

APPLICATION REPORT

On Behalf of

Shenzhen Betop Electronics Co., Ltd.

Tubo series base light

**Model: BT-TB72W-2400, BT-TB60W-2400, BT-TB36W-2400, BT-TBXXW-2400,
BT-TB40W-1200, BT-TB36W-1200, BT-TB24W-1200, BT-TBXXW-1200,
BT-TBXXW-600 (XX Represent wattage)**

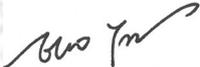
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Building C-D, Yisong Ecological Science and Technology Park,
Jiejiabao Road No.9, Shiyan Town, Bao'an District, Shenzhen, China**

**Prepared By : Shenzhen LCS Compliance Testing Laboratory Ltd.
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Date of Test : March 25, 2015 – April 10, 2015

Date of Report : April 10, 2015

Report Number : LCS1506241488S

TEST REPORT JIS C 8105-2-1 Luminaires - Part 2: Particular requirements Section One-Fixed general purpose luminaires	
Report reference No.	LCS1506241488S
Tested by(name + signature).....	Eko Yang 
Approved by(name +signature)	Hart Qiu 
Date of issue	April 10, 2015
Contents	67 pages
Testing laboratory	
Name	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China
Testing location	Same as above
Client	
Name	Shenzhen Betop Electronics Co., Ltd.
Address.....	Building C-D, Yisong Ecological Science and Technology Park, Jiejiabao Road No.9, Shiyan Town, Bao'an District, Shenzhen, China
Manufacturer	
Name	Shenzhen Betop Electronics Co., Ltd.
Address.....	Building C-D, Yisong Ecological Science and Technology Park, Jiejiabao Road No.9, Shiyan Town, Bao'an District, Shenzhen, China
Test specification	
Standard	JIS C 8105-1-2010; JIS C 8105-2-1-2010; IEC 62031: 2008+A1: 2012; IEC 61347-1: 2008+A1: 2011+A2: 2013; IEC 61347-2-13: 2006
Test procedure	Compliance with JIS C 8105-1-2010; JIS C 8105-2-1-2010; IEC 62031: 2008+A1: 2012; IEC 61347-1: 2008+A1: 2011+A2: 2013; IEC 61347-2-13: 2006
Non-standard test method	N/A
Test item Description	Tubo series base light
Trademark	Bitco
Model and/or type reference.....	BT-TB72W-2400, BT-TB60W-2400, BT-TB36W-2400, BT-TBXXW-2400, BT-TB40W-1200, BT-TB36W-1200, BT-TB24W-1200, BT-TBXXW-1200, BT-TBXXW-600 (XX Represent wattage)
Rating(s).....	110V~, 50/60Hz, Max. 72W, Class I

Test item particulars

Classification of installation and use: Class I
 Supply Connection: Terminal block

Test case verdicts

Test case does not apply to the test object .: N(N/A)
 Test item does meet the requirement: P(Pass)
 Test item does not meet the requirement: F(Fail)

Testing

Date of receipt of test item.....: March 25, 2015
 Date(s) of performance of test.....: March 25, 2015 – April 10, 2015

General remarks

This report shall not be reproduced except in full without the written approval of the testing laboratory.
 The test results presented in this report relate only to the item tested.
 Clause numbers between brackets refer to clauses in JIS C 8105-1-2010.
 "(see remark #)" refers to a remark appended to the report.
 "(see Annex #)" refers to an annex appended to the report.
 Throughout this report a comma is used as the decimal separator.

General product information

- 1, All models is Class I luminaires.
- 2, All models are similar except their model name, power, size. All tests were conducted on model BT-TB72W-2400.
- 3, The max. ambient temperature is 25°C.
- 4, The test report include: Attachment No. 1: Report of IEC 62031.
 Attachment No. 2: Report of IEC 61347-2-13.
 Attachment No. 3: 3 pages of product photos.

Copy of marking plate

Tubo series base light **Bitco**
Model: BT-TB72W-2400
Rating: 110V~, 50/60Hz, 72W



MADE IN CHINA

All labels are similar except rating and model name.

Label testing

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

JIS C 8105-2-1			
Clause	Requirement - Test	Result - Remark	Verdict
1.1 (0)	SCOPE (GENERAL INTRODUCTION)		P
1.1 (0.1)	Scope		--
	Information for luminaires design considered	Yes [<input checked="" type="checkbox"/>] No [<input type="checkbox"/>]	P
	Supply voltage	110V~	P
1.1 (0.2)	Normative references		--
1.2 (0.3)	GENERAL REQUIREMENTS		P
1.2 (0.4)	General test requirements and verification		P
1.3 (1)	TERMS AND DEFINITIONS		P
1.4 (2)	CLASSIFICATION		P
1.4 (2.1)	General		--
1.4 (2.2)	Type of protection	Class I	P
1.4 (2.3)	Degree of protection	IP20	P
1.4 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces	Yes	P
	Luminaire not suitable for direct mounting on normally flammable surfaces	No	N
1.4 (2.5)	Luminaire for normal use	Yes	P
	Luminaire for rough service	No	N
1.5 (3)	MARKING		P
1.5 (3.1)	General		--
1.5 (3.2)	Markings on luminaires	See marking label	P
	a)Marking to be observed when replacing lamps or other replaceable components		N
	b)Marking to be observed during installation	The height of symbols more than 5mm, text more than 2mm	P
	c)Marking to be observed after installation		N
	Format of symbols/text	The height of symbols more than 5mm, except for symbols for class II and class III classification minimum of 3 mm, and symbols of not suitable for direct mounting on normally flammable surfaces minimum 25mm; text more than 2mm	P

JIS C 8105-2-1			
Clause	Requirement - Test	Result - Remark	Verdict
1.5 (3.3)	Additional information		P
	Language of instructions	In official language	P
1.5 (3.3.1)	Combination luminaires	Not combination luminaire	N
1.5 (3.3.2)	Nominal frequency in Hz	50/60Hz	P
1.5 (3.3.3)	Operating temperature		P
1.5 (3.3.4)	Symbol or warning notice		N
1.5 (3.3.5)	Wiring diagram	See the manual	P
1.5 (3.3.6)	Special conditions	No such special conditions	N
1.5 (3.3.7)	Metal halid lamp luminaire – warning		N
1.5 (3.3.8)	Limitation for semi-luminaires		N
1.5 (3.3.9)	Power factor and supply current for supply information		N
1.5 (3.3.10)	Suitability for use indoors		P
1.5 (3.3.11)	Luminaires with remote control	Not such construction	N
1.5 (3.3.12)	Clip-mounted luminaire - warning		N
1.5 (3.3.13)	Specifications of protective shields		N
1.5 (3.3.14)	Symbol for nature of supply	~	P
1.5 (3.3.15)	Rated current of socket outlet	No socket outlet	N
1.5 (3.3.16)	Rough service luminaire	Normal 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 arms reach		N
1.5 (3.3.21)	Luminaires with non replaceable and non-user replaceable light source		N
1.5 (3.3.22)	Controllable luminaires		N
1.5 (3.4)	Test with water and petroleum spirit	15s	P
	Legible after test	Marking still be legible, marking labels not be easily removable and no curling.	P
1.6 (4)	CONSTRUCTION		P
1.6 (4.1)	General		--
1.6 (4.2)	Components replaceable without difficulty		P

JIS C 8105-2-1			
Clause	Requirement - Test	Result - Remark	Verdict
1.6 (4.3)	Wireways smooth and free from sharp edges		P
1.6 (4.4)	Lampholders	No lampholder	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	No such lampholder	N
1.6 (4.4.4)	Positioning		N
	Lampholders for a fluorescent lamp		N
	- pressure test (N).....:		N
	After test the lampholder comply with relevant standard sheets and show no damage		N
	After test on signal-capped lampholder the lampholder have not moved form its position and show no permanent deformation		N
	Edison screw or bayonet-capped lampholders		N
	- bending test (Nm).....:		N
	After test the lamholder have not moved from its position and show no permanent deformation		N
1.6 (4.4.5)	Luminaires with ignitor	Not ignitor	N
1.6 (4.4.6)	Centre contact	Not ignitor	N
1.6 (4.4.7)	Parts in rough service luminaires resistant to tracking	Not for rough service	N
1.6 (4.4.8)	Lamp connectors	No lamp connector	N
1.6 (4.4.9)	Caps and bases correctly used		N
1.6 (4.4.10)	Lampholder or connector according to IEC60061		N
1.6 (4.5)	Starter holders	No such parts	N
	Starter holder in luminaries other than Class II		N
	Starter holder Class II construction		N
1.6 (4.6)	Terminal blocks		P
	Tails		P
	Unsecured blocks		P
1.6 (4.7)	Terminals and supply connections		P
	Luminaries type	Class I Fixed luminaries	P

JIS C 8105-2-1			
Clause	Requirement - Test	Result - Remark	Verdict
1.6 (4.7.1)	Taken to prevent metal parts from becoming live due to a detached wire or screw		N
1.6 (4.7.2)	Supply terminals		P
	8 mm test live conductor		P
1.6 (4.7.3)	Terminals for supply cords		N
1.6 (4.7.3.1)	Welding method and material		N
	- stranded or solid wire of copper materials		N
	- spot welding		N
	- welding of wire and plate		N
	- welded connections are used in type Z attachments only		N
	- mechanical test according to 15.6.2		N
	- electrical test according to 15.6.3		N
	- heat test according to 15.6.3.2.3 and 15.6.3.2.4		N
1.6 (4.7.4)	Terminals other than supply connection		N
	- comply with the requirements of Sections 14 and 15		N
1.6 (4.7.5)	Heat-resistant wiring/sleeves	The external wiring or supply cord is unsuitable for the temperatures reached inside the luminaire	N
1.6 (4.7.6)	Multi-pole plug and socket		N
	- test at 30 N		N
1.6 (4.8)	Switches:		N
	- adequate rating		N
	- adequate fixing		N
	- degree of protection		N
	- polarized supply		N
	- compliance with 61058-1 for electronic switches		N
1.6 (4.9)	Insulating lining and sleeves		N
1.6 (4.9.1)	Reliably retained in position		N
1.6 (4.9.2)	Adequate mechanical, electrical and thermal strength		N
	Resistant to temperature >20°C to the wire temperature or		N
	a) & c) insulation resistance and electric		N

JIS C 8105-2-1			
Clause	Requirement - Test	Result - Remark	Verdict
	strength		
	b)roast test. Temperature (°C)		N
1.6 (4.10)	Insulation of Class II luminaires		N
1.6 (4.10.1)	No contact, mounting surface - accessible metal parts - wiring of basic insulation		N
	Safe installation fixed luminaires		N
	Capacitors and switches		N
	Interference suppression capacitors according to IEC 60384-14and their connection accordance with 8.6 of IEC60065:2001		N
1.6 (4.10.2)	Assembly gaps:		N
	- not coincidental		N
	- no straight access with test probe		N
1.6 (4.10.3)	Supplementary insulation or reinforced insulation:		N
	- fixed		N
	- unable to be replaced; luminaire inoperative		N
	- sleeves retained in position		N
	- lining in lampholder		N
1.6 (4.10.4)	Protective impedance device		N
	Y1, Y2 capacitors according to IEC 60384-14and their connection accordance with 8.6 of IEC60065		N
1.6 (4.11)	Electrical connections and current-carrying parts		P
1.6 (4.11.1)	Contact pressure		P
1.6 (4.11.2)	Screws:		P
	- Self-tapping screws		P
	- thread-cutting screws		N
1.6 (4.11.3)	Screw locking:		P
	- spring washer		P
	- rivets		N
1.6 (4.11.4)	Material of current-carrying parts	> 50% copper	P
1.6 (4.11.5)	No contact to wood or mounting surface	No wood	P
1.6 (4.11.6)	Electro-mechanical contact systems		N
	-test		N
1.6 (4.12)	Screws and connections (mechanical) and		N

