中国认可
国际互认
检测
TESTING
CNAS L6478

TEST REPORT

Reference No......	:	WTZ20F08056710L
Applicant.....	:	EMPIRE OF LIGHT PTY.LTD
Address.....	:	8 ROWANY CLOSE, BONNYRIGG, NSW,2177, AUSTRALIA
Manufacturer	:	The same as above
Address.....	:	The same as above
Product Name.....	:	Panel light
Model No.....	:	See model list on page 3
Standards.....	:	Luminaires Part 2-1: Fixed general purpose luminaries IEC 60598-2-1:1979+A1:1987 IEC 60598-1:2014+A1:2017 used in conjunction with Australia deviation
Date of Receipt sample.....	:	2020-08-27
Date of Test.....	:	2020-08-27 to 2020-10-09
Date of Issue.....	:	2020-10-10
Test Report Form No......	:	WSL-6059821A-02A
Test Result.....	:	**Pass**

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

Prepared By:

Waltek Testing Group (Foshan) Co., Ltd.

Address: No.13-19, 2/F., 2nd Building, Sunlink International Machinery City, Chencun, Shunde District, Foshan, Guangdong, China

Tel:+86-757-23811398 Fax:+86-757-23811381 E-mail:info@waltek.com.cn

Compiled by:

Bonn Ding / Project Engineer

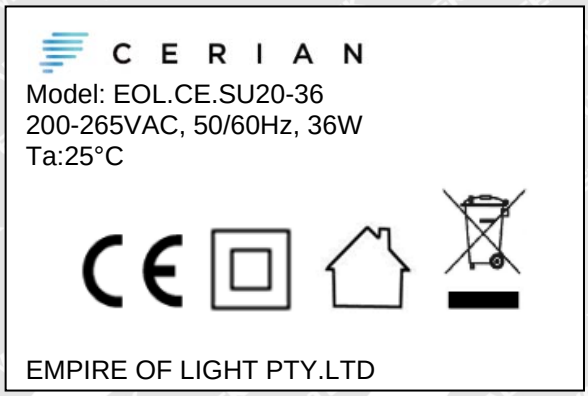
Approved by:

WALTEK TESTING GROUP CO.,LTD. WALTEK (02) TEST REPORT

Oren Yang / Manager

Test item description.....:	Panel light
Trade Mark.....:	CERIAN
Model/Type reference.....:	See model list on page 3
Ratings.....:	See model list on page 3

Copy of marking plate:



On the luminaries surface

Note: The marking label for other models are identical as above, except model No. & rated wattage.

Summary of testing:

1. Unless other specified, all tests were performed on model EOL.CE.SU20-36, the results complied with the requirements of the standards mentioned on page one.
2. Australian deviation to IEC 60598-1:2014+A1:2017 and AS/NZS 60598.1:2017+A1:2017, IEC 60598-2-1:1979+A1:1987 and AS/NZS 60598.2.1:2014+A1:2016+A2:2019 was considered and found to comply with the requirement.
3. The integral LED driver is assessed acc. to IEC 61347-2-13:2014+A1-2016 and IEC 61347-1:2015 +A1:2017 used in conjunction with Australia deviation of AS/NZS 61347.1:2016+A1:2018 and AS 61347.2.13:2018, found to comply with the requirement.
4. Integral LED module was assessed according to IEC 62031:2018 and found to comply with the requirement.
5. Photobiological safety was assessed according to IEC 62471:2006, classification group: exempt☒ risk 1☐ risk 2☐ risk 3☐.
6. Only the most unfavorable results are recorded in this report.

Test items particulars:

Classification of installation and use.....:	Fixed luminaires
Supply Connection.....:	Power cord

Possible test case verdicts:

- test case does not apply to the test object.....:	N (Not applicable)
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)

General remarks:

"(see remark #)" refers to a remark appended to the report.
"(see appended table)" refers to a table appended to the report.
Throughout this report a point is used as the decimal separator.

General product information:

1. The product is Class II fixed luminaires.
2. All models are with the similar construction and LED driver circuitry, PCB layout, except rated power and colour.
3. 200-265VAC, 50/60Hz; for other detail see model list on below:

Model list

Item	Model	Rated power (W)	Protection against electric shock	IP degree
1	EOL.CE.SU20-6	6W	Class II	IP20
2	EOL.CE.SU20-9	9W	Class II	IP20
3	EOL.CE.SU20-12	12W	Class II	IP20
4	EOL.CE.SU20-18	18W	Class II	IP20
5	EOL.CE.SU20-24	24W	Class II	IP20
6	EOL.CE.SU20-36	36W	Class II	IP20

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.2 (0)	**GENERAL TEST REQUIREMENTS**		**P**
1.2 (0.3)	More sections applicable.....:	Yes ☐ No ☒	—
1.2 (0.5)	Components	(see Annex 1)	—
1.2 (0.7)	**Information for luminaire design in light sources standards**		—
1.2 (0.7.2)	Light source safety standard ..... :	IEC 62031	—
	Luminaire design in the light source safety standard		P
1.4 (2)	**CLASSIFICATION**		**P**
1.4 (2.2)	Type of protection .....:	Class II	—
1.4 (2.3)	Degree of protection.....:	IP20	—
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	On the enclosure	P
	Format of symbols/text		P
1.5 (3.3)	Additional information		P
	Language of instructions	In English	P
1.5 (3.3.1)	Combination luminaires		N
1.5 (3.3.2)	Nominal frequency in Hz	50/60Hz	P
1.5 (3.3.3)	Operating temperature		N
1.5 (3.3.4)	Symbol or warning notice		N
1.5 (3.3.5)	Wiring diagram		N
1.5 (3.3.6)	Special conditions		N
1.5 (3.3.7)	Metal halide lamp luminaire – warning		N
1.5 (3.3.8)	Limitation for semi-luminaires		N
1.5 (3.3.9)	Power factor and supply current		N
1.5 (3.3.10)	Suitability for use indoors		N
1.5 (3.3.11)	Luminaires with remote control		N
1.5 (3.3.12)	Clip-mounted luminaire – warning		N
1.5 (3.3.13)	Specifications of protective shields		N

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.5 (3.3.14)	Symbol for nature of supply	~	P
1.5 (3.3.15)	Rated current of socket outlet		N
1.5 (3.3.16)	Rough service luminaire		N
1.5 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments	Type Y	P
1.5 (3.3.18)	Non-ordinary luminaires with PVC cable		N
1.5 (3.3.19)	Protective conductor current in instruction if applicable		N
1.5 (3.3.20)	Provided with information if not intended to be mounted within arm's reach		N
1.5 (3.3.21)	Non-replaceable and non-user replaceable light sources information provided	Non-user replaceable	P
1.5 (3.3.22)	Controllable luminaires, classification of insulation provided		N
1.5 (3.3.23)	Luminaire without controlgear provided with necessary information for selection of appropriate component		N
1.5 (3.3.24)	If not supplied with terminal block, information on the packaging		N
1.5 (3.4)	Test with water	15s	P
	Test with hexane	15s	P
	Legible after test		P
	Label attached		P
1.6 (4)	**CONSTRUCTION**		**P**
1.6 (4.2)	Components replaceable without difficulty		N
1.6 (4.3)	Wireways smooth and free from sharp edges		P
1.6 (4.4)	**Lampholders**		N
1.6 (4.4.1)	Integral lampholder		N
1.6 (4.4.2)	Wiring connection		N
1.6 (4.4.3)	Lampholder for end-to-end mounting		N
1.6 (4.4.4)	Positioning		N
	- pressure test (N) ..... :		—
	After test the lampholder comply with relevant standard sheets and show no damage		N
	After test on single-capped lampholder the lampholder have not moved from its position and show no permanent deformation		N

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- bending test (N) .....:	--	—
	After test the lampholder have not moved from its position and show no permanent deformation		N
1.6 (4.4.5)	Peak pulse voltage		N
1.6 (4.4.6)	Centre contact		N
1.6 (4.4.7)	Parts in rough service luminaires resistant to tracking		N
1.6 (4.4.8)	Lamp connectors		N
1.6 (4.4.9)	Caps and bases correctly used		N
1.6 (4.4.10)	Light source for lampholder or connection according IEC 60061 not connected another way		N
1.6 (4.5)	**Starter holders**		**N**
	Starter holder in luminaires other than class II	No starter holder used	N
	Starter holder class II construction		N
1.6 (4.6)	**Terminal blocks**		P
	Tails		N
	Unsecured blocks		P
1.6 (4.7)	**Terminals and supply connections**		P
1.6 (4.7.1)	Contact to metal parts		N
1.6 (4.7.2)	Test 8 mm live conductor		P
	Test 8 mm earth conductor		N
1.6 (4.7.3)	Terminals for supply conductors		P
1.6 (4.7.3.1)	Welded method and material		N
	- stranded or solid conductor		N
	- spot welding		N
	- welding between wires		N
	- Type Z attachment		N
	- mechanical test according to 15.8.2		N
	- electrical test according to 15.9		N
	- heat test according to 15.9.2.3 and 15.9.2.4		N
1.6 (4.7.4)	Terminals other than supply connection		N
1.6 (4.7.5)	Heat-resistant wiring/sleeves		N
1.6 (4.7.6)	Multi-pole plug		N
	- test at 30 N		N
1.6 (4.8)	**Switches**		**N**

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- adequate rating		N
	- adequate fixing		N
	- polarized supply		N
	- compliance with IEC 61058-1 for electronic switches		N
1.6 (4.9)	**Insulating lining and sleeves**		**P**
1.6 (4.9.1)	Retainment		P
	Method of fixing.....:	Heat-shrink	P
1.6 (4.9.2)	Insulated linings and sleeves:		P
	Resistant to a temperature > 20 °C to the wire temperature or		P
	a) & c) Insulation resistance and electric strength		N
	b) Ageing test. Temperature (°C).....:		N
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		N
	Interference suppression capacitors according to IEC 60384-14		N
1.6 (4.10.2)	Assembly gaps:		N
	- not coincidental		N
	- no straight access with test probe		N
1.6 (4.10.3)	Retainment of insulation:		P
	- fixed		P
	- unable to be replaced; luminaire inoperative		P
	- sleeves retained in position		N
	- lining in lampholder		N
1.6 (4.10.4)	Protective impedance device		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
1.6 (4.11)	**Electrical connections and current-carrying parts**		**P**
1.6 (4.11.1)	Contact pressure		P

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.6 (4.11.2)	Screws:		N
	- self-tapping screws		N
	- thread- cutting screws		N
1.6 (4.11.3)	Screw locking:		N
	- spring washer		N
	- rivets		N
1.6 (4.11.4)	Material of current-carrying parts		P
1.6 (4.11.5)	No contact to wood or mounting surface		P
1.6 (4.11.6)	Electro-mechanical contact systems		N
1.6 (4.12)	**Screws and connections (mechanical) and glands**		**P**
1.6 (4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N
	Torque test: torque (Nm); part.....:	Screws used for fixing enclosure: 0.5Nm	P
	Torque test: torque (Nm); part.....:	Screws used for fixing LED board: 0.5Nm	P
1.6 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N
1.6 (4.12.4)	Locked connections:		N
	- fixed arms; torque (Nm)..... :	--	N
	- lampholder; torque (Nm)..... :	--	N
	- push-button switches; torque 0,8 Nm..... :	--	N
1.6 (4.12.5)	Screwed glands; force (Nm)..... :	--	N
1.6 (4.13)	**Mechanical strength**		**P**
1.6 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm)..... :	--	N
	- other parts; energy (Nm)..... :	All enclosure & lamp cover: 0.35Nm	P
	1) live parts		P
	2) linings		N
	3) protection		P
	4) covers		P
1.6 (4.13.2)	Metal parts have adequate mechanical strength		N
1.6 (4.13.3)	Straight test finger	30 N	P
1.6 (4.13.4)	Rough service luminaires		N
	- IP54 or higher		N
	a) fixed		N

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	b) hand-held		N
	c) delivered with a stand		N
	d) for temporary installations and suitable for mounting on a stand		N
1.6 (4.13.6)	Tumbling barrel		N
1.6 (4.14)	**Suspensions, fixings and means of adjusting**		**P**
1.6 (4.14.1)	Mechanical load:		P
	A) four times the weight	4x0.53kg=2.12kg for EOL.CE.S20-36 (Max.)	P
	B) torque 2,5 Nm		N
	C) bracket arm; bending moment (Nm)..... :	--	N
	D) load track- mounted luminaires		N
	E) clip-mounted luminaires, glass-shelve. Thickness (mm) ..... :	--	N
	Metal rod. diameter (mm) .....:	--	N
	Fixed luminaire or independent control gear without fixing devices		N
1.6 (4.14.2)	Load to flexible cables		N
	Mass (kg) ..... :	--	—
	Stress in conductors (N/mm²) .....:	--	N
	Mass (kg) of semi-luminaire .....:		—
	Bending moment (Nm) of semi-luminaire .....:		N
1.6 (4.14.3)	Adjusting devices:		N
	- flexing test; number of cycles..... :	--	N
	- strands broken..... :	--	N
	- electric strength test afterwards		N
1.6 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N
1.6 (4.14.5)	Guide pulleys		N
1.6 (4.14.6)	Strain on socket-outlets		N
1.6 (4.15)	**Flammable materials**		**P**
	- glow- wire test 650°C..... :	See table(13.3.2)	P
	- spacing ≥30 mm		N
	- screen withstanding test of 13.3.1		N
	- screen dimensions		N
	- no fiercely burning material		P

