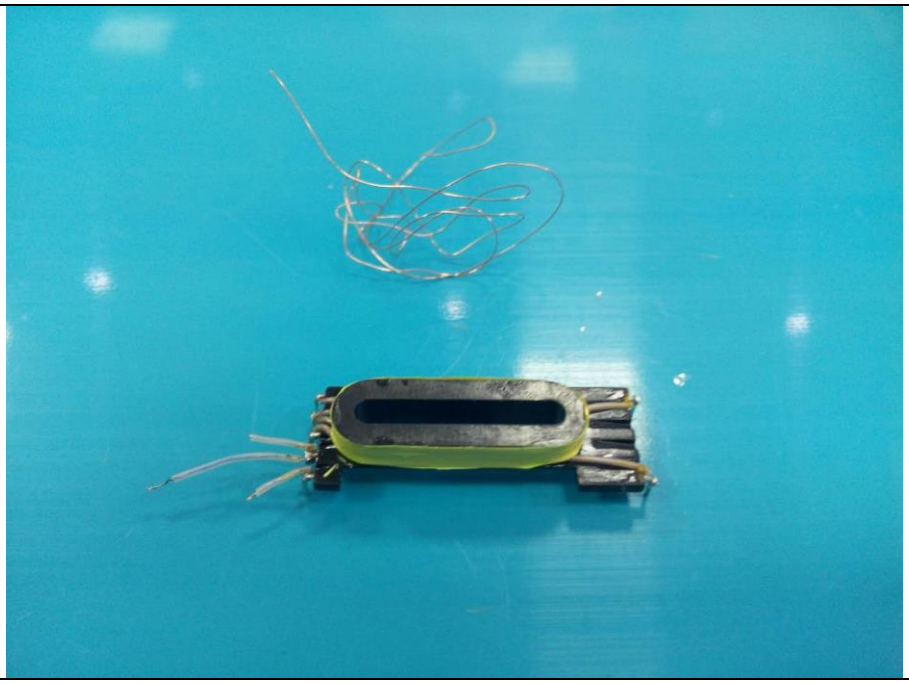

Details of: Transformer

View:

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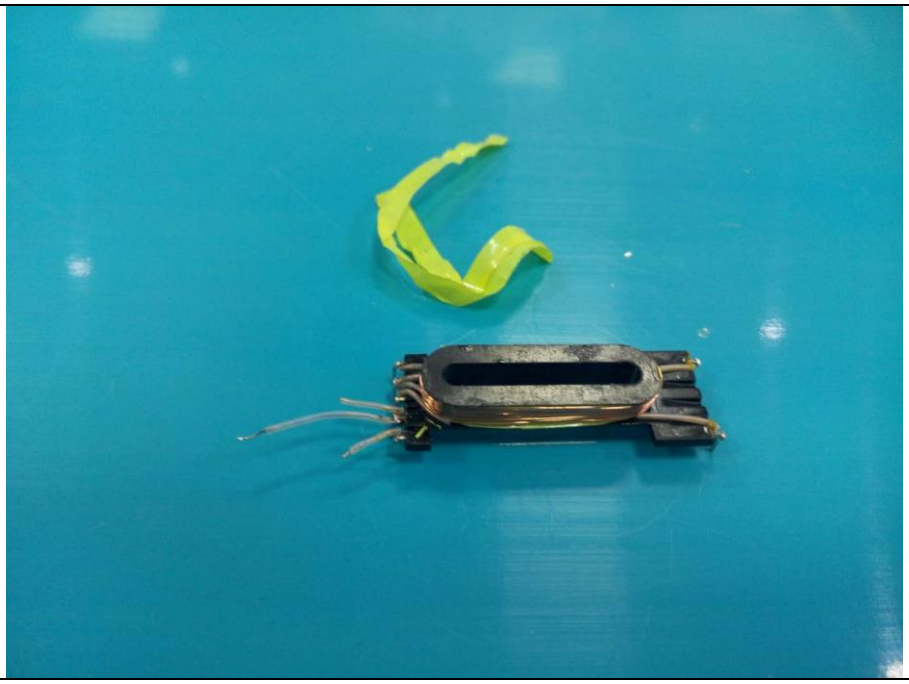

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Details of: Transformer

View:

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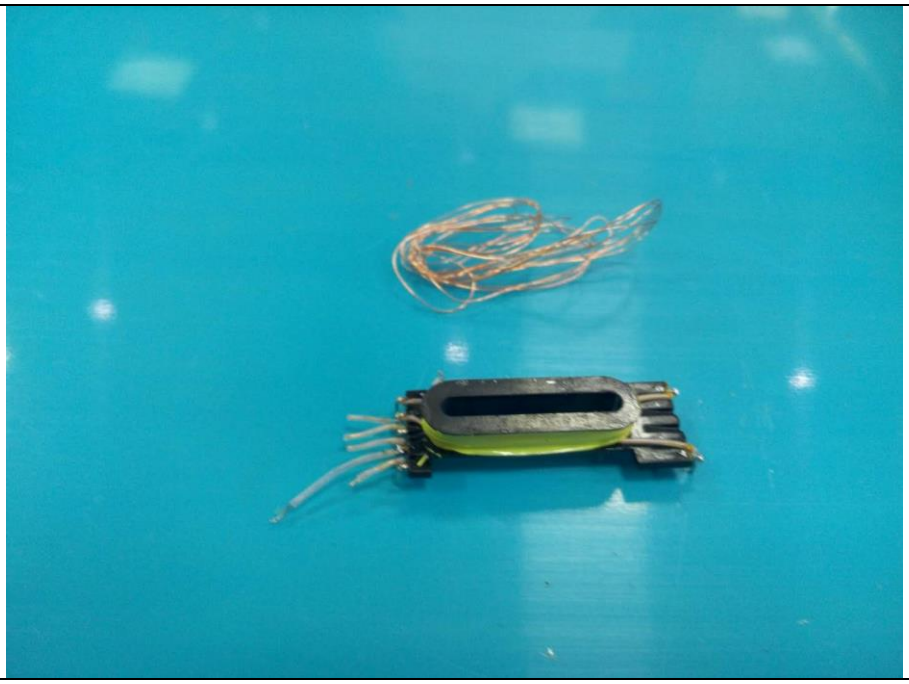

Details of: Transformer

View:

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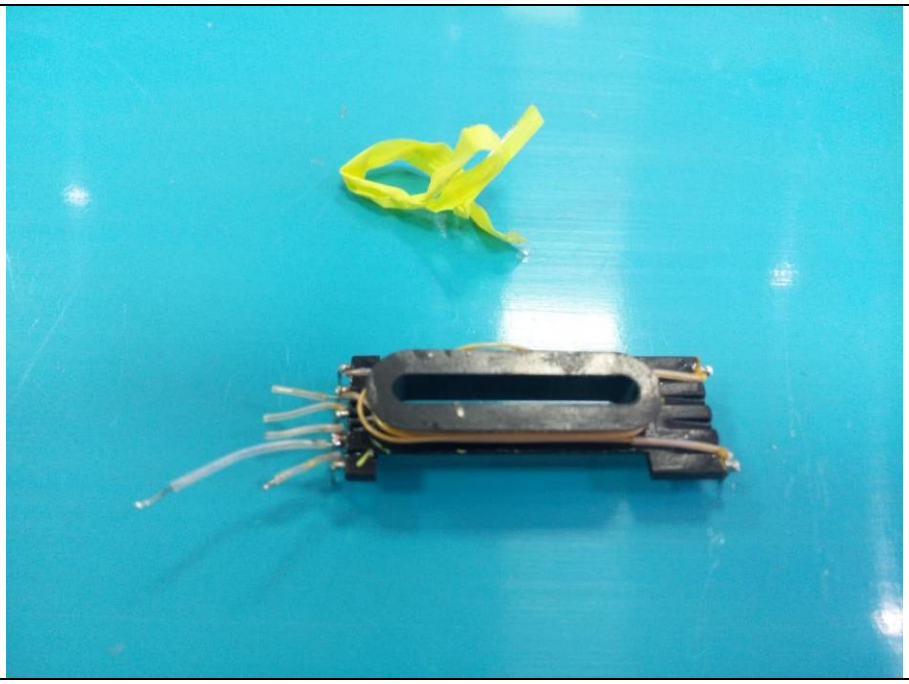

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Details of: Transformer

View:

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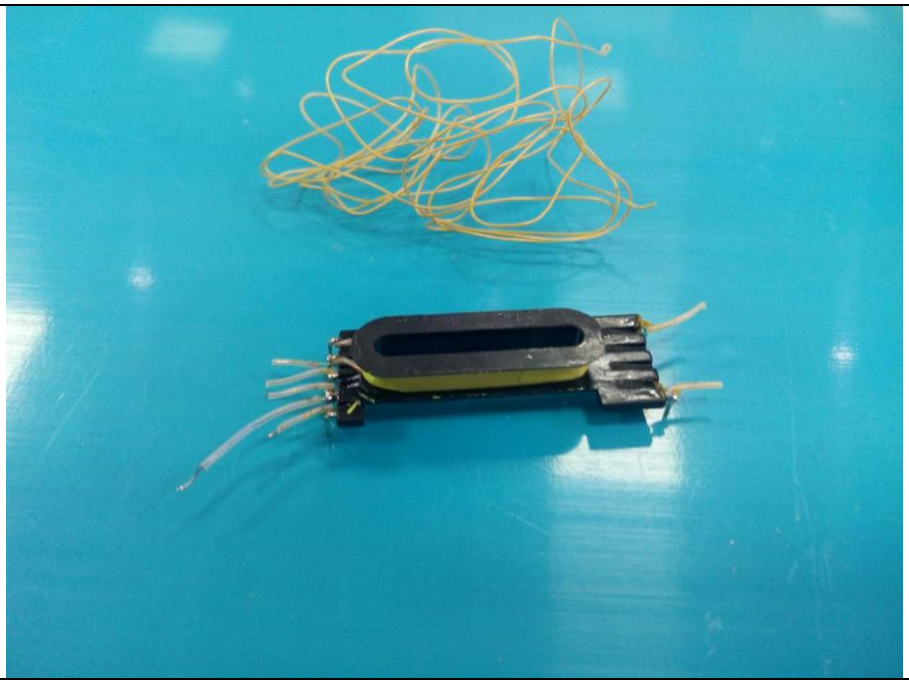

Details of: Transformer, primary winding with insulation tube.