JIS C 8105-2-1			
Clause	Requirement - Test	Result - Remark	Verdict
	glands		
1.6 (4.12.1)	Screw not made of soft metal		P
	Screws made of insulating material	Impair supplementary or reinforced insulation if replacement by a metal screw	N
	Screws used to provide earthing continuity		N
	Fixing screws for ballasts and other components	at least one screw retaining the ballast will have a mechanical and electrical function.	N
	- not considered to be maintenance		N
	Screws of insulating material used in cord anchorages		N
	Torque test: torque (Nm); part	Earth screw: 0.8Nm	P
	Torque test: torque (Nm); part	Fixed enclosure: 0.8Nm	P
	Torque test: torque (Nm); part		N
1.6 (4.12.2)	Screws transmitting contact pressure and screws		N
	Screw with diameter < 3 mm screw into metal		N
1.6 (4.12.3)	Not used		--
1.6 (4.12.4)	Screwed and other fixed connections between different parts of luminaires		N
	- locked connections; torque (Nm)		N
	- locked lampholder during lamp replacement; torque (Nm)		N
	- push-button switches; torque (Nm)	No such switches	N
1.6 (4.12.5)	Screwed glands; force (N)		N
1.6 (4.13)	Mechanical strength		P
1.6 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm)	0.35Nm, no damage	P
	- other parts; energy (Nm)	0.5Nm, no damage	P
	1) live parts not have become accessible		P
	2) effectiveness of insulating linings and barriers not have been impaired		P
	3) degree of protection	IP20	P
	4) possible to remove and to replace external covers		N
1.6 (4.13.2)	Metal parts enclosing live parts have adequate mechanical strength		P

JIS C 8105-2-1			
Clause	Requirement - Test	Result - Remark	Verdict
1.6 (4.13.3)	Straight test finger with a force of 30 N	metal parts not touch live parts, not be excessively deformed and continue to meet the requirements of Section 11	P
1.6 (4.13.4)	Rough service luminaires	Normal service luminaires	N
	IP 54 or higher		N
	a) fixed rough service luminaires and portable rough service luminaires (not hand-held)		N
	b) hand-held luminaires		N
	c) luminaires delivered with a stand		N
	d) luminaires for temporary installations and suitable for mounting on a stand		N
1.6 (4.13.5)	Not used		--
1.6 (4.13.6)	Plug-ballast/transformers and mains socket-outlet-mounted luminaires		N
	Tumbling barrel test		N
	- sample does not exceed 250 g	50 times	N
	- sample exceeds 250 g	25 times	N
1.6 (4.14)	Suspensions, fixings and means of adjustment		N
1.6 (4.14.1)	Adequate factors of safety		P
	Test A) four times the weight.....:	4x5.8Kg	P
	- suspended or fixed luminaire		N
	- external parts fixed to the luminaire		N
	Test B) for rigid suspension luminaires: torque 2.5 Nm.....:		N
	Test C) for rigid suspension brackets: bracket arm; force (N)		N
	a) for heavy-duty brackets		N
	b) for light-duty brackets	10N for support translucent cover	N
	D) for load track-mounted luminaires		N
	E) for clip-mounted luminaires:		N
1.6 (4.14.2)	Load to flexible cables:	No flexible cable	N
	mass (kg)		N
	stress in conductors (N/mm ²)		N
	Mass (kg) of semi-luminaires		N

JIS C 8105-2-1			
Clause	Requirement - Test	Result - Remark	Verdict
	Bending moment (Nm) of semi-luminaires :		N
1.6 (4.14.3)	Adjusting devices:		N
	a) adjusting devices and means of adjustment		N
	- flexing test; number of cycles		N
	- not more than 50 % of the strands in a conductor are broken		N
	- insulation resistance and high-voltage tests afterwards		N
	b) luminaires with a means of adjustment intended to be installed within arm's reach		N
	c) luminaires intended to be mounted within arm's reach		N
1.6 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors	No such tubes	N
1.6 (4.14.5)	Guide pulleys	No such construction	N
1.6 (4.14.6)	Plug-ballast/transformers and mains socket-outlet-mounted luminaires	Not such unit	N
1.6 (4.15)	Flammable materials:		P
	- glow-wire test 650°C		P
	- spacing \geq 30 mm		N
	- screen withstanding test of 13.3.1		N
	- screen dimensions	Spacing from heated parts min 3mm	N
	- no fiercely burning material		N
	- thermal protection		N
	- electronic circuits exempted		N
1.6 (4.15.2)	Luminaires made of thermoplastic material		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
	Lamp control gear		N
1.6 (4.16.1)	Lamp control gear shall spacing:		N
	- spacing 10 mm		N
	- spacing 35 mm		N
1.6 (4.16.2)	Thermal protection:	No such component	N
	- external		N

JIS C 8105-2-1			
Clause	Requirement - Test	Result - Remark	Verdict
	-fixed position		N
	- class P" thermally protected ballast/transformer,		N
	- temperature declared thermally protected ballast/transformer,		N
1.6 (4.16.3)	Design to satisfy the test of 12.6		N
1.6 (4.17)	Drain holes	No drain holes	N
	Clearance at least 5 mm		N
1.6 (4.18)	Resistance to corrosion:		N
1.6 (4.18.1)	- more than IPX1 luminaires		N
1.6 (4.18.2)	- season cracking in copper		N
1.6 (4.18.3)	- corrosion of aluminium		N
1.6 (4.19)	Ignitors	No ignitors used	N
1.6 (4.20)	Rough service vibration	No such appliance	N
1.6 (4.21)	Protective shield		N
1.6 (4.21.1)	Shield fitted		N
	Shield of glass if tungsten halogen lamps		N
1.6 (4.21.2)	Particles from a shattering lamp not impair safety		N
1.6 (4.21.3)	No direct path		N
1.6 (4.21.4)	Impact test on shield		N
	Glow-wire test on lamp compartment		N
1.6 (4.22)	Attachments to lamps		N
1.6 (4.23)	Semi-luminaires comply with Class II	No semi-luminaires	N
1.6 (4.24)	Photobiological hazards		N
1.6 (4.24.1)	UV radiation		N
1.6 (4.24.2)	Retinal blue light hazard		N
1.6 (4.25)	Mechanical hazard	No sharp points or edges	P
1.6 (4.26)	Short-circuit protection		N
1.6 (4.26.1)	uninsulated accessible SELV parts		N
1.6 (4.26.2)	Short circuit test		N
1.6 (4.26.3)	Test chain according to figure 29		N
1.6 (4.27)	Terminal blocks with integrated screwless earthing contacts		N
1.6 (4.28)	Fixing of thermal sensing controls		N
1.6 (4.29)	Luminaire with non replaceable light source		N
1.6 (4.30)	Luminaires with non-user replaceable light		N

JIS C 8105-2-1			
Clause	Requirement - Test	Result - Remark	Verdict

	sources		
1.6 (4.31)	Insulation between circuits		N
1.6 (4.31.1)	SELV circuits		N
1.6 (4.31.2)	FELV circuits		N
1.6 (4.31.3)	Other circuits		N
1.6 (4.32)	Overvoltage protective devices		N

1.7 (11)	CREEPAGE DISTANCES AND CLEARANCES		P
	Working voltage (V)	110V~	P
	Voltage form	Sinusoidal [√] Non-sinusoidal []	P
	PTI	< 600 [√] ≥ 600 []	P
	Impulse withstand category (normal category II) (category III annex U)		
	Rated pulse voltage (kV)		N
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm)	Cr: 3.2mm, limit: 2.5mm Cl: 3.2mm, limit: 1.5mm	P
	(2) Current-carrying parts and accessible parts: cr (mm); cl (mm)	Cr: 3.6mm, limit: 2.5mm Cl: 3.6mm, limit: 1.5mm	P
	(3) Parts becoming live due to breakdown of basic insulation and metal parts: cr (mm); cl (mm)		N
	(4) Outer surface of cable where it is clamp and metal parts: cr (mm); cl (mm)		N
	(5)not used		N
	(6) Current-carrying parts and supporting surface: cr (mm); cl (mm)	Cr: 3.6mm, limit: 2.5mm Cl: 3.6mm, limit: 1.5mm	P

1.8 (7)	PROVISION FOR EARTHING		P
1.8 (7.2.1 + 7.2.3)	Accessible Metal parts		P
	metal parts in contact with supporting surface		P
	Resistance < 0.5 Ω	0.012 Ω	P
	Self-tapping screws used		N
	Thread-forming screws		P
	Thread-forming screws used in a groove		N
	Earth marks contact first		P

JIS C 8105-2-1			
Clause	Requirement - Test	Result - Remark	Verdict
1.8 (7.2.2 +7.2.3)	Earth continuity in joints etc.		P
1.8 (7.2.4)	Locking of clamping means		P
	Compliance with 4.7.3		P
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N
1.8 (7.2.5)	Earth terminal integral part of Connector socket		N
1.8 (7.2.6)	Earth terminal adjacent to mains terminals		P
1.8 (7.2.7)	Electrolytic corrosion of the earth terminal		P
1.8 (7.2.8)	Material of earth terminal		P
	Contact surface bare metal		P
1.8 (7.2.10)	Class II luminaire for looping-in		N
	Double or reinforced insulation to functional earth		N
1.8 (7.2.11)	Earthing core coloured green-yellow		P
	Length of earth conductor		P
1.9 (14)	SCREW TERMINALS		N
	Separately approved: component list	See annex 1	N
	Part of the luminaire		N
1.9 (15)	SCREWLESS TERMINALS and electrical connections		P
	Separately approved: component list	See annex 1	P
	Part of the luminaire		N
1.10 (5)	EXTERNAL AND INTERNAL WIRING		P
1.10 (5.2)	Supply connection and other external wiring		P
1.10 (5.2.1)	Means of connection.....	Terminal block	P
1.10 (5.2.2)	Type of supply cord		N
	Nominal cross-section area (mm ²)		N
	Cables equal to IEC 60227 and 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		N
	- suitable for introduction		N
	- adequate degree of protection		N

JIS C 8105-2-1			
Clause	Requirement - Test	Result - Remark	Verdict
1.10 (5.2.7)	Cable entries through rigid material have rounded edges	Not cable entries	N
1.10 (5.2.8)	Insulating bushings in class II luminaires, in settable and adjustable luminaires or in portable luminaires other than those for wall mounting:		N
	- suitably fixed		N
	- material in bushings		N
	- material not likely to deteriorate		N
	- tubes or guard made of insulating material		N
1.10 (5.2.9)	Bushing locking of screw bushings	No such component	N
1.10 (5.2.10)	Cord anchorage:		N
	- 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 cord	Not such construction	N
	a) at least one part fixed		N
	b) types of cable		N
	c) no damaging of the cable		N
	d) whole cable can be mounted		N
	e) no touching of clamping screws		N
	f) metal screw not directly on cable		N
	g) replacement without special tool		N
	Glands not used as anchorage		N
	Labyrinth type anchorage		N
1.10 (5.2.10.2)	Adequate cord anchorages for type Y and type Z attachments		N
1.10 (5.2.10.3)	Tests:		N
	- impossible to push cable; unsafe		N
	- pull test: 25 times; pull (N)		N
	- torque test: torque (Nm)		N
	- displacement ≤ 2 mm		N
	- no movement of conductors		N
	- no damage of cable or cord		N
1.10 (5.2.11)	External wiring passing into luminaire		P