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

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Glow-wire test on lamp compartment.....:	See Test Table 1.15 (13.3.2)	N
1.6 (4.22)	Attachments to lamps not cause overheating or damage		N
1.6 (4.23)	Semi-luminaires comply Class II		N
1.6 (4.24)	**Photobiological hazards**		**P**
1.6 (4.24.1)	No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P)		N
1.6 (4.24.2)	Retinal blue light hazard		P
	Class of risk group assessed according to IEC/TR 62778 .....:	RG0 unlimited	P
	Luminaires with E_{thr} :		N
	a) Fixed luminaires		N
	- distance x m, borderline between RG1 and RG2... :		N
	- marking and instruction according 3.2.23		N
	b) Portable and handheld luminaires		N
	- marking according 3.2.23 if RG1 exceeded at 200 mm according to IEC/TR 62778		N
	Portable luminaires for children IEC 60598-2-10 and Mains socket outlet nightlights IEC 60598-2-12 not exceed RG1 at 200 mm according to IEC/62778		N
1.6 (4.25)	**Mechanical hazard**		**P**
	No sharp point or edges		P
1.6 (4.26)	**Short-circuit protection**		**N**
1.6 (4.26.1)	Adequate means of uninsulated accessible SELV parts		N
1.6 (4.26.2)	Short-circuit test with test chain according 4.26.3		**N**
	Test chain not melt through		N
	Test sample not exceed values of Table 12.1 and 12.2		N
1.6 (4.27)	**Terminal blocks with integrated screwless earthing contacts**		**N**
	Test according Annex V		N
	Pull test of terminal fixing (20 N)		N
	After test, resistance < 0,05 Ω		N
	Pull test of mechanical connection (50 N)		N
	After test, resistance < 0,05 Ω		N
	Voltage drop test, resistance < 0,05 Ω		N
1.6 (4.28)	**Fixing of thermal sensing control**		N

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

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

1.7 (11)	**CREEPAGE DISTANCES AND CLEARANCES**		**P**
1.7 (11.2.1)	Impulse withstand category (Normal category II)	Category II ☒ Category III ☐	—
	Category III according Annex U		N
	Protected against pollution, reduced creepage and clearance according Annex P of IEC 61347-1		N

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.7 (11.2.2)	Creepage distances for frequency up to 30 kHz	See Test Table 1.7 (11.2) I	P
	Creepage distances for frequency over 30 kHz:		N
	- Controlgear marked with $\hat{U}_{OUT}$ and f_{UOUT} according IEC 61347-1, clause 7.1, item w	See Test Table 1.7 (11.2) II	N
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 1.7 (11.2) II	N
1.7 (11.2.3)	Clearances for frequency up to 30 kHz	See Test Table 1.7 (11.2) I	P
	Clearances distances for frequency over 30 kHz:		N
	- Controlgear marked with U_P	See Test Table 1.7 (11.2) II	N
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 1.7 (11.2) II	N
1.8 (7)	**PROVISION FOR EARTHING**		**N**
1.8 (7.2.1 + 7.2.3)	Accessible metal parts		N
	Metal parts in contact with supporting surface		N
	Resistance < 0,5 Ω.....:	--	N
	Self-tapping screws used		N
	Thread-forming screws		N
	Thread-forming screw used in a grove		N
	Earth makes contact first		N
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N
	Protective earthing of the luminaire not via built-in control gear		N
1.8 (7.2.2 + 7.2.3)	Earth continuity in joints, etc.		N
1.8 (7.2.4)	Locking of clamping means		N
	Compliance with 4.7.3		N
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N
1.8 (7.2.5)	Earth terminal integral part of connector socket		N
1.8 (7.2.6)	Earth terminal adjacent to mains terminals		N
1.8 (7.2.7)	Electrolytic corrosion of the earth terminal		N
1.8 (7.2.8)	Material of earth terminal		N
	Contact surface bare metal		N
1.8 (7.2.10)	Class II luminaire for looping-in		N

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Double or reinforced insulation to functional earth		N
1.8 (7.2.11)	Earthing core coloured green-yellow		N
	Length of earth conductor		N
1.9 (14)	**SCREW TERMINALS**		**N**
	Separately approved; component list.....:	(see Annex 1)	N
	Part of the luminaire.....:	(see Annex 3)	N
1.9 (15)	**SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS**		**P**
	Separately approved; component list.....:	(see Annex 1)	P
	Part of the luminaire.....:	(see Annex 4)	N
1.10 (5)	**EXTERNAL AND INTERNAL WIRING**		**P**
1.10 (5.2)	**Supply connection and external wiring**		P
1.10 (5.2.1)	Means of connection.....:	Power cord	P
	Outdoor luminaire has not PVC insulated external wiring if not class III or SELV ≤ 25 V a.c./60 V d.c. or protected from outdoor environment		N
1.10 (5.2.2)	Type of cable.....:	(see Annex 1)	N
	Nominal cross-sectional area (mm²)..... :	(see Annex 1)	N
	Cables equal to IEC 60227 or IEC 60245		N
1.10 (5.2.3)	Type of attachment, X, Y or Z		N
1.10 (5.2.5)	Type Z not connected to screws		N
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		N
1.10 (5.2.8)	Insulating bushings:		P
	- suitably fixed		P
	- material in bushings		P
	- material not likely to deteriorate		P
	- tubes or guards made of insulating material		P
1.10 (5.2.9)	Locking of screwed bushings		N
1.10 (5.2.10)	Cord anchorage:		N

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- covering protected from abrasion		N
	- clear how to be effective		N
	- no mechanical or thermal stress		N
	- no tying of cables into knots etc.		N
	- insulating material or lining		N
1.10 (5.2.10.1)	Cord anchorage for type X attachment:		N
	a) at least one part fixed		N
	b) types of cable		N
	c) no damaging of the cable		N
	d) whole cable can be mounted		N
	e) no touching of clamping screws		N
	f) metal screw not directly on cable		N
	g) replacement without special tool		N
	Glands not used as anchorage		N
	Labyrinth type anchorages		N
1.10 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment		N
1.10 (5.2.10.3)	Tests:		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		N
1.10 (5.2.11)	External wiring passing into luminaire		N
1.10 (5.2.12)	Looping- in terminals		N
1.10 (5.2.13)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		N
1.10 (5.2.14)	Mains plug same protection		N
	Class III luminaire plug		N

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	No unsafe compatibility		N
1.10 (5.2.16)	Appliance inlets (IEC 60320)		N
	Installation couplers (IEC 61535)		N
	Other appliance inlet or connector according relevant IEC standard		N
1.10 (5.2.17)	No standardized interconnecting cables properly assembled		N
1.10 (5.2.18)	Used plug in accordance with		N
	- IEC 60083		N
	- other standard		P
1.10 (5.3)	**Internal wiring**		**P**
1.10 (5.3.1)	Internal wiring of suitable size and type	(see Annex 1)	P
	Through wiring		N
	- not delivered/ mounting instruction		N
	- factory assembled		N
	- socket outlet loaded (A)..... :		N
	- temperatures.....:	(see Annex 2)	N
	Green-yellow for earth only		N
1.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		P
	Cross-sectional area (mm²)..... :	(see Annex 1)	P
	Insulation thickness		P
	Extra insulation added where necessary		N
1.10 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		P
	Cross-sectional area (mm²)..... :	(see Annex 1)	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
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
1.10 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		N

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Joints, raising/lowering devices		N
	Telescopic tubes etc.		N
	No twisting over 360°		P
1.10 (5.3.3)	Insulating bushings:		P
	- suitable fixed		P
	- material in bushings		P
	- material not likely to deteriorate		P
	- cables with protective sheath		P
1.10 (5.3.4)	Joints and junctions effectively insulated		N
1.10 (5.3.5)	Strain on internal wiring		N
1.10 (5.3.6)	Wire carriers		N
1.10 (5.3.7)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		N
1.10 (5.4)	**Test to determine suitability of conductors having a reduced cross-sectional area**		N
	Under test the temperature of the luminaire wiring insulation not exceed the limits stated in Table 12.2	(see Annex 2)	N
	No damage to luminaire wiring after test		N
1.11 (8)	**PROTECTION AGAINST ELECTRIC SHOCK**		P
1.11 (8.2.1)	Live parts not accessible		P
	Basic insulated parts not used on the outer surface without appropriate protection		P
	Basic insulated parts not accessible with standard test finger on portable, settable and adjustable luminaires		N
	Basic insulated parts not accessible with Ø 50 mm probe from outside, other types of luminaires		P
	Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N
	Basic insulation only accessible under lamp or starter replacement		N
	Protection in any position		P
	Double-ended tungsten filament lamp		N
	Insulation lacquer not reliable		N
	Double-ended high pressure discharge lamp		N

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Relevant warning according to 3.2.18 fitted to the luminaire		N
1.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N
1.11 (8.2.3.a)	Class II luminaire:		P
	- basic insulated metal parts not accessible during starter or lamp replacement		N
	- basic insulation not accessible other than during starter or lamp replacement		P
	- glass protective shields not used as supplementary insulation		N
1.11 (8.2.3.b)	BC lampholder of metal in class I luminaires shall be earthed		N
1.11 (8.2.3.c)	SELV circuits with exposed current carrying parts:		N
	Ordinary luminaire:		N
	- voltage under load (V)..... :	--	N
	- no-load voltage..... :	--	N
	- touch current if applicable (mA) ..... :	--	N
	One conductive part insulated if required		N
	Other than ordinary luminaire:		N
	- nominal voltage ..... :	--	N
	Class III luminaire only for connection to SELV		N
	Class III luminaire not provided with means for protective earthing		N
1.11 (8.2.4)	Portable luminaire have protection independent of supporting surface		N
1.11 (8.2.5)	Compliance with the standard test finger or relevant probe		P
1.11 (8.2.6)	Covers reliably secured		P
1.11 (8.2.7)	Luminaire other than below with capacitor > 0,5 μF not exceed 50 V 1 min after disconnection		P
	Portable luminaire with capacitor > 0,1 μF (0.25) not exceed 34 V 1 s after disconnection		N
	Other luminaires with capacitor > 0,1 μF (0.25) with plug and track adaptors not exceed 60 V 5 s after disconnection		N

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.12 (12)	**ENDURANCE TEST AND THERMAL TEST**		**P**
1.12 (-)	If IP > IP 20 relevant test of (12.4), (12.5) and (12.6) after (9.2) before (9.3) specified in 1.13		—
1.12 (12.2)	**Selection of lamps and ballasts**		—
	Lamp used according Annex B	(Lamp used see Annex 2)	—
	Controlgear if separate and not supplied	(Controlgear used see Annex 2)	—
1.12 (12.3)	**Endurance test:**		P
	a) mounting- position .....:	Mounted according to the suggestion of manufacturer	—
	b) test temperature (°C).....:	35°C	—
	c) total duration (h) .....:	240h	—
	d) supply voltage (V).....:	1.1Un	—
	d) if not equipped with controlgear, constant voltage/current (V) or (A) .....:	--	—
	e) luminaire ceases to operate		—
1.12 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N
	- marking legible		P
	- no cracks, deformation etc.		P
1.12 (12.4)	**Thermal test (normal operation)**	(see Annex 2)	P
1.12 (12.5)	**Thermal test (abnormal operation)**	(see Annex 2)	N
1.12 (12.6)	**Thermal test (failed lamp control gear condition):**		N
1.12 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A) ..... :		—
	- case of abnormal conditions.....:		—
	- electronic lamp control gear		N
	- measured winding temperature (°C): at 1,1 Un .....:		—
	- measured mounting surface temperature (°C) at 1,1 Un.....:		N
	- calculated mounting surface temperature (°C) .....:		N
	- track- mounted luminaires		N
1.12 (12.6.2)	Temperature sensing control		N

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- case of abnormal conditions.....:		—
	- thermal link		N
	- manual reset cut- out		N
	- auto reset cut- out		N
	- measured mounting surface temperature (°C).....:		N
	- track- mounted luminaires		N
1.12 (12.7)	**Thermal test (failed lamp control gear in plastic luminaires):**		N
1.12 (12.7.1)	Luminaire without temperature sensing control		N
1.12 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		N
	Test method 12.7.1.1 or Annex W .....:		—
	Test according to 12.7.1.1:		N
	- case of abnormal conditions.....:		—
	- Ballast failure at supply voltage (V) .....:		—
	- Components retained in place after the test		N
	- Test with standard test finger after the test		N
	Test according to Annex W:		N
	- case of abnormal conditions.....:		—
	- measured winding temperature (°C): at 1,1 Un.....:		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un.....:		—
	- calculated temperature of fixing point/exposed part (°C).....:		—
	Ball-pressure test.....:	See Table 1.15 (13.2.1)	N
1.12 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		N
	- case of abnormal conditions.....:		—
	- measured winding temperature (°C): at 1,1 Un.....:		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un.....:		—
	- calculated temperature of fixing point/exposed part (°C).....:		—
	Ball-pressure test.....:	See Table 1.15 (13.2.1)	N
1.12 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N
	- case of abnormal conditions.....:		—

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- Components retained in place after the test		N
	- Test with standard test finger after the test		N
1.12 (12.7.2)	Luminaire with temperature sensing control		N
	- thermal link.....:	Yes ☐ No ☐	—
	- manual reset cut-out.....:	Yes ☐ No ☐	—
	- auto reset cut-out.....:	Yes ☐ No ☐	—
	- case of abnormal conditions.....:		—
	- highest measured temperature of fixing point/ exposed part (°C):.....:		—
	Ball-pressure test:.....:	See Table 1.15 (13.2.1)	N
1.13 (9)	**RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE**		**P**
1.13 (-)	If IP > IP 20 the order of tests as specified in clause 1.12		P
1.13 (9.2)	Tests for ingress of dust, solid objects and moisture:		—
	- classification according to IP.....:	IP20	—
	- mounting position during test.....:	Acc. to user manual	—
	- fixing screws tightened; torque (Nm).....:	--	—
	- tests according to clauses.....:	Cl.9.2.0	—
	- electric strength test afterwards		P
	a) no deposit in dust-proof luminaire		N
	b) no talcum in dust- tight luminaire		N
	c) no trace of water on current-carrying parts or on insulation where it could become a hazard		N
	c.1) For luminaires without drain holes – no water entry		N
	c.2) For luminaires with drain holes – no hazardous water entry		N
	d) no water in watertight or pressure watertight luminaire		N
	e) no contact with live parts (IP 2X)		P
	e) no entry into enclosure (IP 3X and IP 4X)		N
	e) no contact with live parts through drain holes and ventilation slots (IP3X and IP4X)		N
	f) no trace of water on part of lamp requiring protection from splashing water		N
	g) no damage of protective shield or glass envelope		N