View:

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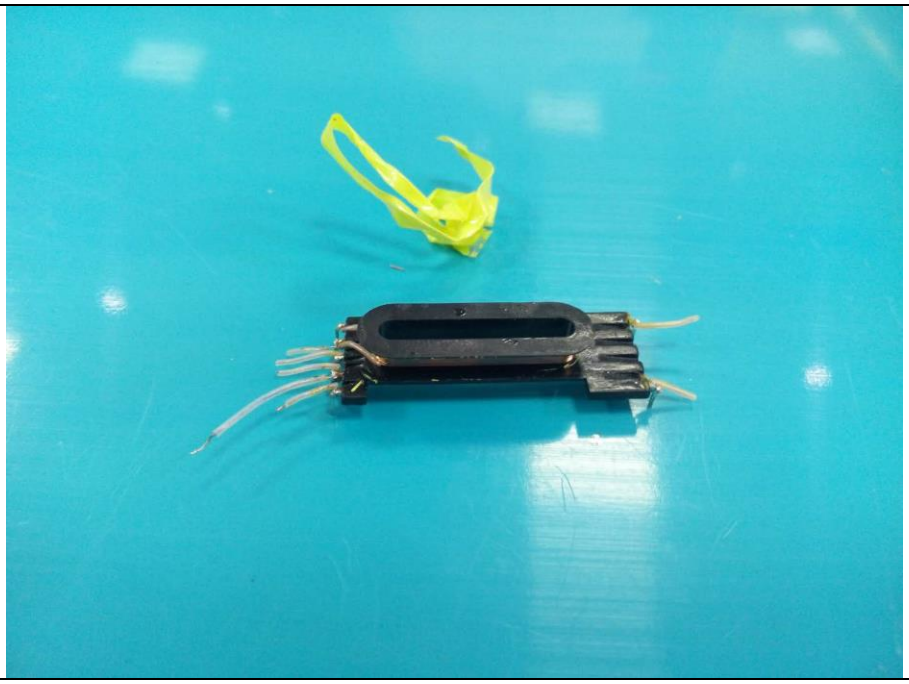

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Details of: Transformer

View:

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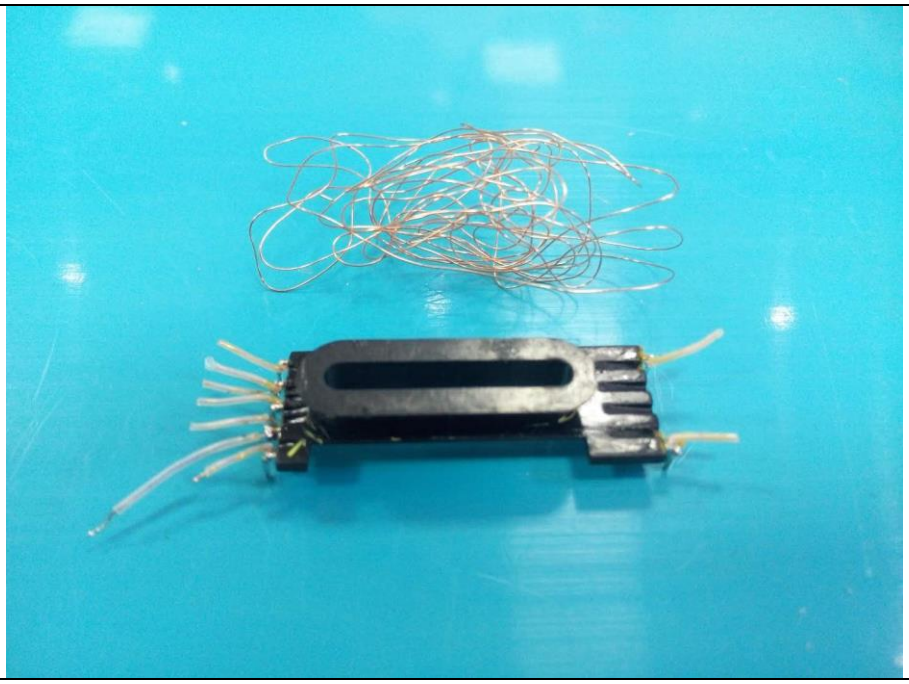

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