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Clause	Requirement - Test	Result - Remark	Verdict
1.10 (5.2.12)	Looping-in terminals	Not looping-in appliance	N
1.10 (5.2.13)	Wire ends not tinned		N
	Wire ends tinned: no cold flow		N
1.10 (5.2.14)	Mains plug same protection	Not plug	N
	Class III luminaire plug		N
1.10 (5.2.16)	Appliance inlets (IEC 60320)	No appliance inlet	N
	Appliance couplers of class II type		N
1.10 (5.2.17)	No standardized in interconnecting cables assembled		N
1.10 (5.2.18)	Used plug in accordance with		N
	- IEC 60083		N
	- other standard		N
1.10 (5.3)	Internal wiring		P
1.10 (5.3.1)	Internal wiring of suitable size and type	0.75mm ²	P
	Through wiring		N
	- not delivered/ mounting instruction		N
	- factory assembled		N
	- socket outlet loaded (A).....:		N
	- temperatures.....:		N
	Green-yellow for earth only		P
1.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		N
	Cross-Sectional area (mm ²)		N
	Insulation thickness		N
	Extra insulation added where necessary		N
1.10 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limited device		N
	Adequate cross-section area and insulation thickness		N
1.10 (5.3.1.3)	Double or reinforced insulation for class II		N
1.10 (5.3.1.4)	Conductors without insulation	Not used	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
	Joints, raising/lowering devices		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Telescopic tubes etc.		N
	No twisting over 360°		P
1.10 (5.3.3)	Insulating bushings on class II luminaires, in settable and adjustable luminaires, or in portable luminaires other than those for wall mounting,		N
	- suitable fixed		N
	- material in bushings		N
	- material not likely to deteriorate		N
	- cables with protective sheath		N
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		N
	Wire ends tinned: no cold flow		N

1.11 (8)	PROTECTION AGAINST ELECTRIC SHOCK		P
1.11 (8.2.1)	Live parts not accessible with standard test finger		P
	Basic insulated parts not used on the outer surface without appropriate protection		P
	Basic insulated parts not accessible with standard test finger on portable and adjustable luminaires		P
	Basic insulated parts not accessible with ø50mm probe from outside, within arms reach, on wall-mounted luminaires		P
	Lamp and starholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N
	Basic insulation only accessible under lamp or starter replacement		N
	Double-ended tungsten filament lamp		N
	Insulation lacquer not reliable		N
	Double-ended high pressure discharge lamp		N
	Relevant warming according to 3.2.18 fitted to the luminaire		N
1.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position	Fixed luminaire	N
1.11 (8.2.3 a)	Class II luminaire:		N

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Clause	Requirement - Test	Result - Remark	Verdict

	- basic insulated metal parts not accessible during starter or lamp replacement		N
	- basic insulated not accessible other than during starter or lamp replacement		N
	- glass protective shields not used as supplementary insulation	No such parts	N
1.11 (8.2.3b)	BC lampholder of metal in class I luminaires shall be earthed		N
1.11 (8.2.3c)	Class III luminaires with expose SELV parts:		N
	Ordinary luminaire :		N
	- touch current		N
	- no-load voltage		N
	- other than ordinary luminaire:		N
	- nominal voltage		N
1.11 (8.2.4)	Portable luminaire:	Fixed luminaire	N
	- protection independent of supporting surface		N
	- terminal block completely covered		N
1.11 (8.2.5)	Compliance with the standard test finger or relevant probe		P
1.11 (8.2.6)	Covers reliably secured		N
1.11 (8.2.7)	Discharging of capacitors >0.5 μ F	0V after 1min	P
	Portable plug connected luminaire with capacitor		N
	Discharge device on or within capacitor		N
	Discharge device mounted separately		N

1.12 (12)	ENDURANCE TEST AND THERMAL TEST		P
1.12 (12.3)	Endurance test:		P
	- mounting-position	Mounting ceiling	P
	- test temperature (°C)	35°C	P
	- total duration (h)	240hrs. Totally 10 cycles, each 24h	P
	- supply voltage: Un factor; calculated voltage (V)	1.1x110V~	P
	- lamp used	LED lamp	P
1.12 (12.3.2)	After endurance test:		P
	- no part unserviceable		P

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Clause	Requirement - Test	Result - Remark	Verdict
	- luminaire not unsafe		P
	- no damage to track system		N
	- marking legible		P
	- no cracks, deformation etc.		P
1.12 (12.4)	Thermal test (normal operation)	(see table 12.4)	P
1.12 (12.5)	Thermal test (abnormal operation)		N
	Short-circuit of starter contacts		N
	Lamps removed and not replaced		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)		N
	- case of abnormal conditions		N
	- electronic ballast		N
	- measured winding temperature (°C): at 1.1 Un		N
	- measured mounting surface temperature (°C): at 1.1 Un		N
	- calculated mounting surface temperature(°C)		N
	- track-mounted luminaires		N
1.12 (12.6.2)	Temperature sensing control:		N
	- manual reset cut-out		N
	- auto reset cut-out		N
	- track-mounted luminaires		N
1.12 (12.7)	Thermal test (failed ballast or transformer 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 $\leq 70W$		N
	Test method 12.7.1.1 or Annex V		N
	Test according to 12.7.1.1:		N
	- case of abnormal conditions		N
	- Ballast failure at supply voltage (V)		N
	- Components retained in place after the test		N
	- Test with standard test finger after the test		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Test according to Annex V:		N
	- case of abnormal conditions		N
	- measured winding temperature (°C): at 1.1 Un.. :		N
	- measured temperature of fixing point/exposed part (°C): at 1.1Un.....:		N
	- calculated temperature of fixing point/exposed part (°C)		N
	Ball-pressure test:		N
	- part tested; temperature (°C)..... :		N
	- part tested; temperature (°C)..... :		N
1.12 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		--
	- case of abnormal conditions		N
	- measured winding temperature (°C): at 1.1 Un..		N
	- measured temperature of fixing point/exposed part (°C): at 1.1 Un..... :		N
	- calculated temperature of fixing point/exposed part (°C)		N
	Ball-pressure test:		N
	- part tested; temperature (°C)..... :		N
	- part tested; temperature (°C)..... :		N
1.12 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N
	- case of abnormal conditions		N
	- Components retained in place after the test		N
	- Test with standard test finger after the test		N
1.12 (12.7.2)	Luminaire with temperature sensing control		N
	- thermal link		N
	- manual reset cut-out		N
	- auto reset cut-out		N
	- case of abnormal conditions		N
	- highest measured temperature of fixing point/exposed part (°C):..... :		N
	Ball-pressure test:		N
	- part tested; temperature (°C)..... :		N

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Clause	Requirement - Test	Result - Remark	Verdict

	- part tested; temperature (°C)..... :		N
--	--	--	---

1.13 (9)	RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE		P
1.13 (9.2)	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP	IP20	P
	- mounting position during test		N
	- fixing screws tightened; torque (Nm)		N
	- tests according to clauses		N
	- electric strength		N
	a) no deposit in dust-proof luminaire		N
	b) no talcum in dust-tight luminaire		N
	c) no trace of water on current-carrying parts or SELV parts or where it could become a hazard		N
	d) i) For luminaires without drain holes – no water entry		N
	d) ii) For luminaires with drain holes – no hazardous water entry		N
	e) no water in watertight luminaire		N
	f) no contact with live parts (IP 2X)	IP20	P
	f) no entry into enclosure (IP 3X and IP 4X)		N
	f) no contact with live parts (IP3X and IP4X)		N
	g) no trace of water on part of lamp requiring protection from splashing water		N
	h) no damage of protective shield or glass envelope		N
1.13 (9.3)	Humidity test 48h	Relative humidity 93%, temperature 25°C, 48h, followed by hi-pot test	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..... :		P
	Insulation resistance:		P
	SELV:		--
	- between current-carrying parts of different polarity..... :		N

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Clause	Requirement - Test	Result - Remark	Verdict
	- between current-carrying parts and mounting surface		N
	- between current-carrying parts and metal parts of the luminaire		N
	Other than SELV:		
	- between live parts of different polarity	100M Ω , limit: 2 M Ω	P
	- between live parts and mounting surface..:	100M Ω , limit: 2 M Ω	P
	- between live parts and accessible parts.. :	100M Ω , limit: 2 M Ω	P
	- between live parts of different polarity through action of a switch		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:		--
	- between current-carrying parts of different polarity..... :		N
	- between current-carrying parts and mounting surface		N
	- between current-carrying parts and metal parts of the luminaire		N
	Other than SELV:		--
	- between live parts of different polarity	1220Vac, no breakdown	P
	- between live parts and mounting surface.....:	1220Vac, no breakdown	P
	- between live parts and accessible parts..:	1220Vac, no breakdown	P
	- between live parts of different polarity through action of a switch		N
1.14 (10.3)	Touch current (mA)		N
	Protective conductor current (mA)	0.46mA<3.5mA	P
1.15 (13)	RESISTANCE TO HEAT, FIRE AND TRACKING		P
1.15 (13.2.1)	Ball-pressure test:		P
	- part tested; temperature (°C)	Translucent cover, 75°C, 0.8mm	P
	- part tested; temperature (°C)	Terminal block, 125°C, 1.2mm	P

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Clause	Requirement - Test	Result - Remark	Verdict
	- part tested; temperature (°C)		N
1.15 (13.3.1)	Needle flame test (10 s):		P
	- part tested	Terminal block	P
1.15 (13.3.2)	Glow-wire test:		P
	- part tested	Translucent cover, 650°C, No burning	P
1.15 (13.4.2)	Tracking test: part tested		N
Annex A	TEST TO ESTABLISH WHETHER A CONDUCTIVE PART MAY CAUSE AN ELECTRIC SHOCK		N
A.2	Voltage not exceed 35 V a.c. peak or 60 V ripple free d.c.		N
A.3	Touch-current not exceed:		N
	- for a.c.: 0,7 mA (peak);		N
	- for d.c.: 2,0 mA		N
Annex B	TEST LAMP		N
Annex C	ABNORMAL CIRCUIT CONDITIONS		N
	a) Short-circuit of starter contacts		N
	b) Lamp rectification		N
	c) Lamps removed and not replaced		N
	d) One electrode of lamp open-circuited		N
	e) Lamp will not start, but both electrodes are intact		N
	f) Blockage of the motor(s) contained in the luminaire		N
Annex D	DRAUGHT-PROOF ENCLOSURE		N
Annex E	DETERMINATION OF WINDING TEMPERATURE RISES BY THE INCREASE—IN-RESISTANCE METHOD		N
Annex F	TEST FOR RESISTANCE TO STRESS CORROSION OF COPPER AND COPPER ALLOYS		N
Annex G	MEASUREMENT OF TOUCH CURRENT AND PROTECTIVE CONDUCTOR CURRENT		N
	CENELEC COMMON MODIFICATIONS (EN)		--