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.13 (9.3)	Humidity test 48 h	25°C, 93%R.H.	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 .....:	--	—
	Insulation resistance (MΩ).....:	--	—
	SELV		P
	- between current-carrying parts of different polarity:	--	N
	- between current-carrying parts and mounting surface.....:	100MΩ	P
	- between current-carrying parts and metal parts of the luminaire.....:	100MΩ	P
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts.....:	--	N
	- Insulation bushings as described in Section 5 .....:	--	N
	Other than SELV		P
	- between live parts of different polarity.....:	100MΩ	P
	- between live parts and mounting surface.....:	100MΩ	P
	- between live parts and metal parts.....:	100MΩ	P
	- between live parts of different polarity through action of a switch.....:	--	N
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts.....:	--	N
	- Insulation bushings as described in Section 5 .....:	--	N
1.14 (10.2.2)	Electric strength test		P
	Dummy lamp		N
	Luminaires with ignitors after 24 h test		N
	Luminaires with manual ignitors		N
	Test voltage (V).....:		P
	SELV		P
	- between current-carrying parts of different polarity:	--	N
	- between current-carrying parts and mounting surface.....:	500V	P

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- between current-carrying parts and metal parts of the luminaire..... :	500V	P
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :	--	N
	- Insulation bushings as described in Section 5 ..... :	--	N
	Other than SELV		P
	- between live parts of different polarity..... :	1530V	P
	- between live parts and mounting surface..... :	3060V	P
	- between live parts and metal parts..... :	3060V	P
	- between live parts of different polarity through action of a switch..... :	--	N
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :	--	N
	- Insulation bushings as described in Section 5 ..... :	--	N
1.14 (10.3)	Touch current or protective conductor current (mA). :	Max. 0.03mA (Touch current)	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)	P

IEC 60598-2-1			
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	2.9	1.5	11.1	2.9	2.5	11.1	
Working voltage (V)..... :					Max. 265Vac			—
PTI..... :					< 600 ☒	≥ 600 ☐		—
Pulse voltage if applicable (kV) .....:					--			—
Supplementary information: Live parts of different polarity								
Distance 2:	R	6.0	3.0	11.1	6.0	5.0	11.1	
Working voltage (V)..... :					Max. 265Vac			—
PTI..... :					< 600 ☒	≥ 600 ☐		—
Pulse voltage if applicable (kV) .....:					--			—
Supplementary information: Current-carrying parts and accessible parts								
Distance 3:	B	3.0	1.5	11.1	3.0	2.5	11.1	
Working voltage (V)..... :					Max. 265Vac			—
PTI..... :					< 600 ☒	≥ 600 ☐		—
Pulse voltage if applicable (kV) .....:					--			—
Supplementary information: Current-carrying parts and supporting surface								

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

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

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

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

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

1.15 (13.2.1)	**TABLE: Ball Pressure Test of Thermoplastics**			**P**
Allowed impression diameter (mm) .....:		≤2.0		—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)	
Lamp cover	See Annex 1	125	0.8	
Plastic enclosure	See Annex 1	125	1.0	
PCB	See Annex 1	135.6	1.2	
Bobbin	See Annex 1	125	0.9	
Plastic enclosure of LED driver	See Annex 1	125	0.8	
Supplementary information:				

1.15 (13.3.1)	**TABLE: Needle-flame test (IEC 60695-11-5)**				**P**
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
PCB	See Annex 1	10	No	3.0	P
Bobbin	See Annex 1	10	No	0	P
Supplementary information:					

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

1.15 (13.3.2)	**TABLE: Glow-wire test (IEC 60695-2-11)**					**P**
Glow wire temperature .....:		650°C				—
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)		Verdict
Lamp cover	See Annex 1	30	No	0		P
Plastic enclosure	See Annex 1	30	No	0		P
Insulation tape	See Annex 1	30	No	0		P
Plastic enclosure of LED driver	See Annex 1	30	No	0		P
PCB	See Annex 1	30	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)**				**P**
Test voltage PTI ..... :		175 V			—
Object/ Part No./ Material	Manufacturer/ trademark	Withstand 50 drops without failure on three places or on three specimens			Verdict
Bobbin	See Annex 1	50	50	50	P
PCB	See Annex 1	50	50	50	P
Supplementary information:					

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

ANNEX 1	**Components**					**P**
object/part No.	code	manufacturer/ trademark	type/model	technical data	Standard	mark(s) of conformity
Input wire of LED driver	B	Arditi CN Electric (Huizhou) Co., Ltd.	H03VVH2-F	2x0.75mm^2	AS/NZS 60227.5	SAA110188EA
Lead wire of LED	B	GUANGZHOU FENGTAI MEIHUA CABLE CO LTD	3239	60000VDC; 200°C;26AWG	--	UL E204798
LED	B	MSL	SMD2835	60mA, 6500K	EN 62778	Tested with appliance
LED board	B	WING SHING ELECTRONIC & PCB LTD	YS-4	V-0; Al	--	UL E190407
Lamp cover	B	FOSHAN NANHAI POLMA ENGINEERING PLASTICS CO LTD	PC-1025	PC; V-0	--	UL E241821
Plastic enclosure	B	COVESTRO DEUTSCHLAND AG [PC RESINS]	6555 + (z)(f1)	PC; V-2	--	UL E41613
LED Driver:						
Fuse	B	Suzhou Walter Electronic Co. Ltd.	2010 Serie(s)	250VAC; 2A	EN 60127-1 EN 60127-3	VDE 40018781
Varistor	B	Shantou High-New Technology Dev. Zone Songtian Enterprise Co., Ltd.	07D511K	510V; T125	EN 61051-1	VDE 40023049
Magnet wire	B	SHANTOU SHENGANG ELECTRICAL INDUSTRIAL CO LTD	xUEW/130, QA-x/130	130°C	--	UL E239508
Bobbin	B	ZHEJIANG JIAMIN PLASTIC CO LTD	PF2A4-161J	150°C	--	UL E231508
Insulation tape	B	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	PZ* (b)	130°C	--	UL E165111
Teflon tube for Transformer	B	CHANGYUAN ELECTRONICS GROUP CO LTD	CB-TT-T; CB-TT-L; CB-TT-S	200°C	--	UL E180908

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

Y capacitor	B	Rugao Shuangcheng Electronic Co., Ltd.	MKP	275VAC; T100; 0.33uF	EN 60384-14	VDE 40025673
Internal wire	B	Zhongshan jia Lai electronics Co.,Ltd	FEP-102	300/500 V, 0.5 mm^2 ; T180, double-insulated	VDE-0250	VDE 40027186
Sleeving	B	LI'S ELECTRONICS CO LTD	HF-001; HF-003	VW-1	--	UL E193292
Plastic enclosure	B	COVESTRO DEUTSCHLAND AG [PC RESINS]	6555 + (z)(f1)	PC; V-2	--	UL E41613
Metal output terminal block	B	Xiamen Fulang Enterprise Co., Ltd	LMTS-135-1-5x5	Cu: 59%; 0.5-3mm^2	IEC 60598-1	Tested with appliance

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

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

ANNEX 2	**Temperature measurements, thermal tests of Section 12**		**P**

	Type reference.....:	EOL.CE.SU20-36	—
	Lamp used.....:	Integral LED	—
	Lamp control gear used.....:	Integral LED driver	—
	Mounting position of luminaire.....:	Acc. to user manual	—
	Supply wattage (W).....:	36.2	—
	Supply current (A)..... :	0.168	—
	Calculated power factor.....:	0.98	—
	Table: measured temperatures corrected for t_a = 25 °C:		P
	- abnormal operating mode.....:	-----	—
	- test 1: rated voltage..... :	-----	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage..... :	1.06 times rated voltage	—
	- 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..... :	-----	—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :	-----	—

temperature (°C) of part	Clause 12.4 – normal				Clause 12.5 – abnormal	
	test 1	test 2	test 3	limit	test 4	limit
Lead wire to LED driver	--	53.9	--	90	--	--
Lead wire to LED (near LED)	--	76.5	--	200	--	--
LED board	--	98.6	--	Ref.	--	--
Lamp cover	--	68.4	--	Ref.	--	--
Plastic enclosure	--	59.7	--	Ref.	--	--
Mounting surface	--	46.8	--	90	--	--
Illuminated surface (0.1m)	--	55.1	--	90	--	--
Varistor	--	98.4	--	125	--	--
E-cap(hottest)	--	103.5	--	105	--	--
PCB of LED driver	--	110.6	--	Cl.13	--	--
LF1 winding	--	109.8	--	130	--	--

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

LF2 winding	--	102.3	--	130	--	--
T1 winding	--	116.7	--	130	--	--
Bobbin	--	95.4	--	Cl.13	--	--
Enclosure inner surface	--	72.3	--	Cl.13	--	--
Enclosure outside (tc)	--	68.5	--	85	--	--

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

ANNEX 3	**Screw terminals (part of the luminaire)**	**N**

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

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

ANNEX 4	**Screwless terminals (part of the luminaire)**	**P**

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

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

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

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

Australia deviation			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 5	**Australia deviation (AS/NZS 60598.2.1 and AS/NZS 60598.1)**	**P**

	APPENDIX ZZ		—
	VARIATIONS TO IEC 60598-1, Ed. 8.0 (2014) FOR AUSTRALIA AND NEW ZEALAND		
0	**GENERAL INTRODUCTION**		**P**
0.1	**Add:** Where the term “lamp” is used in this Standard, it is taken to include electric light sources. LED light sources are subject to the same test parameters as “other discharge lamps”.		P
	NOTE **Portable rechargeable battery operated luminaires** should comply with Annex B, ‘Appliances powered by rechargeable batteries’ of AS/NZS 60335.1, Household and similar electrical appliances—Safety, Part 1: General requirements (IEC 60335-1 ED. 5, MOD). In addition, portable, rechargeable, battery-operated luminaires with lithium ion batteries should have overvoltage protection.		—
0.4.2	**Add:** In Australia, for equipment, other than class III equipment, that is intended for connection to the supply mains **and not marked with**: - a rated voltage of at least 240 V for single-phase equipment or a rated voltage of at least 415 V for three-phase equipment; or - a rated voltage range that includes 240 V for single-phase equipment and 415 V for three-phase equipment, the rated voltage is equal to 240 V for single-phase equipment and 415 V for three-phase equipment, and the upper limit of the voltage range is equal to 240 V for single-phase equipment and 415 V for three-phase equipment.		P
0.5	**Add:** Relevant Australian/New Zealand Standard replaces the IEC Standard unless otherwise specified.		P
0.5.101	**Add:** Capacitors		P
	Capacitors shall be of a type to ensure that any capacitor failure results in a failsafe outcome.		N

Australia deviation			
Clause	Requirement + Test	Result - Remark	Verdict
	Capacitors (**other than those incorporated in control gear** that comply with the relevant standard) shall comply with one of the following: - Capacitors likely to be permanently subjected to the supply voltage, used for radio interference suppression or for voltage dividing shall comply with IEC 60384-14. - Other capacitors shall be not less than Type B capacitors with metal body and break action protection in accordance with IEC 61048 and IEC 61049. A capacitor complying with EIA-456-A, Metallized Film Dielectric Capacitors for Alternating Current Applications, shall comply with IEC 61049 and IEC 61048:2006 excluding the endurance test of 18.1.1.		P
	In addition, capacitors shall have a minimum voltage rating of 250 V at a temperature rating of 100 °C or 280 V at a temperature rating of 85 °C.		P
0.5.102	**Add:** Control gear		P
	Power supplies shall comply with the relevant part 2 of the AS/NZS 61558 series.		N
	Control gear shall comply with the relevant part 2 of the AS/NZS 61347 series.		P
	Battery chargers used for lighting other than emergency lighting shall comply with AS/NZS 60335.2.29.		N
	Sensor switches and similar control circuits, including those incorporated in other equipment, are considered electronic switches (see Clause 4.8).		N
2	**CLASSIFICATION OF LUMINAIRES**		P
2.2	**Class 0 luminaires** are not permitted in Australia or New Zealand.		—
3	**MARKING**		**P**
3.1	In Australia and New Zealand, instructions and other texts required by this Standard shall at least be written in English.		P
3.2	**Delete** the second paragraph beginning with 'Marking may be on ballast provided…'.		N
Table 3.1	**Move** Item 3.2.21 from the second column to the third column. 3.2.21 The relevant symbol for luminaires not suitable for covering with thermally insulating material		N

Australia deviation			
Clause	Requirement + Test	Result - Remark	Verdict
3.2.3	**The rated maximum ambient temperature t_a.** (see Figure 1).		P
3.2.12	**Add:** In Australia, luminaires for household use and similar 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”.		P
3.2.23	**Add:** 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
3.3.7	**Delete Clause and replace with**: Luminaires for use with **metal halide lamps** shall be provided with instructions that state the substance of the following: 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
3.3.18	**Delete** the text ‘, i.e. for indoor use only’.		N
3.3.21	**Delete** the text ‘Caution, risk of electric shock’ and the symbol.		P
3.3.101	The instructions shall contain details of the components in the luminaire that require replacement as part of a maintenance program.		N
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.		N
	The safety warnings are not required where these batteries are not intended to be replaced or are only accessible after damaging the equipment.		—

Australia deviation			
Clause	Requirement + Test	Result - Remark	Verdict
	The safety warnings: – 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.		N
4	**CONSTRUCTION**		P
4.7.2	**Delete** the first paragraph and r**eplace with** the following: 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.		P
4.8	**Add:** 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
	Electronic switches, when incorporated in or supplied with the luminaire, shall comply with the requirements of AS/NZS 60669.2.1 or IEC 61058-1 classified for 10,000 operating cycles		N
4.10.4	**Delete the last sentence and replace with the following::** 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.		N
4.14.6	**Add:** A fixed socket-outlet complying with AS/NZS 3112 or AS/NZS 60884.1 is used for the test.		N

Australia deviation			
Clause	Requirement + Test	Result - Remark	Verdict
4.32	**Add:** **Metal oxide varistors** shall comply with the requirements of AS/NZS 3100 for metal oxide varistors incorporated in accessories.		P
4.101.1	**Small batteries**		N
	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.		N
	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.		N
	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.		N
	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. 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.		N
	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.		N
	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 %.....:	4 Nm	N
4.101.1	**Battery compartment fasteners**		N

Australia deviation			
Clause	Requirement + Test	Result - Remark	Verdict
	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.		N
	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

5	**EXTERNAL AND INTERNAL WIRING**		**P**
5.2.1	First paragraph **replaced by**: 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.		P
	Delete the second and third paragraph.		—
	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.		N
	The plug portion of a luminaire with integral pins shall comply with the relevant requirements of AS/NZS 3112.		N
	NOTE 4 PVC-insulated connection cords should not be used with outdoor luminaires in cold alpine locations.		—

Australia deviation			
Clause	Requirement + Test	Result - Remark	Verdict
5.2.2	First paragraph **replaced by**: 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 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.		N

Table 5.1 — Supply cord

Luminaire	Rubber	PVC	No insulation
Ordinary class I luminaires	60245 IEC 51S [c]	60227 IEC 52 [c]	
Ordinary class II luminaires	60245 IEC 53 [c]	60227 IEC 52 [c]	
Luminaires which are other than ordinary class I and II	60245 IEC 57 [c]	60227 IEC 53 [ac]	
Portable rough service luminaires	60245 IEC 66 [c]	PVC insulated and sheathed heavy duty flexible cord	
Class III or with SELV circuits luminaires (up to 25 V a.c./60 V d.c.)			Un-insulated conductor [b]
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.	Unsheathed basic insulated conductor		

[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.