JIS C 8105-2-1			
Clause	Requirement - Test	Result - Remark	Verdict
3	MARKING		--
3.3.301	Adequate warning on the package		--
5	EXTERNAL AND INTERNAL WIRING		--
5.2.1	Connecting leads		N
	- without a means for connection to the supply		N
	- terminal block specified		N
	- relevant information provided		N
	- compliance with 4.6, 4.7.1, 4.7.2, 4.10.1, 11.2,12 and 13.2 of Part 1		N
5.2.2	Cables equal to HD21 S2 or HD22 S2		N
ZB	ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)		N
3.3	DK: power supply cord with label		N
	IT: warning label on Class 0 luminaire		N
4.5.1	DK: socket-outlets		N
5.2.1	CY, DK, FI, SE, GB: type of plug		N
ZC	ANNEX ZC, NATIONAL DEVIATIONS (EN)		N
4&5	FR: Shuttered socket-outlets 10/16A		N
13.3	GB: Requirements according to United Kingdom Building Regulation		N
13.3.2	FR: Glow-wire test 850°C alt. 750°C for luminaries in premises open to public or 960°C for luminaries in emergency exits		N

Tables

	ANNEX 1: components					P
object/part No.	Code	manufacturer/trademark	type/model	technical data	standard	mark(s) of conformity
Terminal block	B	Various	Various	300V, 20A	--	VDE
Internal wire	B	Hong Shun Wire & Cable Fluoroplastics Factory	2HSAF	1x0.75mm, 300/500V	DIN VDE 0282-3	VDE 40017011
Translucent cover	B	CHI MEI CORPORATION	PC-110(+)	110°C, V-2	UL 94	E56070 Test with appliance
LED PCB	B	RONG HUI ELECTRONICS (HUIZHOU) CO LT	RH-4	V-0, 130°C	UL796	UL E252098
Insulation sheet	B	SHENZHEN TEEBON PLASTICS TECHNOLOGY CO LTD	TB-FR183	V-0; 80°C	--	UL E357515
LED Bead	B	SHINEON	SSM5630-50-N-N1N2-F	Vf: 5.2-5.6V If: 150mA 2600K-7000K	--	Test with appliance
Fuse	B	Dongguan Electronics Better	932	T3.15A; 250V	EN 60127-1 EN 60127-3	VDE 40033369
Varister (VR1)	B	Centra Science Crop	CNR-14D471K	300VAC	EN 61051-1 EN 61051-2 EN 61051-2-2	VDE 40008220
X-capacitor	B	Dain Electronics Co., Ltd	MPX	0.47µF; 300V; 110°C	EN 60384-14	VDE 40018798
Y-capacitor	B	Welson Industrial Co., Ltd.	WD	1000pF/400V, 125°C	IEC 60384-14	VDE115455
Opto-coupler	B	Everlight Electronics Co.,Ltd	EL817C	--	EN60747-5-2	VDE 132249
Driver PCB	B	Kingboard Laminates Co	KB-6150N	V-0, 130°C	UL796	E123995
Transformer	B	Shenzhen Betop Electronics Co., Ltd.	TF1	Class B, 110°C	EN 61347-2-13	--
-Bobbin	B	CHANG CHUN PLASTICS CO LTD	T375J	V-0, 150°C	UL 94	E59481
-Magnetic coil	B	Feng Ching Metal Corp	xUEW	130°C	UL1446	E172395
-Triple insulated wire	B	FENG CHING METAL CORP	STW-B(130°C)	130°C	UL1446	VDE 40013359
-Insulation tape	B	suzhou mailaduona electric material co ltd	JY312(#)	130°C	UL510	E188295
-Tube	B	GREAT HOLDING INDUSTRIAL CO LTD	TFT	200°C	UL 94	E156256

Tables

-Varnish	B	JOHN C DOLPH CO	BC-346A	155°C	UL1446	E317427
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The codes above have the following meaning:

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

B – The component is replaceable if authorized by the test house

C – Integrated component tested together with the appliance

D – Alternative component

ANNEX 2: temperature measurements, thermal tests of Section 12					P	
Type reference	BT-TB72W-2400			P		
Lamp used	LED lamp			P		
Lamp control gear used.....	LED lamp controlgear			P		
Mounting position of luminaire.....	See user manual			P		
Supply wattage (W)				P		
Supply current (A)				P		
Calculated power factor.....				P		
Table: measured temperatures corrected for $t_a = 25^\circ\text{C}$:				P		
- abnormal operating mode.....				N		
- test 1: rated voltage.....				N		
- test 2: 1,06 times rated voltage or 1,05 times Rated wattage	1.06x110V~			P		
- test 3: Load on wiring to socket-outlet, 1.06 times voltage or 1,05 times wattage	--			N		
- test 4: 1,1 times rated voltage or 1,05 times Rated wattage				N		
Through wiring or looping-in wiring loaded by a current of A during the test				N		
Temperature(°C) of part	Clause 12.4 – normal				Clause 12.5 – abnormal	
	Test 1	Test 2	Test 3	Limits	Test 4	Limit
Translucent cover	--	37.2	--	Ref.	--	--
Input terminal block	--	36.7	--	100	--	--
Internal wire near LED	--	60.2	--	105	--	--
LED PCB (near LED)	--	66.3	--	130	--	--
Mounting surface	--	48.9	--	90	--	--
Varister (VR1)	--	83.5	--	85	--	--
X-capacitor (CX1)	--	97.1	--	110	--	--
Y-capacitor (CY1)	--	96.3	--	125	--	--
Winding of transformer T1	--	100.4	--	110	--	--
PCB near transformer T1	--	92.1	--	130	--	--

Tables

C16	--	86.4	--	105	--	--
Ambient	--	25.0	--	--	--	--

	ANNEX 3: screw terminals (part of the luminaire)		--
14	SCREW TERMINALS		--
14.2	Type of terminal		--
	Rated current (A)		--
14.3.2.1	One or more conductors		N
14.3.2.2	Special preparation		N
14.3.2.3	Terminal size		N
	Cross-sectional area (mm ²)		N
14.3.3	Conductor space (mm).....		N
14.4	Mechanical tests		N
14.4.1	Minimum distance		N
14.4.2	Cannot slip out		N
14.4.3	Special preparation		N
14.4.4	Nominal diameter of thread (metric ISO thread).....		N
	External wiring		N
	No soft metal		N
14.4.5	Corrosion		N
14.4.6	Nominal diameter of thread (mm).....		N
	Torque (Nm)		N
14.4.7	Between metal surfaces		N
	Lug terminal		N
	Mantle terminal		N
	Pull test; pull (N)		N
14.4.8	Without undue damage		N

	ANNEX 4: screwless terminals (part of the luminaire)		--
15	SCREWLESS TERMINALS		--
15.2	Type of terminal		---
	Rated current (A)		---
15.3.1	Material		N
15.3.2	Clamping		N
15.3.3	Stop		N
15.3.4	Unprepared conductors		N
15.3.5	Pressure on insulating material		N
15.3.6	Clear connection method		N

Tables

15.3.7	Clamping independently		N							
15.3.8	Fixed in position		N							
15.3.10	Conductor size		N							
	Type of conductor		N							
15.5.1	Terminals internal wiring		N							
15.5.1.1	Pull test spring-type terminals (4 N, 4 samples)		N							
15.5.1.2	Pull test pin or tab terminals (4 N, 4 samples)		N							
	Insertion force not exceeding 50 N		N							
15.5.2	Permanent connections: pull-off test (20 N)		N							
15.6	Electrical tests		--							
	Voltage drop (mV) after 1 h (4 samples).....:		N							
	Voltage drop of two inseparable joints		N							
	Number of cycles		N							
	Voltage drop (mV) after 10th alt. 25th cycle (4 samples).....:		N							
	Voltage drop (mV) after 50th alt. 100th cycle (4 samples).....:		N							
	After ageing, voltage drop (mV) after 10th alt. 25th cycle (4 samples).....:		N							
	After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples).....:		N							
15.7	Terminals external wiring		N							
	Terminal size and rating		N							
15.8.1	Pull test spring-type terminals (4 samples); pull (N)		N							
	Pull test pin or tab terminals (4 samples); pull (N)		N							
15.9	Contact resistance test		N							
	Voltage drop (mV) after 1 h		N							
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Voltage drop of two inseparable joints									
	Voltage drop after 10th alt. 25th cycle									
	Max. allowed voltage drop (mV).....:									
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Voltage drop after 50th alt. 100th cycle									
	Max. allowed voltage drop (mV).....:									
terminal	1	2	3	4	5	6	7	8	9	10

Tables

voltage drop (mV)										
	Continued ageing: voltage drop after 10th alt. 25th cycle									
	Max. allowed voltage drop (mV).....: —									
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Continued ageing: voltage drop after 50th alt. 100th cycle									
	Max. allowed voltage drop (mV).....: —									
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										

Attachment No.1

TEST REPORT

IEC 62031 LED modules for general lighting - Safety specifications

Report reference No......: See report JIS C 8105-2-1

Tested by(name + signature).....: See report JIS C 8105-2-1

Approved by(name + signature).....: See report JIS C 8105-2-1

Date of issue: See report JIS C 8105-2-1

Contents.....: See report JIS C 8105-2-1

Testing laboratory

Name: See report JIS C 8105-2-1

Address.....: See report JIS C 8105-2-1

Testing location: See report JIS C 8105-2-1

Client

Name: See report JIS C 8105-2-1

Address.....: See report JIS C 8105-2-1

Manufacturer

Name: See report JIS C 8105-2-1

Address.....: See report JIS C 8105-2-1

Test specification

Standard.....: IEC 62031: 2008+A1: 2012

Test procedure: Compliance with IEC 62031: 2008+A1: 2012

Non-standard test method: N/A

Test item Description.....: See report JIS C 8105-2-1

Trademark: See report JIS C 8105-2-1

Model and/or type reference: See report JIS C 8105-2-1

Rating(s).....: See report JIS C 8105-2-1

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

IEC 62031			
Clause	Requirement - Test	Result - Remark	Verdict
5.3	Unless otherwise specified, the type test is carried out on one sample consisting of one or more items submitted for the purpose of the type test.		P
5.4	If the light output has detectably changed, the module shall not be used for further tests.		P
5.5	For SELV-operated LED modules, the requirements of IEC 61347-2-13, Annex I, apply additionally.		N

6	CLASSIFICATION		---
	Independent		N
	Built-in		N
	Integral		P

7	MARKING		---
7.1	Mandatory marking for built-in or independent modules		N
	a) Mark of origin (trade mark, manufacturer's name or name of the responsible vendor/supplier).	See page 3	N
	b) Model number or type reference of the manufacturer.	See page 3	N
	c) Either the -rated supply voltage(s), or voltage range, supply frequency or/and -rated supply current(s) or current range, supply frequency (the supply current may be given in the manufacturer's literature) or/and -rated input power, or power range.	See page 3	N
	d) Nominal power.		N
	e) Indication of position and purpose of the connections where it is necessary for safety. In case of connecting wires, a clear indication shall be given in a wiring diagram.		N
	f) Value of t_c . If this relates to a certain place on the LED module, this place shall be indicated or specified in the manufacturer's literature.		N
	g) For eye protection, see requirements of IEC 62471.		N
	h) Built-in modules shall be marked in order to separate them from independent modules. The mark shall be located on the packaging or on the module itself.		N
7.2	Location of marking		---

IEC 62031			
Clause	Requirement - Test	Result - Remark	Verdict
	Items a), b), c) and f) of 7.1 shall be marked on the module.		N
	Items d), e), g) and h) of 7.1 shall be marked legible on the module or on the module data sheet.		N
	For integral modules, no marking is required, but the information given in 7.1 a) to g) shall be provided in the technical literature of the manufacturer.		N
7.3	Durability and legibility of marking		N
	Rubbing 15 s water, 15 s petroleum; marking legible		N

8 (14)	SCREW TERMINALS		N
	Separately approved: component list	See annex 1	N
	Part of the luminaire	See annex 3	N

8 (15)	SCREWLESS TERMINALS and electrical connections		N
	Separately approved: component list	See annex 1	N
	Part of the luminaire	See annex 4	N

IEC 62031			
Clause	Requirement - Test	Result - Remark	Verdict
9	PROVISION FOR EARTHING		N
	External metal parts connected to the earth terminal:		N
	- compliance with 7.2.1 in IEC 60598-1		N
	Test with a current of 10 A between earthing terminal and each of the accessible metal parts; measured resistance (Ω): $< 0,5 \Omega$		N
	Protective earth, symbol		N
	Terminal complying with clause 8 in Part 1		N
	Locked against loosening and not possible to loosen by hand		N
	Not possible to loosen clamping means unintentionally on screwless terminals		N
	Earthing via means of fixing		N
	Earthing terminal only used for the earthing of the control gear		N
	All parts of material minimizing the danger of electrolytic corrosion		N
	Made of brass or equivalent material		N
	Contact surface bare metal		N
	Conductors by tracks on printed circuit boards:		N
	- a.c. current of 25 A for 1 min between earthing terminal and accessible metal parts		N
	- compliance with clause 7.2.1 in IEC 60598-1		N
10	PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS		N
10.1	Ballast protected against accidental contact with live parts		N
A1	Current measured according to EN 60990, figure 4 and clause 7.1: max. 0,7 mA (peak) or 2,0 mA d.c., for $f \geq 1000$ Hz max. 70 mA		N
A2	Voltage at 50 k Ω (V): max. 34 V (peak)		N
	Lacquer or enamel not considered to be adequate protection		N
	Adequate mechanical strength on parts providing protection		N
10.2	Capacitors $> 0,5 \mu\text{F}$: voltage after 1 min (V): < 50 V		N
11	MOISTURE RESISTANCE AND INSULATION		P

IEC 62031			
Clause	Requirement - Test	Result - Remark	Verdict
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (MΩ): ≥ 2 MΩ		P
	The leakage current shall not exceed the values shown in figure 2 when measured in accordance with annex I		N

12	ELECTRIC STRENGTH		P
	Immediately after clause 11 electric strength test for 1 min		P
	Working voltage ≤ 42 V, test voltage 500 V		N
	Working voltage > 42 V, test voltage (V): 2U + 1000 V	See report JIS C 8105-2-1	P
	Reinforced insulation, test voltage (V):		N
	No flashover or breakdown		P

13	Fault conditions		---
	Windings of ballasts shall have adequate thermal endurance	No such parts	N
13.1	General		N
	When operated under fault conditions the ballast: - does not emit flames or molten material	No such parts	N
	- does not produce flammable gases		N
	- protection against accidental contact not impaired		N
	Thermally protected ballasts does not exceed the marked temperature value	Not thermally protected ballasts	N
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected		N
	Short-circuit of creepage distances and clearances if less than specified in clause 18 (except between live parts and accessible metal parts)		N
	Short-circuit or interruption of semiconductor devices		N
	Short-circuit across insulation consisting of lacquer, enamel or textile		N
	Short-circuit across electrolytic capacitors		N
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite	No ignition	N
13.2	Overpower condition		P

IEC 62031			
Clause	Requirement - Test	Result - Remark	Verdict
	The test shall be started at an ambient temperature as specified in Annex A.		P
	The module shall be switched on and the power monitored (at the input side) and increased until 150 % of the rated voltage, current or power is reached. The test shall be continued until the module is thermally stabilised. A stable condition is reached, if the temperature does not change by more than 5 K in 1 h. The temperature shall be measured in the tc point. The module shall withstand the overpower condition for at least 15 min, the time period of which can lie within the stabilisation period if the temperature change is ≤ 5 K.		P
	If the module contains an automatic protective device or circuit which limits the power, it is subjected to a 15 min operation at this limit. If the device or circuit effectively limits the power over this period, the module has passed the test, provided the compliance (4.1 and last paragraph of 13.2) is fulfilled.		N
	After finalising the overpower mode, the module is operated under normal conditions until thermally being stable.	No damage	P
	A module fails safe if no fire, smoke or flammable gas is produced and if the 15 min overpower condition has been withstood. To check whether molten material might present a safety hazard, a tissue paper, as specified in 4.187 of ISO 4046-4, spread below the module shall not ignite.	No damage	P

15	Construction		P
	Wood, cotton, silk, paper and similar fibrous material shall not be used as insulation.		P

16	Creepage distances and clearances		P
	Working voltage (V)	See report JIS C 8105-2-1	P
	Voltage form	Sinusoidal [<input checked="" type="checkbox"/>] Non-sinusoidal [<input type="checkbox"/>]	N
	PTI	< 600 [<input checked="" type="checkbox"/>] > 600 [<input type="checkbox"/>]	N
	Impulse withstand category (normal category II) (category III annex U)	Normal category II	N
	Rated pulse voltage (kV)		N

IEC 62031			
Clause	Requirement - Test	Result - Remark	Verdict
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm)		N
	(2) Current-carrying parts and accessible parts: cr (mm); cl (mm)	See report JIS C 8105-2-1	P
	(3) Parts becoming live due to breakdown of basic insulation and metal parts: cr (mm); cl (mm)		N
	(4) Outer surface of cable where it is clamp and metal parts: cr (mm); cl (mm)		N
	(5)not used		N
	(6) Current-carrying parts and supporting surface: cr (mm); cl (mm)		N

17	SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS		P
	Electrical connections	See report JIS C 8105-2-1	P
	Contact pressure	No pressure transmitted to the insulating material	N
	Screws:		N
	- Self-tapping screws		N
	- thread-cutting screws		N
	Screw locking:		N
	- spring washer		N
	- rivets	No rivet provided	N
	Material of current-carrying parts	> 50% copper	N
	No contact to wood or mounting surface	No wood	N
	Electro-mechanical contact systems	No such construction	N
	Mechanical connections and glands		N
	Screw not made of soft metal		N
	Screws of insulating material		N
	Torque test: torque (Nm); part		N
	Torque test: torque (Nm); part		N
	Screw with diameter < 3 mm screw into metal		N
	Locked connections:		N
	- fixed arms; torque (Nm)		N
	- lampholder; torque (Nm)		N
	- push-button switches; torque (Nm)	No such switches	N
	Screwed glands; force (N) :		N

18	RESISTANCE TO HEAT, FIRE AND TRACKING		---
18.1	Parts of insulating material retaining live parts in position, ball-pressure test:		N
	- part; test temperature (°C)	See report JIS C 8105-2-1	N
18.2	Printed boards in accordance with IEC 60249-1, 4.3		N

IEC 62031			
Clause	Requirement - Test	Result - Remark	Verdict
18.3	External parts of insulating material preventing electric shock glow-wire test 650 °C	See report JIS C 8105-2-1	N
18.4	Parts of insulating material retaining live parts in position, needle-flame test 10 s:		N
	- flame extinguished within 30 s		N
	- no flaming drops igniting tissue paper		N
18.5	Tracking test	Ordinary	N
19	RESISTANCE TO CORROSION		---
	Rust protection:		P
	-10% solution of ammonium chloride in water		N
	- adequate varnish on the outer surface		P

Tables

Table 11(a)	Humidity test				P
Test condition:	Temperature	Relative Humidity	Duration	Breakdown (Y/N)	
	25°C	93%	48 hours	N	
Test points		Measured insulation		Limited insulation	
Between	To				
+ & -	Enclosure		100MΩ	2MΩ	

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

Table 12	Electric strength			P
Test points		Test voltage		Results
Between	To			
+ & -	Enclosure		1220Vac	No breakdown

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

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

Tables

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

<p>Attachment 2</p> <p>IEC 61347-2-13</p> <p>Lamp controlgear</p> <p>Part 2-13: Particular requirements for d.c. or a.c. supplied electronic controlgear for LED modules</p>	
Report reference No.	See report JIS C 8105-2-1
Compiled by (name + signature).....	See report JIS C 8105-2-1
Approved by (name + signature).....	See report JIS C 8105-2-1
Date of issue	See report JIS C 8105-2-1
Total number of pages.....	See report JIS C 8105-2-1
Testing laboratory	
Name	See report JIS C 8105-2-1
Address	See report JIS C 8105-2-1
Testing location	Same as above
Client	
Name	See report JIS C 8105-2-1
Address	See report JIS C 8105-2-1
Manufacturer	
Name	See report JIS C 8105-2-1
Address	See report JIS C 8105-2-1
Test specification	
Standard	IEC 61347-1: 2008+A1: 2011+A2: 2013, IEC 61347-2-13: 2006
Test procedure	Compliance with IEC 61347-1: 2008+A1: 2011+A2: 2013, IEC 61347-2-13: 2006
Non-standard test method	N/A
Test item Description	
Trademark.....	See report JIS C 8105-2-1
Model and/or type reference.....	See report JIS C 8105-2-1
Rating(s)	See report JIS C 8105-2-1

Test item particulars	
Construction	Integral controlgear
Lamp type	LED lamp
Operation model	Continuous
Maximum case temperature	--
Supply connect	--
Output voltage	--
Test case verdicts	
Test case does not apply to the test object :	N(N/A) (not applicable)
Test item does meet the requirement	P(Pass)
Test item does not meet the requirement ...:	F(Fail)
Testing	
Date of receipt of test item	See report JIS C 8105-2-1
Date(s) of performance of test	See report JIS C 8105-2-1
General remarks	
The test results presented in this report relate only to the object tested.	
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.	
Clause numbers between brackets refer to clauses in IEC 61347-1	
"(see Enclosure #)" refers to additional information appended to the report.	
"(see appended table)" refers to a table appended to the report.	
Throughout this report a comma (point) is used as the decimal separator.	
General product information	
1. All test are under the ambient of 25°C.	

IEC 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
4(4)	GENERAL REQUIREMENTS		---
	Lamp controlgear shall be so designed and constructed that in normal use		P
	Independent lamp controlgear		N
	IP classification		N
	F marking		N
	- Independent SELV controlgear comply with the requirements of Annex I		N
	- controlgear which are not of the pure voltage and current types		N
5(5)	GENERAL NOTES ON TEST		---
6 (6)	CLASSIFICATION		---
	Built-in controlgear.....: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		---
	Independent controlgear.....: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		---
	Integral controlgear: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		---
	SELV-equivalent or isolating controlgear.....: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		---
	Auto-wound controlgear.....: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		---
	Independent SELV controlgear.....: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		---
7(7)	MARKING		---
7.1 (7.1)	Mandatory markings:		P
	- mark of origin	See marking label	N
	- model number, type reference	see marking label	N
	- symbol for independent controlgear, if applicable	see marking label	N
	- correlation between interchangeable parts and controlgear marked		N
	- rated supply voltage		N
	- earthing symbol	Class II appliance	N
	- symbol of tw		N
	- max. ambient temperature of ta		N

IEC 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
	- cross –section of conductors of terminal		N
	- lamp type and rated wattage or wattage range		N
	- wiring diagram		N
	- value of tc		N
	- symbol for temperature declared, thermally protected controlgear		N
	- heat sink(s) required		N
	- limiting temperature of the winding under abnormal conditions		N
	Constant voltage types		N
	- rated output power		N
	- rated output voltage		N
	Constant current types		N
	- rated output power		N
	- rated output current		N
	Operation with LED modules only		N
7.2(--)	- mains-connected windings		N
	-SELV-equivalent controlgear		N
(7.2)	Marking durable and legible		N
	Rubbing 15 s water, 15 s petroleum; marking legible		N