Third paragraph **replaced by**:

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.

5.2.16	**Add:** Class II luminaires for fixed wiring incorporating an appliance coupler shall not have means to allow further luminaires to be connected, including looping in by cascading. 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

Australia deviation			
Clause	Requirement + Test	Result - Remark	Verdict
5.2.18	**Replaced by:** All portable luminaires with a flexible supply cord shall be fitted with a plug complying with AS/NZS 3112. **Other luminaires** with flexible cords shall be fitted with a plug complying with AS/NZS 3112, unless they have the warning allowed by Clause 3.2.12.		N
5.3.1	Third paragraph **replaced with** the following: Internal wires coloured green, yellow or green/yellow combination shall be used for making protective earth connections only. **Functional earth** connections shall not be made by wires coloured green, yellow or green/yellow combination.		N
	NOTE 3 Internal wires of other colours are not precluded from making protective earthing connections		—
5.3.1.3	**Replaced by**: 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.		P
7	**PROVISION FOR EARTHING**		**N**
7.2.11	Third paragraph **replaced with** the following: All conductors, whether internal or external, coloured green, yellow or green/yellow combination, shall only be connected to an earthing terminal.		N
8	**PROTECTION AGAINST ELECTRIC SHOCK**		**P**

Australia deviation			
Clause	Requirement + Test	Result - Remark	Verdict
8.2.1	First two paragraphs including Note 1 **replace by** following: 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. This does not apply to the non-current-carrying parts of caps which comply with the relevant IEC safety standard.		P
	Delete “Covers in fixed luminaires that cannot be removed by a single action with one hand are not removed. However, covers which have to be removed for changing lamps or starters are removed for this test.”		—
9	**RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE**		**N**
9.2	**Add** after NOTE 1**:** *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.*		—
10	**INSULATION RESISTANCE AND ELECTRIC STRENGTH, TOUCH CURRENT AND PROTECTIVE CONDUCTOR CURRENT**		**P**
10.3	**Delete** the second row beginning with ‘Class I luminaires rated up to and including 16 A…’. First column, third row, deletes the word ‘Metal’.		—
12	**ENDURANCE TEST AND THERMAL TEST**		—
Table 12.1	First column, first row, the text **replaced by**: ‘Case (of **control gear**, capacitor, starting device, electronic ballast or convertor, etc.)’		—

Australia deviation			
Clause	Requirement + Test	Result - Remark	Verdict
	Add: *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.*		—

13	**RESISTANCE TO HEAT, FIRE AND TRACKING**				**P**
13.3	Parts of non-metallic material (other than ceramic) shall be resistant to flame and ignition. This Clause applies to all parts, including components, even if they have been tested to their own IEC or equivalent standard.				—
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 test glow-wire at 750 ºC and applied to one test sample for 30 s:				P
	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.				—
	Object/ Part No./ Material	Manufacturer/ trademark	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
	Bobbin	See Annex 1	No	0	P
	PCB	See Annex 1	No	0	P
	Insulation tape	See Annex 1	No	0	P
	Plastic enclosure of LED driver	See Annex 1	No	0	P
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 at 650 ºC and applied to one test sample for 30 s:				P
	Object/ Part No./ Material	Manufacturer/ trademark	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
	See table(13.3.2)	See Annex 1	No	0	P

Australia deviation						
Clause	Requirement + Test			Result - Remark		Verdict
13.3.3	During the application of the glow-wire tests of sub clauses 13.3.1, if a flame is produced that persists for longer than 2 s, 'the 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' are further applied to needle-flame test of AS/NZS 60695.11.5.			No flame produced		N
	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
	--	--	--	--	--	--
	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.					—

Australia deviation			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 6	**Variations to AS/NZS 60598.2.1:1998 for application in Australia and/or New Zealand (AS/NZS 60598.2.1:2014+A1:2016+A2:2019)**	**P**

1	**SCOPE**		**P**
	This Standard specifies requirements for fixed general purpose luminaires incorporating electric light sources for operation on supply voltages less than 1000V AC RMS or 1500V ripple-free DC (high voltage). It is to be read in conjunction with those sections of AS/NZS 60598.1 to which reference is made. This Standard also specifies requirements for double-capped LED lamps (Appendix A) and T8 to T5 lamp converters (Appendix B). Appendix A is to be read in conjunction with those sections of AS/NZS 60598.1 to which reference is made. Appendix B is to be read in conjunction with those sections of AS/NZS 60598.1 and AS/NZS 61347.2.3 or AS/NZS 61347.1 to which reference is made.	Fixed lamp	P
6	**MARKING**		**N**
	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 A LED LAMPS		N
7	**CONSTRUCTION**		**N**
	LED luminaires or new luminaires designed for T8 to T5 converters with G5 and G13 lampholders shall include a fuse to protect a fluorescent lamp that is inadvertently installed.		N
	Each fuse shall—		N
	a) be of the 250 V HBC type		N
	b) have a 2 A max. quick-acting type rating; and		N
	c) be used to protect a maximum of two lamps.		N
13	**ENDURANCE TESTS AND THERMAL TESTS**		**P**
	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.		P
14	**RESISTANCE TO DUST AND MOISTURE**		**P**
	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.		P

Australia deviation			
Clause	Requirement + Test	Result - Remark	Verdict

APPENDIX A	**SAFETY REQUIREMENTS FOR DOUBLE-CAPPED LED LAMPS**	**N**
	The requirement is not applicable due to the nature of the product.	—

APPENDIX B	**SAFETY REQUIREMENTS FOR T8 TO T5 LAMP CONVERTERS**	**N**
	The requirement is not applicable due to the nature of the product.	—

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

ANNEX 6	**Lamp controlgear - Part 2-13: Particular requirements for d.c. or a.c. supplied electronic controlgear for LED modules IEC 61347-2-13:2014+A1:2016**	**P**

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
- (4)	Built-in electronic controlgear with double or reinforced insulation comply with Annex O of IEC 61347-1	(see Annex O)	N
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		P

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

7 (7)	**MARKING**		**N**
7.1 (7.1)	**Mandatory markings**		**N**
	a) mark of origin	See copy of marking plate	N
	b) model number or type reference	See copy of marking plate	N
	c) symbol for independent controlgear, if applicable		N
	d) correlation between interchangeable parts and controlgear marked		N
	e) rated supply voltage (V)		N
	supply frequency (Hz)		N
	supply current (A)	See copy of marking plate	N
	f) earthing symbol		N
	k) wiring diagram		N

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	l) value of tc	See copy of marking plate	N
	m) symbol for declared temperature		N
	t) LUM earthing symbol		N
	u) if not SELV maximum working voltage U_{out} between:		N
	- output terminals (V) .....:	--	N
	- output terminals and earth (V) .....:	--	N
7.1 (-)	Constant voltage type:	Yes ☐ No ☐	—
	- rated output power P_{rated} (W) .....:		N
	- rated output voltage U_{rated} (V) .....:		N
	Constant current type:	Yes ☐ No ☐	—
	- rated output power P_{rated} (W) .....:	See copy of marking plate	N
	- rated output current I_{rated} (A) .....:	See copy of marking plate	N
	Indication if for LED modules only		N
7.1 (7.2)	Marking durable and legible		N
	Rubbing 15 s water, 15 s petroleum; marking legible		N
7.2 (7.1)	**Information to be provided, if applicable**		N
	h) declaration of protection against accidental contact		N
	i) cross-section of conductors (mm²)		N
	j) number, type and wattage of lamp(s)		N
	s) SELV symbol		N
7.2 (-)	- declaration of mains connected windings		N

8 (10)	**PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS**		**P**
- (10.1)	Controlgear protected against accidental contact with live parts	Rely on enclosure	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)	N
- (10.1)	Lacquer or enamel not used for protection or insulation		P
	Adequate mechanical strength on parts providing protection		N
- (10.2)	Capacitors > 0,5 µF: voltage after 1 min (V): < 50 V	12 V	P
- (10.3)	Controlgear providing SELV		P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	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
	Tests according Annex L of IEC 61347-1	(see Annex L)	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
	One conductive part is insulated if output voltage or current exceeding the values above and withstand test voltage 500 V		N
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor	Approved Y1 capacitor use	P
	Y1 or Y2 capacitors comply with IEC 60384-14		P
	Resistors comply with test (a) in 14.1 of IEC 60065		N
9 (8)	**TERMINALS**		**N**
	Screw terminals according section 14 of IEC 60598-1:		N
	Separately approved; component list	(see Annex 1)	N
	Part of the controlgear	(see Annex 2)	N
	Screwless terminals according section 15 of IEC 60598-1:		N
	Separately approved; component list	(see Annex 1)	N
	Part of the controlgear	(see Annex 3)	N
10 (9)	**PROVISION FOR PROTECTIVE EARTHING**		**N**
- (9.1)	Provisions for protective earthing		N
	Terminal complying with clause 8		N

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Locked against loosening and not possible to loosen by hand		N
	Not possible to loosen clamping means unintentionally on screwless terminals		N
	All parts of material minimizing the danger of electrolytic corrosion		N
	Made of brass or equivalent material		N
	Contact surface bare metal		N
	Test according 7.2.3 of IEC 60598-1		N
- (9.2)	Provision for functional earthing		N
	Comply with clause 8 and 9.1		N
	Functional earth insulated from live parts by double or reinforced insulation		N
- (9.3)	Lamp controlgear with conductors for protective earthing by tracks on printed circuit board		N
	Test with a current of 25 A between earthing terminal 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
- (9.4)	Earthing of built-in lamp controlgear		N
	Earth by means of fixing to earthed metal of luminaire in compliance of 7.2 of IEC 60598-1		N
	Earthing terminal only for earthing the built-in controlgear		N
- (9.5)	Earthing via independent controlgear		N
- (9.5.1)	Earth connection to other equipment		N
	Looping or through connection, conductor min. 1,5 mm² and of copper or equivalent		N
	Protective earthing wires in line with 5.3.1.1 and clause 7 of IEC 60598-1		N
- (9.5.2)	Earthing of the lamp compartments powered via the independent lamp controlgear		N
	Test with a current of 25 A between input and output earth terminals; measured resistance (Ω) between earthing terminal 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
	Output earthing terminal marked as in 7.1 t) of IEC 61347-1		N
11 (11)	**MOISTURE RESISTANCE AND INSULATION**		**P**

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
- (11)	After storage 48 h at 91- 95% relative humidity and 20- 30 °C measuring of insulation resistance:		P
	For basic insulation ≥ 2 MΩ ..... :	> 100 MΩ	P
	For double or reinforced insulation ≥ 4 MΩ .....:	> 100 MΩ	P
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		N
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
	Working voltage ≤ 50 V, test voltage 500 V		N
	Working voltage > 50 V ≤ 1000 V, test voltage (V):		P
	Basic insulation, 2U + 1000 V	Between L & N (remove fuse): 1530V (Working voltage: 265V)	P
	Supplementary insulation, 2U + 1000 V		N
	Double or reinforced insulation, 4U + 2000 V	Between input circuit and output circuit: 3060V Between live parts and enclosure: 3060V (working voltage: 265V)	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		N
14 (14)	**FAULT CONDITIONS**		**P**
- (14.1)	When operated under fault conditions the controlgear:		P
	- does not emit flames or molten material		P
	- does not produce flammable gases		P
	- protection against accidental contact not impaired		P
	Thermally protected controlgear does not exceed the marked temperature value		N
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected	(see appended table)	P
- (14.2)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (after any reduction in 14.2 - 14.5)	(see appended table)	N

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
- (14.3)	Short-circuit or interruption of semiconductor devices	(see appended table)	P
- (14.4)	Short-circuit across insulation consisting of lacquer, enamel or textile	(see appended table)	N
- (14.5)	Short-circuit across electrolytic capacitors	(see appended table)	P
14 (-)	Reversed voltage polarity if d.c. supplied control gear	(see appended table)	N
- (14.6)	After the tests has been carried out on three samples:		P
	The insulation resistance ≥ 1 MΩ .....:	>100 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		N
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
	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
	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

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

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
	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
	Plugs and socket-outlets for SELV comply with IEC 60906-3 and IEC 60884-2-4		N
	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
	- plugs not able to enter socket-outlets of other standardised system		N
	- socket-outlets not admit plugs of other standardised system		N
	- socket-outlets without protective earth		N
- (15.4)	Insulation between circuits and accessible parts		P
- (15.4.2)	SELV circuits		P
	Source used to supply SELV circuits:		P
	- 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
	Voltage in the circuit not higher than ELV		N
	SELV circuits insulated from LV by double or reinforced insulation		P
	SELV circuits insulated from non SELV circuits by double or reinforced insulation		P
	SELV circuits insulated from FELV circuits by supplementary insulation		N
	SELV circuits insulated from other SELV circuits by basic insulation		N
	SELV circuits insulated from accessible conductive parts according Table 6 in 15.4.5		N