8(10)	PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS		---
(10.1)	Lamp controlgear which do not rely upon the luminaire enclosure for protection against electric shock compliance Annex A		P
	Integral lamp controlgear, which relies upon the luminaire enclosure for protection		N
	Lacquer or enamel is not considered		N
	Parts providing protection against accidental contact have adequate mechanical strength		N
	- a force of 10 N test with test finger		N

IEC 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
(10.2)	Capacitors > 0,5 μ F: voltage after 1 min (V): < 50V:		N
8.1(--)	SELV-equivalent controlgear, double or reinforced insulation between the accessible parts and live parts		P
8.2(--)	Exposed SELV terminals		N
	- the load output voltage under load does not exceed 25 V r.m.s.		N
	- the no-load output voltage does not exceed 33 V r.m.s. and the peak does not exceed $33 \sqrt{2}$ V		N
	Connected between SELV or SELV equivalent output and primary circuits, one capacitor Y1 or two capacitors Y2 in series.	Y1	P

9(8)	TERMINAL, CABLES AND CORDS		---
	Screw terminals shall comply with section 5 of EN 60598-1	See Annex 3 of below table	N
	Screwless terminals shall comply with section 5 of EN 60598-1		N
	Cables and cords shall comply with section 5 of EN 60598-1		N

IEC 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
10(9)	Provisions for protective earthing		---
(9.1)	Provisions for protective earthing		N
	Earthing terminals compliance with clause 8 of IEC 61347-1		N
	Contact on-rusting or bare metal		N
	Protective earth, symbol		N
	Provisions for functional earthing		N
	Earthing of lamp controlgear (other than independent lamp controlgear)		N
	Corrosion resistance of earthing terminal		N
	Earthing screw		N
	a.c. current of 25 A for 1 min between the earthing terminal or earthing contact and each of the accessible metal parts, measured resistance (Ω): < 0,5 Ω		N
11 (11)	MOISTURE RESISTANCE AND INSULATION		---
	After storage 48 h at 91-95% relative humidity and 20-30°C measuring of insulation resistance with d.c. 500 V (M Ω):		P
	Between live part and different polarity.....:	>100 M Ω	P
	Between live part and external parts.....:	>100 M Ω	P
	Between live part and control terminal.....:		P
	For SELV-equivalent controlgear, the insulation between input and output terminals.....:	>100 M Ω	P
12(12)	ELECTRIC STRENGTH		---
	Immediately after clause 11 electric strength test for 1 min		P
	Up to and including 50 V (test voltage: 500V)		N
	Above 50V up to and including 1 000 V (test voltage: 2U+1000V)	1220Vac, no breakdown	P
	Insulation conditions of windings of separating transformers in SELV-equivalent control gear	3000Vac, no breakdown	P
	No flashover or breakdown after electric strength test		P

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

13 (13)	THERMAL ENDURANCE TEST FOR WINDINGS OF BALLAST		---
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14 (14)	FAULT CONDITIONS		---
	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 below.	P
14.1(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)	Refer to table 14	P
	Distances on printed boards provided with coating according to IEC 60664-3		P
14.2(14.2)	Short-circuit or interruption of semiconductor devices	Refer to table 14	P
14.3(14.3)	Short-circuit across insulation consisting of lacquer, enamel or textile	Refer to table 14	P
14.4(14.4)	Short-circuit across electrolytic capacitors	Refer to table 14	P
	After the tests the insulation resistance with d.c. 500 V ($M\Omega$) are $\geq 1 M\Omega$		P
	After the tests the accessible parts has not become live		P
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
	Accessible parts compliance with Annex A		P

15(--)	TRANSFORMER HEATING		---
15.1	SELV-equivalent controlgear, windings of separating transformers, compliance with Clauses 7.1 and 11.2 of IEC 60065	See report JIS C 8105-2-1	P

IEC 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
15.2	Normal operation		P
	Test voltage at rated supply voltage		P
15.3	Abnormal operation		P
	Test voltage between 90 % and 110 % of the rated supply voltage		P
16 (--)	ABNORMAL CONDITIONS		N
	Safety not impaired when the controlgear is operated at any voltage between 90% and 110% of rated voltage		N
16.1	Control gear which are of the constant voltage output type:		--
	a) No LED module inserted		N
	b) Double LED modules or equivalent load connected to the output terminals		N
	c) Output terminal short-circuited (20 cm and 200 cm or declared length)		N
	During and at the end of the tests no defect impairing safety, nor any smoke or flammable gases produced		N
16.2	Control gear which are of the constant current output type:		--
	a) No LED module connected		P
	b) Double the LED modules or equivalent load connected in series to the output terminals		P
	c) Output terminal short-circuited (20 cm and 200 cm or declared length)		P
	Maximum output voltage not exceeded		P
	During and at the end of the tests no defect impairing safety, nor any smoke or flammable gases produced		P
17(15)	CONSTRUCTION		---
17.1(15.1)	Wood, cotton, silk, paper and similar fibrous Material not used as insulation		P
17.2(15.2)	Printed boards used as internal connections complies with clause 14 of IEC 61347-1		P

IEC 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
(15)	Plugs and socket-outlets used in SELV or ELV circuits		N
18(16)	CREEPAGE DISTANCES AND CLEARANCES		---
	Creepage distances and clearances according to Table 3 and 4, as appropriate		P
	Printed boards see clause 14 of IEC 61347-1	L/N: Cr: 3.2mm, Cl: 3.2mm Primary and secondary circuit: Cr: 6.3mm, Cl: 6.3mm	P
19(17)	SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS		---
	Screws, current-carrying parts and connections in compliance with EN 60598-1		N
20(18)	RESISTANCE TO HEAT, FIRE AND TRACKING		---
20.1(18.1)	Parts of insulating Material retaining live parts in position, ball-pressure test:		P
	- part; test temperature (°C)	PCB: 125°C, 0.6mm Bobbin of transformer: 125°C, 0.8mm	P
20.2(18.2)	Resistance to flame and ignition		P
20.2.1 (18.2.1)	Insulating Material retaining live parts in position, glow-wire test with 650 °C	PCB: 650°C, no burning Bobbin of transformer: 650°C, no burning	P
20.2.2 (18.2.2)	Parts of insulating material providing protection against electric shock or retaining of SELV live parts, glow-wire test with 650°C		N
20.2.3 (18.2.3)	Needle-flame test	PCB, Bobbin of transformer	P
20.3(18.3)	Resistant to tracking.		N
21(19)	RESISTANCE TO CORROSION		---
	Rust protection:		N
	- test according 4.18.1 of EN 60598-1		N
	- adequate varnish on the outer surface		N

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

Annex A	TEST TO ESTABLISH WHETHER A CONDUCTIVE PART IS A LIVE PART WHICH MAY CAUSE AN ELECTRIC SHOCK		---
A.1	According to Clause A.2 and A.3		N
A.2	The voltage not exceed 35Va.c. peak or 60Vripple free d.c.		N
A.3	Where the voltage exceeds 35Va.c. peak or 60Vripple free d.c. or a protective impedance device is used the touch-current shall not exceed:		N
	- for a.c.:0,7 mA (peak);		N
	- for d.c.: 2,0 mA		N

Annex B	PARTICULAR REQUIREMENTS FOR THERMALLY PROTECTED LAMP CONTROLGEAR		---
B.7	Marking		N
	- the symbol for "class P" thermally protected lamp controlgear		N
	- the symbol for temperature declared thermally protected lamp controlgear		N
B.8	Thermal endurance of windings		N
B.9	Lamp controlgear heating		N
B.9.1	Preselection test		N
B.9.2	"Class P" thermally protected lamp controlgear		N
B.9.3	Temperature declared thermally protected lamp controlgear as specified in IEC61347-2-8, with a rated maximum case temperature of 130°C or lower		N
B.9.4	Temperature declared thermally protected lamp controlgear as specified in IEC61347-2-8 with a rated maximum case temperature exceeding 130°C		N
B.9.5	Temperature declared thermally protected lamp controlgear as specified in IEC61347-2-9		N

Annex C	PARTICULAR REQUIREMENTS FOR ELECTRONIC BALLASTS WITH MEANS OF PROTECTION AGAINST OVERHEATING		---
C3	GENERAL REQUIREMENTS		N

IEC 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
C3.1	Thermal protection means integral with the controlgear, 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
C.4	General notes on tests		N
C.5	Classification		N
	a) automatic resetting type		N
	b) manual resetting type		N
	c) non-renewable, non-resetting type		N
	d) renewable, non-resetting type		N
	e) other type of thermal protection; description		N
C.6	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
	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		N

IEC 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
	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
	Controlgear according to C5 a) or C5 e) operated until stable conditions are achieved		N
	Automatic-resetting thermal protectors working 3 times		N
	Controlgear according to C5 b) working 6 times		N
	Controlgear 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

Annex D	REQUIREMENTS FOR CARRY OUT THE HEATING TESTS OF THERMALLY PROTECTED LAMP CONTROLGEAR	---
D.1	Test enclosure	N
D.2	Heating of enclosure	N
D.3	Lamp controlgear operating conditions	N
D.4	Lamp controlgear position in the enclosure	N
D.5	Temperature measurements	N

Annex E	ANNEX E – USE OF CONSTANT S OTHER THAN 4500 IN t_w TESTS	---
E1	Constant S claimed	N
	Claimed test method	N
E2	Procedure A	N
	Adequate data provided by the manufacturer	N
	The inverse of the slope is greater than or equal to the claimed value of S	N

IEC 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
	Compliance with the failure criteria for procedure B		N
E3	Procedure B		N
	Claimed value of T1		N
	Claimed value of T2		N
	Endurance test carried out at:		N
	T1 (7 samples)		N
	T2 (7 samples)		N
	Duration of test calculated from equation (2)		N
	T1		N
	T2		N
	During the test: - No open circuit - No breakdown insulation		N
	The claimed constant S is deemed to be verified		N

Annex F	ANNEX F - DRAUGHT-PROOF ENCLOSURE	---
	Draught-proof enclosure in accordance with the description	N
	Dimensions of the enclosure	N
	Other design; description	N

Annex G	EXPLANATION OF THE DERIVATION OF THE VALUES OF PULSE VOLTAGES	---
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Annex H	TEST	---
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I(--)	ANNEX I - PARTICULAR ADDITIONAL REQUIREMENTS FOR INDEPENDENT SELV D.C. OR A.C. SUPPLIED ELECTRONIC CONTROLGEAR FOR LED MODULES	N
I.3	Classification	---
I.3.1	Class I	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
	Class II	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
I.3.2	a) non-inherently short circuit proof controlgear	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>

IEC 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
	b) non-inherently open circuit proof controlgear	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	---
	c) inherently short circuit proof controlgear	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	---
	d) inherently open circuit proof controlgear	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	---
	e) fail safe controlgear	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	---
	f) non-short-circuit proof controlgear	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	---
	g) non-open-circuit proof controlgear	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	---
I.4	Marking		N
	Adequate symbols are used	See rating label.	N
I.5	Protection against electric shock		N
I.5.1	No connection between output winding and body		N
	No connection between output winding and protective earthing circuit	Class II equipment.	N
I.5.2	Input and output circuits electrically separated from each other		N
I.5.2.1	Insulation between input and output winding of the HF-transformer consists of double or reinforced insulation		N
	Class II: insulation between input/output and body consists of double or reinforced insulation		N
	Class I: insulation between input and body consists of basic and between output and body supplementary insulation		N
I.5.2.2	Insulation between input and output winding via the core consists of double or reinforced insulation		N
	Insulation between cord and windings of the HF - transformer consists of basic insulation		N
I.5.2.3	Serrated tape, additional layer		N
I.5.2.4	Class I controlgear for fixed connection provided with basic insulation plus protective screening comply with the following conditions:		N
	a) Insulation between the input winding and the protective screen complies with the requirements for basic insulation		N

IEC 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
	b) Insulation between the protective screen and the output winding complies with the requirements for basic insulation		N
	c) Metal screen consists of a metal foil or of a wire wound screen		N
	d) Metal screen so arranged that both edges cannot simultaneously touch a magnetic core		N
	e) Metal screen and its lead-out wire have a crosssection sufficient to ensure that an overload device will open the circuit before the screen is destroyed		N
	f) Lead-out wire sufficiently fixed to the metal screen		N
I.5.2.5	Last turn of each winding of the transformer retained by positive means		N
	Impregnated winding		N
	Winding held together by means of insulating Material		N
I.5.3	Components bridging between input and output circuit		N
I.5.3.1	Used capacitors and resistors comply with 8.2		N
I.5.3.2	Used opto-couplers		N
I.6	Heating		---
I.6.1	No excessive temperatures in normal use		P
	Used Material classified as Class _____		---
	Stated value of t_a _____		---
I.6.2	Upri: 1.06 time supply rated voltage		---
	Determined temperature rises in windings: - Primary: _____ K - Limit Max: _____ K - Core: _____ K - Limit Max: _____ K	See Annex 2 for below tables	N
	After the test:		N
	- no connections have worked loose		N

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Clause	Requirement – Test	Result - Remark	Verdict
	- no reduction of creepage distances and clearances		N
	- no flow of sealing compound		N
	- no operation of protecting devices		N
	- electric strength test between input and output windings		N
I.6.3	Cycling test (10 cycles):		N
I.6.3.1	- heat run at _____ K		N
I.6.3.2	- moisture treatment 48 h		N
I.6.3.3	- vibration test 1 h; 1,5 g		N
I.6.3.4	After the tests:		N
	- insulation resistance		N
	- dielectric strength test at 35 % of specified value; test voltage _____ V		N
	- Current or the ohmic component does not deviates by more than 30 %		N
I.7	Short-circuit and overload protection		N
I.7.1	U _{pri} : 1.06 times rated voltage or 0.94 and 1.06 times rated supply voltage - used voltage _____ V		N
I.7.2 I.7.3 I.7.4	Determined temperature rise in windings and on other parts:		N
	- test according to Clause _____		N
	- Primary winding _____ K		N
	- Limit Max _____ K		N
	- Core _____ K		N
	- Limit Max _____ K		N
	- External enclosure _____ K		N
	- Limit Max _____ K		N
	- Rubber insulation of wiring _____ K		N
	- Limit Max _____ K		N

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Clause	Requirement – Test	Result - Remark	Verdict
	- PVC insulation of wiring _____ K		N
	- Limit Max _____ K		N
	- Supports _____ K		N
	- Limit Max _____ K		N
I.7.5	Fail-safe convertors		N
I.7.5.1	- U _{pri} : 1.06 times rated supply voltage V:		---
	- I _{sec} : 1.5 times rated output current A:		---
	- time until steady-state conditions t ₁ (h) :		---
	- time until failure t ₂ (h): < t ₁ ; < 5 h		N
I.7.5.2	During the test:		N
	- no flames, molten Material, etc.		N
	- temperature rise of enclosure < 150 K		N
	- temperature rise of plywood support < 100 K		N
	After the test:		N
	- electric strength (test voltage; 35 % of specified value); no flashover or breakdown for primary-to-secondary and for primary-to-body		N
	- live parts not accessible by test finger through holes of enclosure		N
I.8	Insulation resistance and electric strength		N
I.8.1	Conditioned 48 h between 91 % and 95 %		N
I.8.2	Adequate insulation (500 V d.c. for 1 min) between:		N
	Live parts and the body -for basic insulation not less than 2 M Ω		N
	Live parts and the body -for reinforced insulation not less than 4 M Ω		N
	Input- and output circuits not less than 5 M Ω		N
	For transformer: primary pin or core to secondary pin		N
	Metal parts of class II controlgear which are separated from live parts by basic insulation only and the body not less than 5 M Ω		N

IEC 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
	Metal foil in contact with the inner and outer surfaces of enclosures of insulating Material not less than $2 M \Omega$		N
I.8.3	Electric strength test:		N
	1) Between live parts of input circuits and live parts of output circuits.....:		N
	2) Over basic or supplementary insulation between:		N
	a) live parts which are or may become of different polarity		N
	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
	3) Over reinforced insulation between the body and live parts		N
	4) For transformer: primary pin or core to secondary pin		N
	No flashover or breakdown occurred		N
I.9	Construction		N
I.9.1	Comply with all requirements		N
I.9.2	The distance between input and output terminals shall not be less than 25 mm		N
I.10	Components		N
I.10.1	Socket-outlets in the output circuit does not accept plugs complying with IEC 60083 and IEC 60906-1		N
I.10.2	Self-resetting protective devices shall not be used unless it is certain that there will be no hazards		N
	Compliance is checked by connecting the controlgear for 48 h at 1.06 times the rated voltage with the output short-circuited		N
I.11	Creepage distances and clearances		N
	1. Insulation between input and output circuits:		N

IEC 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
	a) measured values > specified values (mm) :		N
	2. Insulation between terminals for external connection:		N
	a) measured values > specified values (mm) :		N
	4. Basic or supplementary insulation:		N
	a) measured values > specified values (mm) :		N
	5. Reinforced insulation:		N
	a) measured values > specified values (mm) :		N
	6. Distance through insulation:		N
	a) measured values > specified values (mm) :		N

(Annex I)	ADDITIONAL REQUIREMENTS FOR BUILT-IN MAGNATIC BALLASTS WITH DOUBLE OR REINFORCED INSULATION	---
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(Annex J)	SCHEDULE OF MORE ONEROUS REQUIREMENTS	---
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(Annex K)	CONFORMITY TESTING DURING MANUFACTURE	---
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(Annex L)	PARTICULAR ADDITIONAL REQUIREMENTS FOR CONTROLGEARS PROVIDING SELV		---
(L.3)	Classification		P
	-Class I	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	---
	-Class II	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	---
	-Class III	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	--
	- non-inherently short circuit proof controlgear	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	--
	- inherently short-circuit proof controlgear;	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	--
	- fail-safe controlgear;	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	--
	- non-short-circuit proof controlgear.	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	--
(L.4)	Marking		P
	Adequate symbols are used		P
(L.5)	Protection against electric shock		P
	Controlgears providing SELV shall, in addition to the requirements given in 10.3 and 10.4, comply with relevant requirements specified in 9.2 of IEC 61558-1:2005		P

IEC 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
(L.6)	Heating		P
	Compliance is checked by the relevant tests of Clause 14 of IEC 61558-1:2005, but with the following adjustments:		P
	– Subclause 14.1, 10th paragraph: Replace 10 % by 6 %;		P
	– Replace Table 1 by the following Table L.2:		P
(L.7)	Short-circuit and overload protection		P
	Compliance is checked by the relevant tests of Clause 15 of IEC 61558-1:2005, but with the following adjustments:		P
	– Subclause 15.1, second paragraph: Replace the reference to "14.1" by "L.6" of this annex		P
	– Subclause 15.1, third paragraph after Table 3: Replace the reference to "18.3" by "L.8.3" of this annex		P
	– Subclause 15.3.4: This subclause is not applicable.		N
	– Subclause 15.5.1, third paragraph: Replace the reference to "14.2" by "L.6" of this annex.		P
(L.8)	Insulation resistance and electric strength		P
(L.8.2)	Insulation resistance is measured with a d.c. voltage of approximately 500 V applied, the measurement being made 1 min after application of the voltage		P
	- Between input circuits and output circuits $\geq 5M\Omega$	$>100 M\Omega$	P
	Between metal part of class II convertors which are separated from live parts by basic insulation only and the body $\geq 5M\Omega$		N
	Between metal foil in contact with the inner and outer surfaces of enclosures of insulating material $\geq 2M\Omega$		N
(L.8.3)	value of the test voltage and the points of application are given in Table L.4.	Primary circuit and secondary circuit: 3000Vac, no breakdown	P
(L.9)	Construction		P
(L.9.1)	The construction of transformers used in controlgears providing SELV shall be comply with all relevant parts specified in 19.12 of IEC 61558-1:2005		P
(L.10)	Components		P
	Components used as protective devices in controlgears providing SELV shall comply with relevant requirements given in 20.6, 20.7, 20.8, 20.9, 20.10 and 20.11 of IEC 61558-1:2005.		P

IEC 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
(L.11)	Creepage distances, clearances and distances through insulation		P
	Creepage distances, clearances and distances through insulation shall be not less than the values shown in Table 3 and Table L.5.	Primary circuit and secondary circuit: Cr: 6.3mm, Cl: 6.3mm	P
	In addition transformers which form an integral part of a controlgear providing SELV shall comply with relevant requirements and tests given in Clause 26 of IEC 61558-1:2005		P

(Annex M)	DIELECTRIC STRENGTH TEST VOLTAGES FOR CONTROLGEAR INTENDED FOR THE USE IN IMPULSE WITHSTAND CATEGORY III		--
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(Annex N)	REQUIREMENTS FOR INSULATION MATERIALS USED FOR DOUBLE OR REINFORCED INSULATION		--
(N.4)	Material requirements		N
(N.4.1)	The insulation material shall comply with IEC 60085 and the IEC 60216 series.		N
(N.4.2)	The adequacy of solid insulation is verified by the electric strength test (Clause 12) of at least 5 kV or the applicable test voltage specified in Table N.1 multiplied by 1,35, whichever is the greater		N
(N.4.3)	Thin sheet insulation		N
(N.4.3.1)	Thickness and composition of thin sheet insulation		N
(N.4.3.2)	Mandrel test (electric strength test during mechanical stress)		N

(Annex O)	ADDITIONAL REQUIREMENTS FOR BUILT-IN ELECTRONIC CONTROLGEAR WITH DOUBLE OR REINFORCED INSULATION		--
(O.6)	Marking		N
	Built-in Electronic controlgear with double or reinforced insulation marking		N
(O.7)	Protection against accidental contact with live parts		N
	it shall not be possible for the test finger to make contact with metal parts protected by basic insulation only.		N
(O.8)	Terminals		N
	Clause 8 of this standard applies.		N
(O.9)	Provision for earthing		N

IEC 61347-2-13			
Clause	Requirement – Test	Result - Remark	Verdict
	For doubled or reinforced built-in electronic controlgear only functional earthing terminals are permitted. The requirements of Clause 9 of this standard apply to the functional earthing terminals.		N
(O.10)	Moisture resistance and insulation		N
	Clause 11 of this standard applies.		N
(O.11)	Electric strength		N
	Clause 12 of this standard applies.		N
(O.13)	Fault conditions		N
	At the end of the tests, when the controlgear has returned to the ambient temperature, shall comply in addition to Clause O.12 between live part and accessible metal parts or external parts of insulating material in contact with the supporting surface, but with the values of the dielectric strength test reduced to 35 % of the value requested in Table 1.		N
	Furthermore, the insulation resistance according to Clause O.10 between live part and accessible metal parts or external parts of insulating material in contact with the supporting surface shall not be less than 4 M .		N
(O.14)	Construction		N
	All accessible metal parts of the electronic built-in electronic controlgear shall be insulated from live parts by double or reinforced insulation.		N
(O.15)	Creepage distances and clearances		N
	For built-in electronic controlgear, provided with double or reinforced insulation, the corresponding values given for luminaires in EN 60598-1 apply.		N
(O.16)	Screws, current-carrying parts and connections		N
	Clause 17 of this standard applies.		N
(O.17)	Resistance to heat and fire		N
	Clause 18 of this standard applies.		N
(O.18)	Resistance to corrosion		N
	Clause 19 of this standard applies.		N