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
- (15.4.3)	FELV circuits		N
	Source used to supply FELV circuits:		N
	- separating transformer in accordance with relevant part 2 of IEC 61558		N
	- separating controlgear providing basic insulation between input and output circuits in accordance with relevant part 2 of IEC 61347		N
	- another source		N
	- source in circuits separated by the LV supply by basic insulation		N
	Voltage in the circuit not higher than ELV		N
	FELV circuits insulated from LV supply by at least basic insulation		N
	FELV circuits insulated from other FELV circuits if functional purpose		N
	FELV circuits insulated from accessible conductive parts according Table 6 in 15.4.5		N
	Plugs and socket-outlets for FELV system comply with:		N
	- plugs not able to enter socket-outlets of other voltage systems		N
	- socket-outlets not admit plugs of other voltage systems		N
	- socket-outlets have a protective conductor contact		N
- (15.4.4)	Other circuits		P
	Insulation between circuits other than SELV or FELV and accessible conductive parts in according Table 6 in 15.4.5.		P
- (15.4.5)	Insulation between circuits and accessible conductive parts		P
	Accessible conductive parts insulated from active parts of electric circuits by insulating according Table 6		P
	Requirements for Class II construction with equipotential bonding for protection against indirect contact with live parts:		P
	- all conductive parts are connected together		P
	- conductive parts are reliably connected together according test of IEC 60598-1 cl. 7.2.3		P
	- conductive parts comply with requirements of Annex A in case of insulation fault		P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
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		P
	Controlgear protected against pollution comply with Annex P	(see Annex P)	N
- (16.2)	Creepage distances		P
- (16.2.2)	Minimum creepage distances for working voltages		P
	Creepage distances according to Table 7	(see appended table)	P
- (16.2.3)	Creepage distances for working voltages with frequencies above 30 kHz		N
	Creepage distances according to Table 8	(see appended table)	N
- (16.3)	Clearances		P
- (16.3.2)	Clearances for working voltages		P
	Clearances distances according to Table 9	(see appended table)	P
- (16.3.3)	Clearances for ignition voltages and working voltages with higher frequencies		N
	Clearances distances for basic or supplementary insulation according to Table 10	(see appended table)	N
	Clearances distances for reinforced insulation according to Table 11	(see appended table)	N
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		N
(4.11.2)	Screws:		N
	- self-tapping screws		N
	- thread-cutting screws		N
(4.11.3)	Screw locking:		N
	- spring washer		N
	- rivets		N
(4.11.4)	Material of current-carrying parts		P
(4.11.5)	No contact to wood or mounting surface		P
(4.11.6)	Electro-mechanical contact systems		P
(4.12)	Mechanical connections and glands		N

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
(4.12.1)	Screws not made of soft metal		N
	Screws of insulating material		N
	Torque test: torque (Nm); part..... :	--	N
	Torque test: torque (Nm); part..... :	--	N
	Torque test: torque (Nm); part..... :	--	N
(4.12.2)	Screws with diameter < 3 mm screwed into metal	--	N
(4.12.4)	Locked connections:		N
	- fixed arms; torque (Nm)..... :	--	N
	- lampholder; torque (Nm)..... :	--	N
	- push-button switches; torque 0,8 Nm.....:	--	N
(4.12.5)	Screwed glands; force (Nm)..... :	--	N
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)	P
- (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
20 (19)	**RESISTANCE TO CORROSION**		**N**
	- test according 4.18.1 of IEC 60598-1		N
	- adequate varnish on the outer surface		N
21 (-)	**MAXIMUM WORKING VOLTAGE (Uout) IN ANY LOAD CONDITION**		**P**
	Not exceed declared maximum working voltage Uout in any load condition		P

14	**TABLE: tests of fault conditions**	**P**
TR06-25 of LED driver		
Part	Simulated fault	Hazard
RV1	Short circuit	No
EC1	Short circuit	No
EC2	Short circuit	No
D1	Short circuit	No
D3	Short circuit	No
BD1	Short circuit	No
U1	Short circuit	No

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

17 (16)	TABLE: clearance and creepage distance measurements (mm)							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:	B	3.0	1.5	9	3.0	2.5	7	
Working voltage (V) :					265VAC			—
Frequency if applicable (kHz):					--			—
PTI :					< 600 ☒	≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) :					--			—
Pulse voltage if applicable (kV) :					--			—
Supplementary information: Live parts of different polarity								
Distance 2:	R	6.2	3.0	9	6.2	5.0	7	
Working voltage (V) :					265VAC			—
Frequency if applicable (kHz):					--			—
PTI :					< 600 ☒	≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) :					--			—
Pulse voltage if applicable (kV) :					--			—
Supplementary information: Primary circuit to secondary circuit (PCB under CY1)								
Distance 3:	R	6.0	4.7	13 of IEC 61558-1	6.0	5.0	13 of IEC 61558-1	
Working voltage (V) :					265VAC			—
Frequency if applicable (kHz):					--			—
PTI :					< 600 ☒	≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) :					--			—
Pulse voltage if applicable (kV) :					--			—
Supplementary information: Primary winding/core to secondary winding								
Distance 4:	R	6.0	3.0	9	6.0	5.0	7	
Working voltage (V) :					265VAC			—
Frequency if applicable (kHz):					--			—
PTI :					< 600 ☒	≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) :					--			—
Pulse voltage if applicable (kV) :					--			—
Supplementary information: Live part and enclosure								

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

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

19 (18.1)	**TABLE: Ball Pressure Test**			**P**
Allowed impression diameter (mm).....:		≤2,0		—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)	
See table 1.15 (13.2.1)				
Supplementary information:				

19 (18.2)	**TABLE: Test of printed boards**				**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
PCB of LED driver	See Annex 1	30	No	0	P
Supplementary information:					

19 (18.3)	**TABLE: Glow-wire test**			**P**
Glow wire temperature..... :		650°C		—
Object/ Part No./ Material	Manufacturer/ trademark	Ignition of specified layer Yes/No	Duration of burning (s)	Verdict
See table 1.15 (13.3.2)				
Supplementary information:				

19 (18.4)	**TABLE: Needle-flame test**				**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
See table 1.15 (13.3.1)					
Supplementary information:					

19 (18.5)	**TABLE: Proof tracking test**		**P**
Test voltage PTI ..... :		--	—
Object/ Part No./ Material	Manufacturer/ trademark	Withstand 50 drops without failure on three places or on three specimens	Verdict
See table 1.15 (13.4)			
Supplementary information:			

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	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
(A.2)	Voltage ≤ 35 V peak or ≤ 60 V d.c ..... :	Max.55V	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. .....:	--	N
	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**		**N**
(C3)	GENERAL REQUIREMENTS		N
(C3.1)	Thermal protection means integral with the convertor, protected against mechanical damage		N
	Renewable only by means of a tool		N
	If function depending on polarity, for cord-connected equipment protection means in both leads		N
	Thermal links comply with IEC 60691		N
	Electrical controls comply with IEC 60730-2-3		N
(C3.2)	No risk of fire by breaking (clause C7)		N
(C5)	CLASSIFICATION		N
	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 .....:		—
(C6)	MARKING		N
(C6.1)	Symbol for temperature declared thermally protected ballasts		N
(C6.2)	Declaration of the type of protection provided		N
(C7)	LIMITATION OF HEATING		N
(C7.1)	Preselection test:		N
	Test sample placed for at least 12 h in an oven having temperature (tc - 5) K		N
	No operation of the protection device		N
(C7.2)	Functioning of protection means:		N

IEC 61347-2-13			
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 (tc +0; -5) °C is obtained		N
	No operation of the protection device		N
	Introducing of the most onerous test condition determined during test of clause 14.2 to 14.5		N
	Output of windings connected to the mains supply short-circuited, and other part of the controlgear operated under normal conditions		N
	Increasing of the current through the windings continuously until operation of the protection means		N
	Continuous measuring of the highest surface temperature		N
	Ballasts according to C5 a) or C5 e) operated until stable conditions are achieved		N
	Automatic-resetting thermal protectors working 3 times		N
	Ballasts according to C5 b) working 6 times		N
	Ballasts according to C5 c) and C5) d) working once		N
	Highest temperature does not exceed the marked value		N
	Any overshoot of 10% over the marked value within 15 min		N
	After 15 min value not exceed marked value		N
(D)	**ANNEX D – REQUIREMENTS FOR CARRY OUT THE HEATING TESTS OF THERMALLY PROTECTED LAMP CONTROLGEAR**		**N**
	Tests in C7 performed in accordance with Annex D, if applicable		N
(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
(H)	**ANNEX H - TESTS**		**P**
	All tests performed in accordance with the advice given in Annex H, if applicable		P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
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 Annex 1	—
	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 %	93%	P
(L.8.2)	Insulation resistance		P
	Between input- and output circuits not less than 5 MΩ ..... :	>100 MΩ	P
	Between metal parts of class II convertors which are separated from live parts by basic insulation only and the body not less than 5 MΩ ..... :	--	N
	Between metal foil in contact with the inner and outer surfaces of enclosures of insulating material not less than 2 MΩ ..... :	>100 MΩ	P
(L.8.3)	Electric strength		P
	1) Between live parts of input circuits and live parts of output circuits ..... :	3750V	P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	2) Over basic or supplementary insulation between:		P
	a) live parts having different polarity ..... :	1875V	P
	b) live parts and body if intended to be connected to protective earth .....:	--	N
	c) accessible metal parts and a metal rod of the same diameter as the flexible cable or cord ..... :	--	N
	d) live parts and an intermediate metal part .....:	--	N
	e) intermediate metal parts and the body .....:	--	N
	f) each input circuit and all other input circuits .....:	--	N
	3) Over reinforced insulation between the body and live parts .....:	3750V	P
(L.9)	**Construction**		P
(L.9.1)	Transformer comply with 19.12 of IEC 61558-1 and 19 of IEC 61558-2-6		P
	HF transformer comply with 19 of IEC 61558-2-16		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
	Required distance (mm) .....:	--	—
	Measured (mm) ..... :	--	N
	Supplementary information		—
	2) Supplementary distance through insulation		P
	Required distance (mm) .....:	--	—
	Measured (mm) ..... :	At least 3 layer insulation tape used in transformer, totally thick. 0.15mm	P
	Supplementary information		—
	3) Reinforced distance through insulation		P
	Required distance (mm) .....:	Enclosure(potting compound): 0.83mm Insulation tape around transformer : 0.16mm	—

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	Measured (mm) ..... :	Enclosure(potting compound): Min 1.0mm Insulation tape around transformer: Used three layers(one layer is 0.06mm)	P
	Supplementary information		—
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
	Requirements not applicable to the evaluated product		—
(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
(N.4.2)	**Solid insulation**		N
	Electric strength test at least 5 kV or 1,35 x test voltage in Table N.1		N
	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
(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		P
	- Non-separated layers: Min. 3 layers and fulfil mandrel test of 150N		N
	- Separated layers: Min. 2 layers and each layer fulfil mandrel test of 50N		P
	- Separated layers (alternative): Min. 3 layers and 2/3 of the layers fulfil mandrel test of 100N		N
(N.4.3.2)	Mandrel test (electric strength test during mechanical stress)		P
	Electric strength test after mandrel test:		P
	- Non-separated layers: min. 5 kV or 1,35 x test voltage in Table N.1		N
	- 2/3 of min. 3 separated layers: min. 5 kV or 1,25 x test voltage in Table N.1	5000 V	P

IEC 61347-2-13			
Clause	Requirement + Test	Result - Remark	Verdict
	- one of 2 separated layers: min. 5 kV or 1,25 x test voltage in Table N.1		N
	No flashover or breakdown occurred		P

(O)	**ANNEX O: ADDITIONAL REQUIREMENTS FOR BUILT-IN ELECTRONIC CONTROLGEAR WITH DOUBLE OR REINFORCED INSULATION**	N
	Requirements not applicable to the evaluated product	—

(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
	Requirements not applicable to the evaluated product	—

LED driver	Thermal test under abnormal operation of I.7/L.7		P
Test condition:	Over load		Limit (°C)
Teat voltage:	1.1 x 265V=291.5V		
	Measured temperature (°C)		
Test input voltage	--	291.5V	
Test part	--	--	
LF1 winding	--	116.4	175
LF2 winding	--	112.3	175
T1 winding	--	124.5	175
Enclosure outer surface (tc)	--	75.9	105
Ambient	--	25.0	--

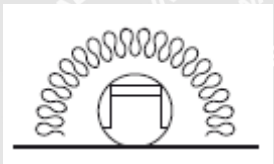
Australian deviation			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 7	**Australian deviation**		**P**
	VARIATIONS TO IEC 61347-1 ED.3.0 (2015) FOR APPLICATION IN AUSTRALIA AND NEW ZEALAND (AS/NZS 61347.1:2016+A1:2018)		**P**
(1)	**SCOPE**		**P**
	At the end of Clause 1, add the following text: Where the term lamp is used within this standard it is taken to include electric light sources. LED light sources are to be subject to the same test parameters as “other discharge lamps”.		—
	Amendment 1 specifies additional safety requirements for independent lamp controlgear to provide adequate protection in respect of the fire risk associated with the combination of independent lamp controlgear **used with recessed luminaires**, flammable building elements, flammable debris and building insulation.		N
(3)	**TERMS AND DEFINITIONS**		**P**
(3.1.2)	Add: Independent lamp controlgear includes lamp controlgear permanently connected and lamp controlgear able to be disconnected from the light source. Independent lamp controlgear able to be disconnected are considered “separate to the luminaire”. NOTE *Separate excludes cutting connection wires.* Hereafter, “lamp controlgear” will be shown as “controlgear”.		—
(3.101)	Do-not-cover classification An independent controlgear that can be used where normally flammable materials, including building insulation, are or may be present, but cannot be abutted against any material and cannot be covered in normal use.		—
(3.102)	IC classification An independent controlgear that can be abutted against normally flammable materials, including building insulation, and can be covered in normal use. Building elements, building insulation or debris have restricted access to the heated parts of the controlgear.		—

Australian deviation			
Clause	Requirement + Test	Result - Remark	Verdict
(3.103)	Non IC classification An independent controlgear that cannot be abutted against or covered by normally flammable materials or used in installations where building insulation or debris is, or may be, present in normal use. NOTE *This classification is not suitable for residential installations.*		—
(4)	**GENERAL REQUIREMENTS**		**P**
	After the fourth paragraph, add the following new Note: NOTE Test conditions and marking requirements for independent controlgear, for use with building insulation or flammable surfaces, for example when used with recessed luminaires, are under consideration.		—
(4.101)	Supply connection wiring		P
	Independent lamp controlgear shall be provided with only one of the following means of connection to the LV supply.		—
	– Means of connection.....	☐ Device for the connection of controlgears. ☐ Terminals. ☒ Connecting lead (tails). ☐ Supply cord and plug. ☐ Adaptor for engagement with supply tracks. ☐ Appliance inlet or inlet plug. ☐ Installation coupler. ☐ Luminaire coupler. ☐ Integral pins for insertion into socket outlets.	P
	In Australia, equipment with a supply cord shall be fitted with a plug complying with AS/NZS 3112 or a coupler complying with its standard. However for other than controlgear supplying portable luminaire a plug is not required if the controlgear is marked with a cord tag with the symbol for “must be installed by a licensed electrician” in accordance with AS/NZS 60598.1.	 FIGURE ZZ1 MUST BE INSTALLED BY A LICENSED ELECTRICIAN	p
(4.102)	General		N
	The resistance to dust and solid object provisions of Section 9 of AS/NZS 60598.1 apply, excluding the humidity test, along with the following:		—
	a) For independent controlgear with an IP classification greater than IP20, the tests and compliance criteria of Section 9 of AS/NZS 60598.1 shall be applied.		N

Australian deviation			
Clause	Requirement + Test	Result - Remark	Verdict
	b) For independent controlgear with an IC classification, the IP4X probe or IP rating tests of Clause 4.103 and compliance shall be applied.		N
(4.103)	Ingress test for IC classified controlgear		N
	Solid foreign objects shall have restricted access to the hot surfaces of IC classified controlgear. The IP4X probe of AS 60529 shall be applied to the controlgear without appreciable force and shall not enter any area where the temperature of any part or surface exceeds the temperature limit for 'mounting surface: normally flammable surface' of AS/NZS 60598.1, when the surface is measured while the controlgear is operated in accordance with the thermal test conditions of Paragraph ZA1. NOTE *This test is intended to ensure fine flammable insulation material or debris is unlikely to enter controlgear and cause a fire.*		N
(5)	**GENERAL NOTES ON TESTS**		**P**
(5.101)	Controlgear voltage		P
	In Australia, for equipment other than Class III equipment, intended for connection to the a.c. supply mains, and that are not marked with: – a rated voltage of at least 240 V for single-phase equipment or a rated voltage of at least 415 V for three-phase equipment; or – a rated voltage range that includes 240 V for single-phase equipment and 415 V for three-phase equipment, The rated supply voltage and the upper limit of the voltage range is 240 V / 415 V.		P
(5.102)	Independent controlgear for use near or in contact with building material or insulation		N
	Independent controlgear shall be —		—
	-.....) classified, marked and tested for suitability for use near building materials or insulation and classified "Do not Cover", **or**		N
	-.....) classified, marked and tested for suitability for use in contact with building materials and coverable with insulation, and classified as "IC".		N
(5.103)	Thermal tests for "Do-not-Cover" classified controlgear		N
(5.103.1)	"Do not-Cover" controlgear, normal operation test		N

Australian deviation			
Clause	Requirement + Test	Result - Remark	Verdict
	Controlgear classified as “Do not Cover” shall be tested in accordance with the requirements of Clause 5.5.		N
(5.103.2)	“Do-not-Cover” classified controlgear, abnormal operation test		N
	Controlgear classified as “Do not Cover” shall be tested in accordance with the requirements of Paragraph ZA3. When the “Do not Cover” controlgear is tested in accordance with Paragraph ZA3, no temperature shall exceed —		N
	- a) mounting surface (°C)..... :		N
	- b) outer surface of the controlgear (°C)..... :		N
	During and after normal operation:		N
	- no damage to the controlgear such as scorching, deformation or melting		N
	- no thermal protection device operate		N
	- no electronic control operate		N
(5.104)	Thermal tests for “IC” controlgear		N
	Controlgear classified as “IC” shall be tested in accordance with the requirements of Paragraph ZA3. When the “IC” controlgear is tested in accordance with Paragraph ZA3, no temperature shall exceed —		N
	- a) the controlgear mounting surface (°C)..... :	Limit: 90 °C	N
	- b) the lesser of t_c or 90 °C on the outside surface of the controlgear or other places accessible to the relevant test probe of Clause 4.103. (°C)..... :	Limit: tc/90 °C	N
	During and after normal operation:		N
	- no damage to the controlgear such as scorching, deformation or melting		N
	- no thermal protection device operate		N
	- no electronic control operate		N
(6)	**Classification**		N
(6.101)	Independent controlgear shall be classified as:	☐ Do-not-cover ☐ IC ☐ Non-IC	N
(7)	**MARKING**		**N**
(7.1)	Language of instructions shall in English		N

Australian deviation			
Clause	Requirement + Test	Result - Remark	Verdict
	The information provided shall contain details related to components in controlgear requiring replacement as part of a maintenance program.		N
	FELV control terminals shall be marked with the warning symbol “Risk of electric shock”. 		N
	Instructions shall be provided with controlgear that have FELV control terminals that state the following:		—
	– WARNING: FELV terminals marked “Risk of electric shock” are not safe to touch.		N
	– WARNING: Circuits connected to any FELV control terminal shall be insulated for the LV supply voltage of the controlgear and any terminals connected to the FELV circuit shall be protected against accidental contact.		N
(7.101)	Controlgear classification symbol		N
	Independent controlgear shall be marked with the symbol shown in the appropriate figure of this clause and the meaning explained in the instructions provided with the controlgear.		N
	Controlgear classified as “Non IC” does not require to be marked.		N
	Controlgear classified as “Do not Cover” shall be marked with the symbol 		N
	Controlgear classified as “IC” shall be marked with the symbol 		N
	NOTE *The independent controlgear symbol and the symbol for “Do not Cover” and “IC” can be combined to be represented as shown above.*		—
(7.102)	Additional information to be supplied with the controlgear		N

Australian deviation			
Clause	Requirement + Test	Result - Remark	Verdict
	"Do-not-cover" and "Non-IC" classified controlgear shall be supplied with instructions and diagrams showing all dimensions for safe installation and include, as appropriate, the following:		N
	a) The minimum clearance distance from the top and sides of the controlgear to normally flammable building elements (mm)……..:		N
	b) If the minimum clearance distances from each side of the controlgear are different, then each minimum clearance distance shall be stated separately (mm)……..…:		N
	b) If there are different minimum clearance distances for various types of normally flammable building element or building insulation, then each minimum clearance distance shall be stated separately (mm)……..:		N
	c) Where controlgear is required to be mounted on a specific surface or has additional installation requirements, the relevant information shall be supplied with the controlgear. NOTE *Installation in a non-combustible enclosed space may include installation in a rebate in a concrete slab, ceiling or wall.*		N
(7.103)	Independent controlgear		N
	For independent controlgear not supplied with, but intended for use with, a separate lamp or light source container or head, for example, a remote mounted floodlight, the instructions supplied shall specify the independent controlgear parameters for use by the luminaire assembler.		N
(7.104)	Location and durability of marking		N
	The marking required by Clause 7.101 shall be a minimum size of 5 mm × 5 mm		N
(7.105)	Compliance		N
	Compliance with Clauses 7.101 to 7.104 is checked by inspection.		N
(10)	**PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS**		**N**
(10.1)	For the purpose of this Clause, FELV circuits are considered a live part.		N
(15)	**CONSTRUCTION**		**P**
(15.101)	Power factor correction capacitors		P

Australian deviation			
Clause	Requirement + Test	Result - Remark	Verdict
	Power factor correction capacitors incorporated into controlgear shall be not less than Type B capacitors with metal body and break action protection in accordance with IEC 61048 and AS/NZS 61049. A capacitor complying with ANCI/EIA-456-A shall comply with AS/NZS 61049 and IEC 61048:2006, excluding the endurance test.		P
	In addition capacitors shall have a minimum voltage rating of 250 V at temperature rating of 85 °C or 280 V at temperature rating of 100 °C.		N
	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.		P
(18)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		**P**
(18.2.1)	Parts of non-metallic material shall be resistant to flame and ignition.		P
	For materials other than ceramic, compliance is checked by the test of sub clauses 18.2.2, 18.2.3, 18.2.4 and 18.2.5 as appropriate.		P
	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 controlgear.		—
	This Clause applies to all parts, including components, even if they have been tested to their own standard		—
(18.2.2)	Parts of non-metallic material supporting connections shall withstand glow-wire test 750 °C.	See table (18.2.2)	P
(18.2.3)	All other parts of non-metallic material shall withstand glow-wire test 650 °C.	See table (18.2.3)	P
(18.2.4)	During the application of the glow-wire tests of sub clauses 18.2.2 and 18.2.3, if the duration of the produced flames are ≥ 2s, the 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 are subjected to the needle-flame test.	See table (18.2.4)	P
(18.2.5)	PCBs which other than V-0 classification in controlgear shall be subject to the needle-flame test of AS/NZS 60695.11.5.	See table (18.2.5)	P
	The needle flame is applied to one test sample for 30 s to an edge of the PCB at least 10 mm from a corner.		—

Australian deviation			
Clause	Requirement + Test	Result - Remark	Verdict

(18.2.2)	TABLE: Glow-wire test (AS/NZS 60695.2.11)			P
Glow wire temperature .....:	750°C			—
Object/ Part No./ Material	Manufacturer/ trademark	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
PCB	See Annex 1	N	0	P
Bobbin	See Annex 1	N	0	P
Insulation tape	See Annex 1	N	0	P
Plastic enclosure	See Annex 1	N	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:				

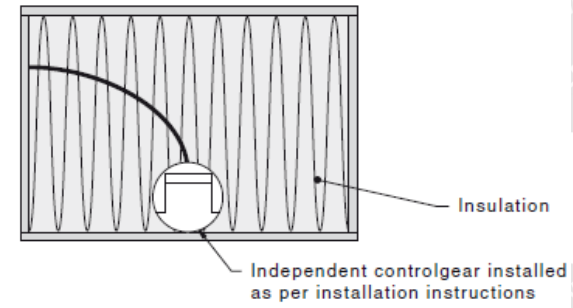
(18.2.3)	TABLE: Glow-wire test (AS/NZS 60695.2.11)			P
Glow wire temperature .....:	650°C			—
Object/ Part No./ Material	Manufacturer/ trademark	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Plastic enclosure	See Annex 1	N	0	P
Insulation tape	See Annex 1	N	0	P
Any flame or glowing 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:				

(18.2.4)	TABLE: Needle-flame test (AS/NZS 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
PCB	See Annex 1	10	N	0	P
Supplementary information:					

(18.2.5)	TABLE: Needle-flame test (AS/NZS 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
PCB	See Annex 1	10	N	3.0	P
Bobbin	See Annex 1	10	N	0	P
Supplementary information:					

APPENDIX ZA	THERMAL TEST PROCEDURE FOR INDEPENDENT CONTROLGEAR	N

Australian deviation			
Clause	Requirement + Test	Result - Remark	Verdict
ZA1	GENERAL		—
	For the purposes of this Appendix, the requirements of Clause 12 of AS/NZS 60598.1 apply, with the following modifications and additions:		N
	- (a) Independent controlgear shall be energized at 0.94 or 1.06 times the rated voltage, whichever produces higher temperatures.....		N
	- (b) total duration (h).....:		—
	- (c) mounting- position.....:		N
	- (d) The internal surfaces shall be painted matt black.		N
	Temperature measurements are conducted in accordance with Annex K of AS/NZS 60598.1 on the hottest points.		—
ZA2	TEST BOX		N
	A test box, consisting of a mounting surface on top of which is a rectangular box with vertical sides and a top, shall be constructed as specified.		N
	- (a) The mounting surface shall be made of 15 mm - 20 mm thick porous wood fibre board.		—
	- (b) The vertical sides and top of the test box shall be made of 15 mm - 20 mm thick porous wood fibre board.		—
	- (c) The dimensions of the test box shall be a minimum of 450 mm wide x 450 mm long x 300 mm high and shall maintain a minimum horizontal distance of 75 mm from the sides and ends of the controlgear to the sides of the test box, and the minimum vertical distance of 75 mm from the top of the controlgear to the underside of the test box top when placed in accordance with Clause ZA3.2.		—
	- (d) The internal surfaces shall be painted matt black.		—
	Test box shall be supported or suspended in a draught-proof enclosure in accordance with AS/NZS 60598.1, Annex D.		N
ZA3	CONTROLGEAR TEST PROCEDURE FOR “DO NOT COVER—ABNORMAL OPERATION” AND IC (ALL SITUATIONS)		N
ZA3.1	General		N

Australian deviation			
Clause	Requirement + Test	Result - Remark	Verdict
	This test procedure is for both 'Do not Cover—abnormal operation' and IC controlgear. It assesses the suitability of the control gear to abut normally flammable materials, as specified in the installation instructions, and be covered by insulation, inadvertently (do not cover—abnormal operation) or by intent (IC all situations).		N
ZA3.2	Test set-up		N
	The controlgear under test is placed in the centre of the test box.		N
	Thermal insulation is then added to the test box to completely fill the test box. The insulation is pushed around the controlgear to form a close fit to the sides and top without compression.		N
	The type of thermal insulation is formed insulation where 200 mm is equivalent to an RI 4.0 classification in accordance with AS/NZS 4859.1.		—
	Thermocouples attached to the controlgear (on accessible surfaces, in accordance with the specified classification and access probe), controlgear mounting surface, and any thermal insulation in the most unfavourable positions.		N
	The test box shall have its top added and sealed.		N
	The test set-up is shown in Figure ZA2. 		N

Australian deviation			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 8	**VARIATIONS TO IEC 61347-2-13:2014+A1:2016 FOR AUSTRALIA/NEW ZEALAND AS 61347.2.13:2018**	**P**

4	**GENERAL REQUIREMENTS**		**P**
	Where the controlgear has accessible outputs, the controlgear shall be SELV output and conform with Annex I.		P