Tables

14			TABLE: tests of fault conditions	P
Part	Simulated fault	Test result		Hazard
BD1(1-4)	s-c	Fuse open, no flame, no flammable gas, no molten parts, no hazard.		YES /NO
C2	s-c	Fuse open, no flame, no flammable gas, no molten parts, no hazard.		YES /NO
C3	s-c	Fuse open, no flame, no flammable gas, no molten parts, no hazard.		YES /NO
Q1(G-S)	s-c	Shut down, recoverable, no flame, no flammable gas, no molten parts, recoverable, no hazard.		YES /NO
Q1 (S-E)	s-c	Fuse open, no flame, no flammable gas, no molten parts, no hazard.		YES /NO
U1(1-8)	s-c	Fuse open, no flame, no flammable gas, no molten parts, no hazard.		YES /NO
D1	s-c	Shut down, recoverable, no flame, no flammable gas, no molten parts, recoverable, no hazard.		YES /NO
D8	s-c	Shut down, unrecoverable, no flame, no flammable gas, no molten parts, recoverable, no hazard.		YES /NO
C16	s-c	Shut down, recoverable, no flame, no flammable gas, no molten parts, recoverable, no hazard.		YES /NO
Output (+&-)	s-c	Shut down, recoverable, no flame, no flammable gas, no molten parts, recoverable, no hazard.		YES /NO

16		TABLE: creepage distances and clearances					N	
		Minimum distances for a.c. (50/60 Hz) sinusoidal voltages						
RMS working voltage (V) not exceeding		50	150	250	500	750	1000	
Creepage distance	- Basic insulation	PTI ≥600	0.6	0.8	1.5	3	4	5.5
		PTI <600	1.2	1.6	2.5	5	8	10
- Supplementary insulation		PTI ≥600	--	0.8	1.5	3	4	5.5
		PTI <600	--	1.6	2.5	5	8	10
- Reinforced insulation			--	3.2	5	6	8	11
Clearance								
- Basic insulation PTI			0.2	0.8	1.5	3	4	5.5
- Supplementary insulation PTI			--	0.8	1.5	3	4	5.5
- Reinforced insulation			--	1.6	3	6	8	11

Annex 2: Normal temperature test			P
Type reference	See report JIS C 8105-2-1		P
Lamp used	LED		P
Lamp control gear used.....			P
Mounting position of luminaire.....			P
Supply wattage (W)			P

Tables

	Supply current (A)		P
	Calculated power factor.....		P
	Table: Test is be made under tc:		P
	Normal operating mode.....		P
	- test 1: rated voltage.....		N
	- test 2: 1.06 times rated voltage.....		P
Temperature(°C) of part	normal temperature test		
	Test 1 (Max. °C/K)	Test 2 (Max. °C/K)	Limits (°C/K)
--	--	--	--

	Annex 3: Abnormal conditions test		P		
	Type reference	See report JIS C 8105-2-1	P		
	Lamp used	LED lamp	P		
	Lamp control gear used.....		P		
	Mounting position of luminaire.....		P		
	Supply wattage (W)		P		
	Supply current (A)		P		
	Calculated power factor.....		P		
	Table: Test is be made under ta: 25°C		P		
	- test Voltage:1.1 times rated voltage	1.1x110V	P		
	Abnormal operating mode.....		P		
	- test 1: No LED module connected.....	Protection	P		
	- test 2: Double the LED modules or equivalent load connected....	Protection	P		
	- test 3: Output terminal short-circuited.....	Protection	P		
	- test 4: Transformer overload.....		P		
Temperature(°C) of part	Abnormal temperature test (Test under the severe)				
	Test 1 (°C)	Test 2 (°C)	Test 3 (°C)	Test 4 (°C)	Limits (°C)
Winding of transformer T1	--	--	--	116.6	175
Ambient	--	--	--	25.0	--

Tables

ANNEX 4: Screw terminals (part of the luminaire)		--
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 (mm ²)..... :	N
14.3.3	Conductor space (mm)..... :	N
14.4	Mechanical tests	N
14.4.1	Minimum distance	N
14.4.2	Cannot slip out	N
14.4.3	Special preparation	N
14.4.4	Nominal diameter of thread (metric ISO thread)..... :	N
	External wiring	N
	No soft metal	N
14.4.5	Corrosion	N
14.4.6	Nominal diameter of thread (mm)..... :	N
	Torque (Nm)..... :	N
14.4.7	Between metal surfaces	N
	Lug terminal	N
	MAntle terminal	N
	Pull test; pull (N)..... :	N
14.4.8	Without undue damage	N

ANNEX 5: Screwless terminals (part of the luminaire)		--
15	SCREWLESS TERMINALS	--
15.2	Type of terminal..... :	---
	Rated current (A)..... :	---
15.3.1	Material	N
15.3.2	Clamping	N

Tables

15.3.3	Stop		N
15.3.4	Unprepared conductors		N
15.3.5	Pressure on insulating Material		N
15.3.6	Clear connection method		N
15.3.7	Clamping independently		N
15.3.8	Fixed in position	Fixed on PCB	N
15.3.10	Conductor size		N
	Type of conductor		N
15.5.1	Terminals internal wiring		N
15.5.1.1	Pull test spring-type terminals (4 N, 4 samples)		N
15.5.1.2	Pull test pin or tab terminals (4 N, 4 samples)		N
	Insertion force not exceeding 50 N		N
15.5.2	Permanent connections: pull-off test (20 N)		N
15.6	Electrical tests		--
	Voltage drop (mV) after 1 h (4 samples).... :		N
	Voltage drop of two inseparable joints		N
	Number of cycles		N
	Voltage drop (mV) after 10th alt. 25th cycle (4 samples)		N
	Voltage drop (mV) after 50th alt. 100th cycle (4 samples)		N
	After ageing, voltage drop (mV) after 10th alt. 25 th cycle (4 samples)		N
	After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples)		N
15.7	Terminals external wiring		N
	Terminal size and rating		N
15.8.1	Pull test spring-type terminals (4 samples); pull (N)		N
	Pull test pin or tab terminals (4 samples); pull (N)		N
15.9	Contact resistance test		N
	Voltage drop (mV) after 1 h		N

Tables

terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Voltage drop of two inseparable joints									
	Voltage drop after 10th alt. 25th cycle									
	Max. allowed voltage drop (mV) :									
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Voltage drop after 50th alt. 100 th cycle									
	Max. allowed voltage drop (mV) :									
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Continued ageing: voltage drop after 10th alt. 25th cycle									
	Max. allowed voltage drop (mV) :									
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Continued ageing: voltage drop after 50th alt. 100th cycle									
	Max. allowed voltage drop (mV) :									
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										

ATTACHMENT 3 Photo Documentation

View:

- General
- Front
- Rear
- Internal
- Top
- Bottom
- PWB



Figure 1

View:

- General
- Front
- Rear
- Internal
- Top
- Bottom
- PWB

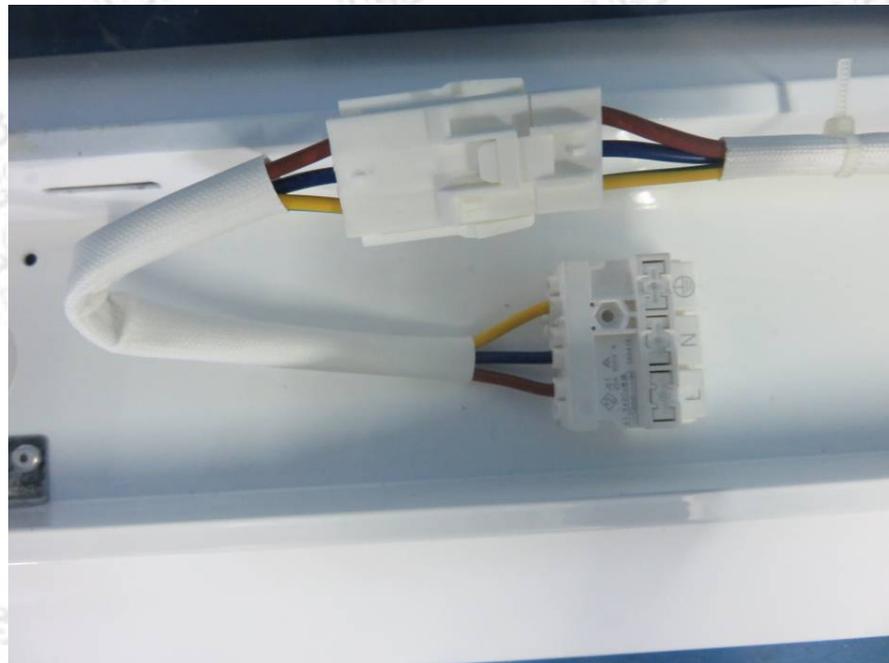


Figure 2

ATTACHMENT 3 Photo Documentation

View:

- General
- Front
- Rear
- Internal
- Top
- Bottom
- PWB



Figure 3

View:

- General
- Front
- Rear
- Internal
- Top
- Bottom
- PWB



Figure 4

ATTACHMENT 3

Photo Documentation

View:

-]General
-]Front
-]Rear
-]Internal
-]Top
-]Bottom
-]PWB



Figure 5

View:

-]General
-]Front
-]Rear
-]Internal
-]Top
-]Bottom
-]PWB

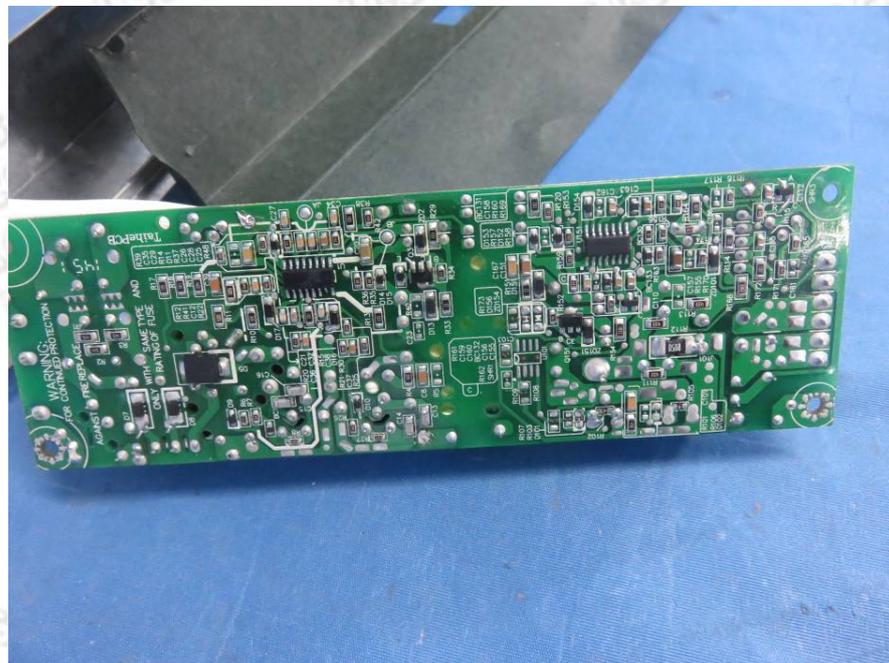


Figure 6