8	**PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS**		**P**
	Delete text and replace with the following:		P
	The requirements of Clause 10 of IEC 61347-1 apply except that the text of Clause 10.4 shall be deleted and replaced with the following:		—
	Output circuits of SELV controlgear with accessible outputs shall not exceed 25 V r.m.s. or 60 V d.c. ripple-free d.c. under load except as indicated below.		P
	If the voltage exceeds 25 V r.m.s. or 60 V ripple-free d.c. the touch current shall not exceed: – for a.c.: 0,7 mA (peak); – for d.c.: 2,0 mA; the no-load output voltage ≤ 33 √2 V peak or 60 V d.c. ripple-free d.c.		—
	- touch current		N
	- no-load voltage.....		N
	Insulated terminals if convertor with rated output voltage > 25 V or 60 V d.c. ripple-free d.c.		N
	One capacitor Y1 or two capacitors Y2 complying with IEC 60384-14 of the same values used in series between SELV or SELV-equivalent output and primary circuits		P
	Other components bridging the separating transformer complying with IEC 60065, clause 14		N
21	After the first sentence, add the following:		P
	For SELV controlgear, the voltage at the output terminals shall not exceed the SELV limits of Clause 10.4 of IEC 61347-1 as modified by Clause 8 of this Standard (AS 61347.2.13:2018).		P

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 9	**LED modules for general lighting – Safety specifications** **IEC 62031:2018**	**P**

4	**GENERAL REQUIREMENTS**		P
4.4	Integral modules treated as part of luminaires defined in clause 0.5 of IEC 60598-1		P
4.5	Independent modules complies with requirements in IEC 60598-1		N

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

6	**CLASSIFICATION**		—
	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**
	Requirements not applicable to the evaluated product.	—

8	**TERMINALS**		**N**
	Screw terminals according section 14 of IEC 60598-1:		N
	Separately approved; component list	(see Annex 2)	N
	Part of the luminaire	(see Annex 3)	N
	Screwless terminals according section 15 of IEC 60598-1:		N
	Separately approved; component list	(see Annex 2)	N
	Part of the luminaire	(see Annex 4)	N
	Connectors according IEC 60838-2-2:		N
	Separately approved; component list	(see Annex 2)	N

9 (9)	**PROVISION FOR PROTECTIVE EARTHING**	**N**
	Requirements not applicable to the evaluated product.	—

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
10 (10)	**PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS**		**N**
	Requirements not applicable to the evaluated product.		—
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 .....:	100MΩ	P
	For double or reinforced insulation ≥ 4 MΩ .....:		N
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		N
12 (12)	**ELECTRIC STRENGTH**		**P**
	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V		N
	Working voltage ≤ 50 V, test voltage 500 V		N
	Working voltage > 50 V ≤ 1000 V, test voltage (V):		N
	Basic insulation, 2U + 1000 V		P
	Supplementary insulation, 2U + 1000 V		N
	Double or reinforced insulation, 4U + 2000 V		N
	No flashover or breakdown		P
	Solid or thin sheet insulation for double or reinforced insulation fulfil the requirements in Annex N in IEC 61347-1		N
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
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected		P

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
- (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)		N
	Creepage distances on printed boards less than specified in clause 16 in Part 1 provided with coating according to IEC 60664-3		N
- (14.2)	Short-circuit or interruption of semiconductor devices	LED	P
- (14.3)	Short-circuit across insulation consisting of lacquer, enamel or textile	(see appended table)	N
- (14.4)	Short-circuit across electrolytic capacitors	(see appended table)	N
- (14.5)	After the tests has been carried out on three samples:		P
	The insulation resistance ≥ 1 MΩ ..... :	100 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
- (14.6)	Relevant fault condition tests with high-power supply		—
13.2	Module withstands overpower condition >15 min.		P
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		N
	During the tests, tissue paper, spread below module, does not ignite		P
15	**CONSTRUCTION**		**P**
	Wood, cotton, silk, paper and similar fibrous material not used as insulation		P
16	**CREEPAGE DISTANCES AND CLEARANCES**		**P**
	Creepage and distances and clearances in compliance with IEC 60598-1		P
17 (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
18 (18)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		**N**
	Resistance to Heat, Fire and Tracking in compliance with IEC 61347-1 (clause numbers between parentheses refer to IEC 61347-1)		N
(18.1)	Ball-pressure test:		N

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	- part tested; temperature (°C)..... :	--	N
(18.2)	Test of printed boards		N
	- part tested..... :	--	N
(18.3)	Glow- wire test (650°C):		N
	- part tested..... :	--	N
(18.4)	Needle flame test (10 s):		N
	- part tested..... :	--	N
(18.5)	Tracking test:		N
	- part tested..... :	--	N
19 (19)	**RESISTANCE TO CORROSION**		**N**
	Rust protection:		N
	- test according 4.18.1 of IEC 60598-1		N
	- adequate varnish on the outer surface		N
20	**INFORMATION FOR LUMINAIRE DESIGN**		**N**
	Information in Annex D		—
21	**HEAT MANAGEMENT**		**N**
21.1	General		N
	Exchangeability is safeguarded by cap or base		N
21.2	Heat-conducting foil and paste		N
	Heat-conducting foil delivered with the module if necessary		N
21.4	Construction		N
	Electrical connection and mechanical holding are separate		N
22	**Photobiological safety**		**P**
22.1	UV radiation		N
22.2	Blue light hazard		P
	RG at 200 mm according to IEC/TR 62778	RG0 unlimited	P
22.3	Infrared radiation		N

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
A	**ANNEX A - TESTS**		**P**
	All tests performed in accordance with the advice given in Annex H of IEC 61347-1, if applicable		P
	ANNEX 1 - SELV-operated LED modules		**N**
	SELV-operated LED modules in compliance with Annex I of IEC 61347-2-13		N

IEC 62471			
Clause	Requirement + Test	Result - Remark	Verdict

Annex 10	**Photobiological safety (IEC 62471:2006)**	**P**

Emission limits for risk groups of continuous wave lamps α=0.11rad — P

Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0.001	4.0e-05	0.003	--	0.03	--
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	1.0e+00	33	--	100	--
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	2.1e+01	10000	--	4000000	--
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	1.0*	--	1,0	--	400	--
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	3.2e+03	28000/α	--	71000/α	--
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/α	--	6000/α	--	6000/α	--
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0.0e+00	570	--	3200	--

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

Assessment:
Lamp classification group…… exempt☒ risk 1☐ risk 2☐ risk 3☐

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

Photo Documentation

Model: EOL.CE.SU20-36

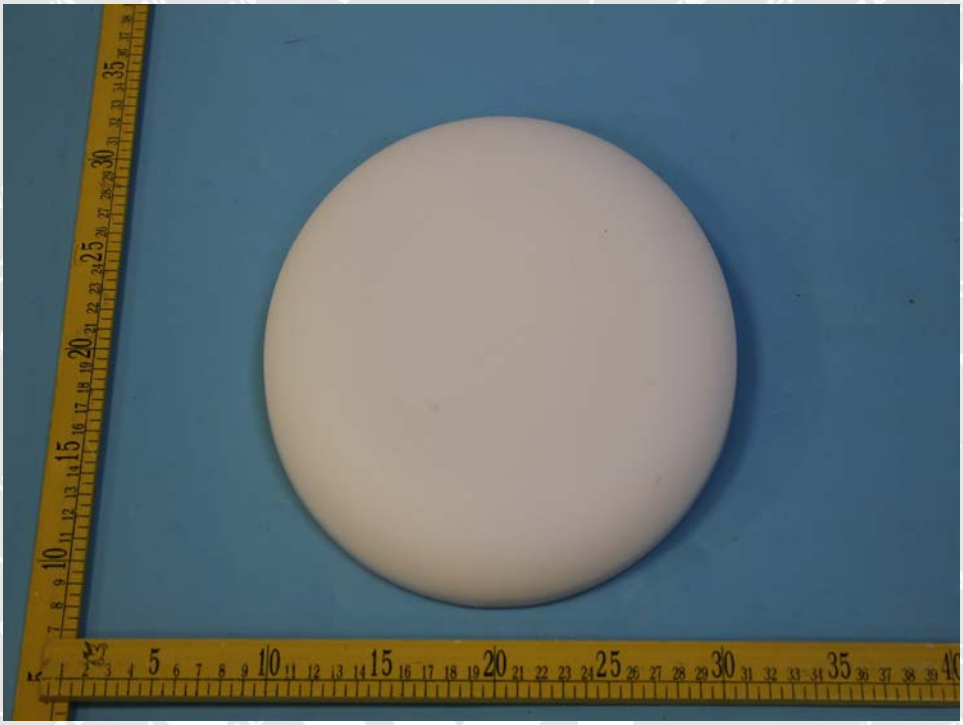


Photo 1

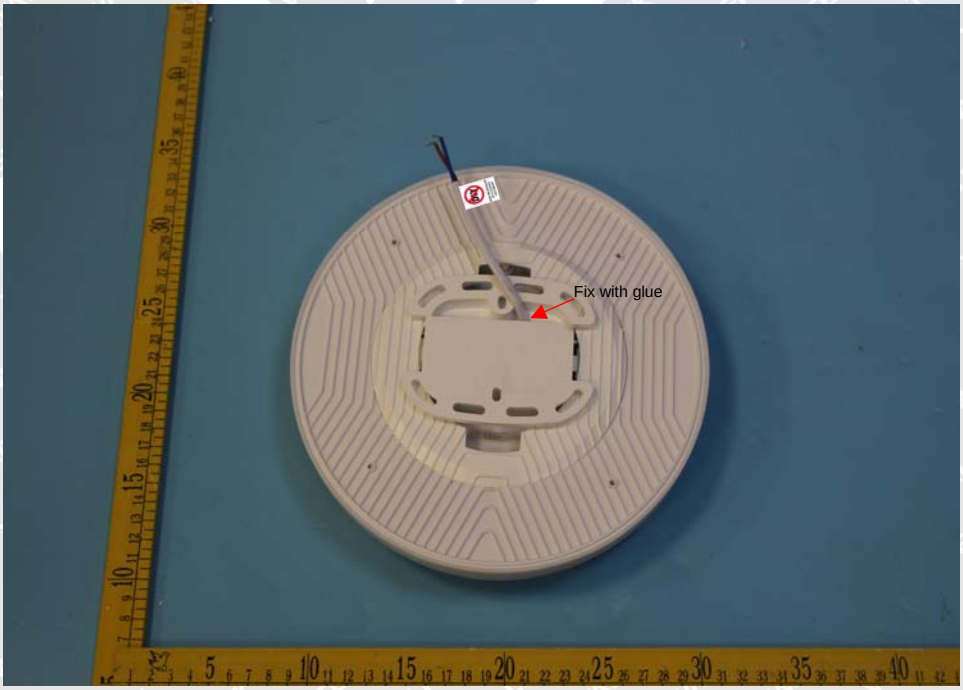


Photo 2

Photo Documentation

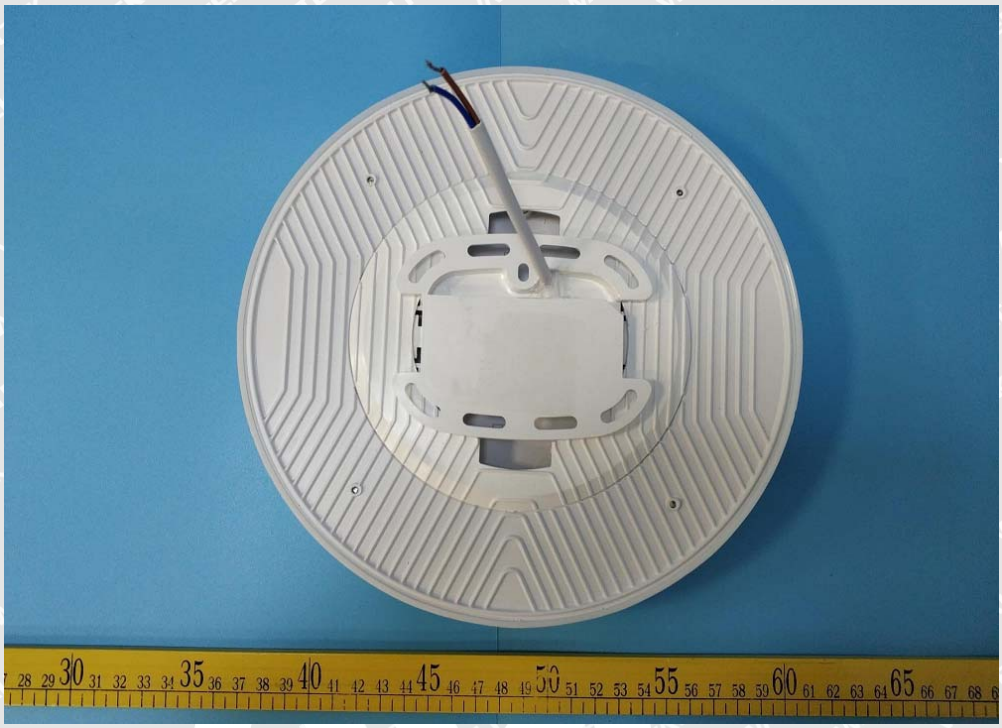


Photo 3

Photo 4

Photo Documentation

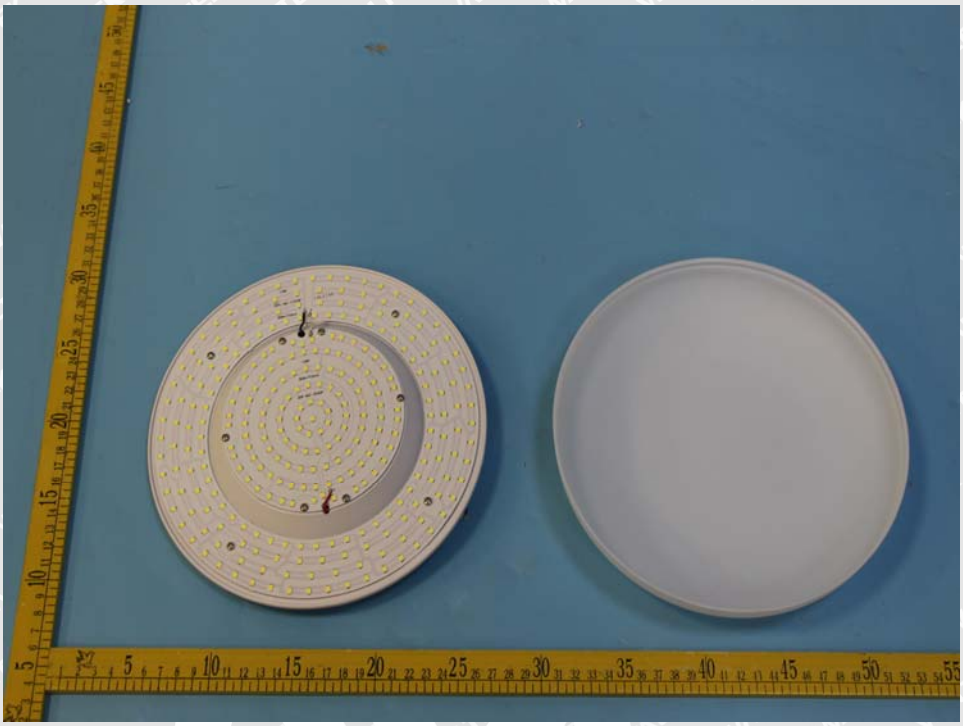


Photo 5

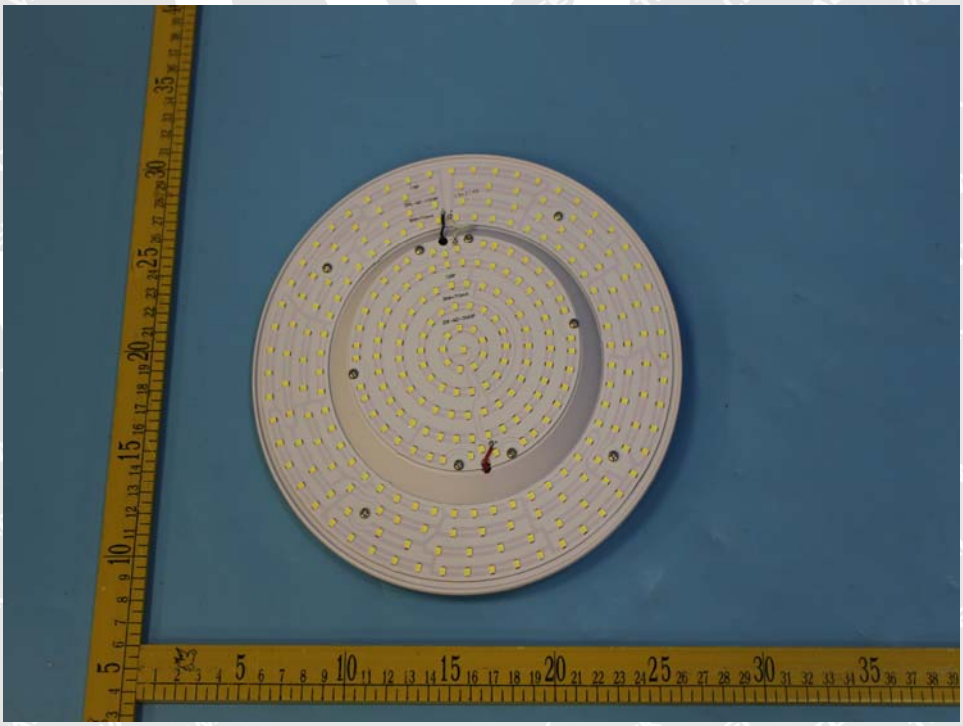


Photo 6

Photo Documentation

Photo 7

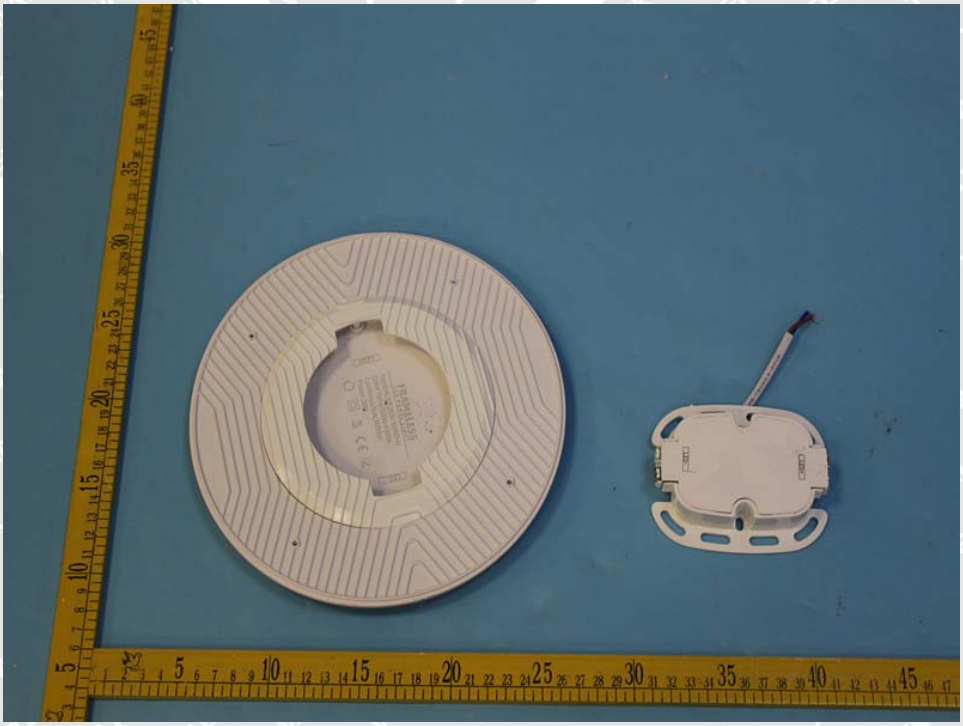


Photo 8

Photo Documentation

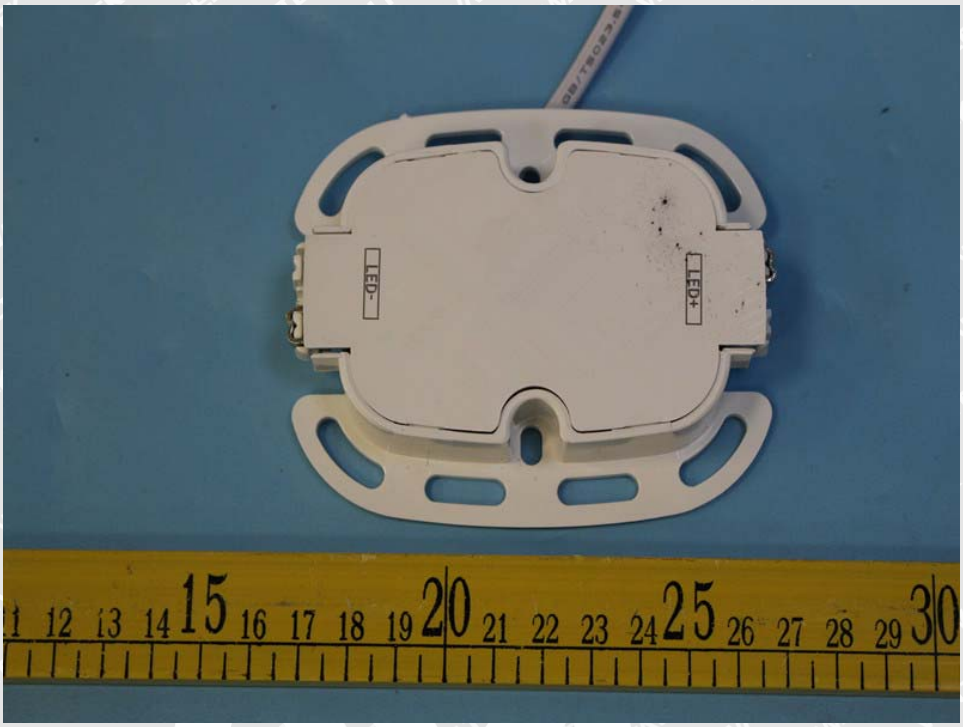


Photo 9

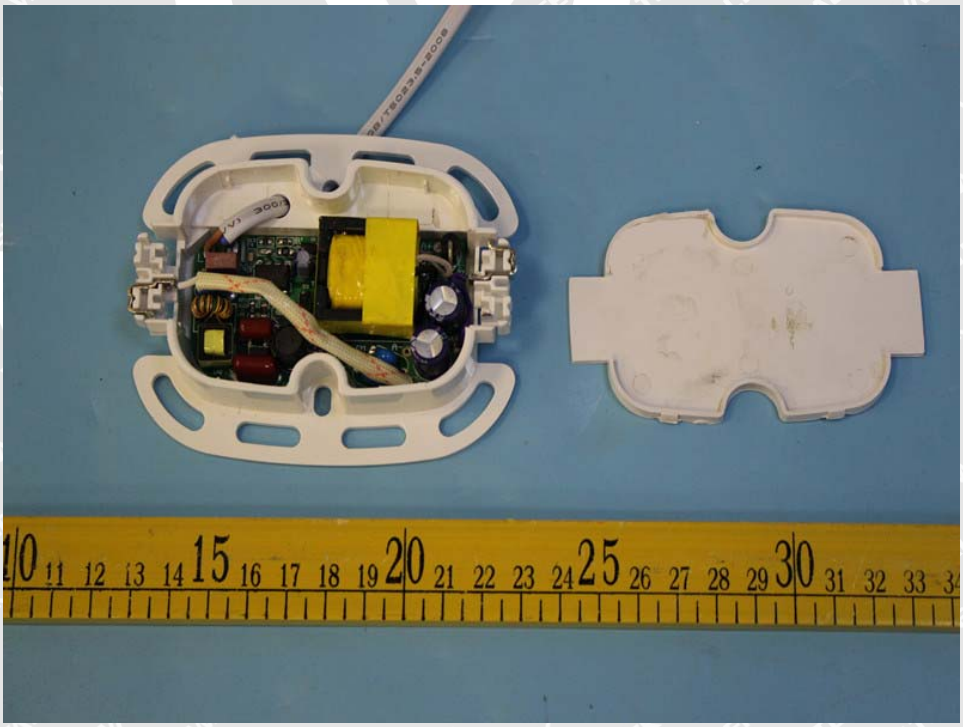


Photo 10

Photo Documentation

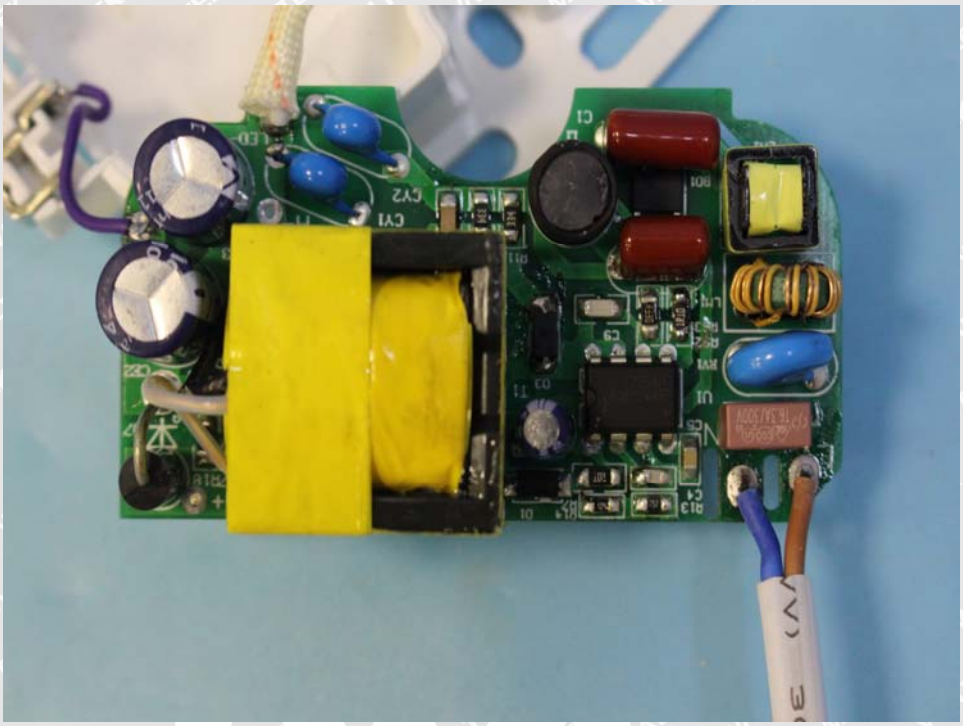


Photo 11

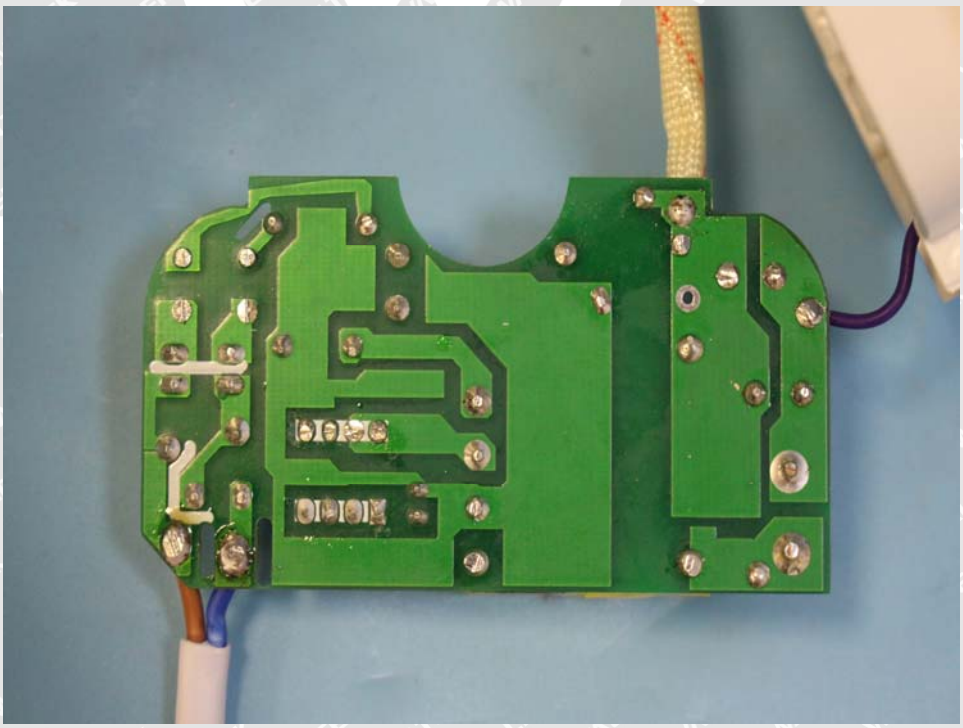


Photo 12

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