

**TEST REPORT  
EN 60598-2-1  
Luminaires  
Part 2: Particular requirements:  
Section One – Fixed general purpose luminaires**

**Report Reference No.**.....: 3007562.50-QUA/LI  
**Date of issue**.....: 2011-03-28  
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**CB Testing Laboratory**.....: DEKRA Certification Hong Kong Limited  
**Address** .....: Unit 1-14, 6/F., Fuk Shing Commercial Building, 28 On Lok Mun Street, On Lok Tsuen, Fanling, N.T., Hong Kong

**Applicant's name**.....: Matrix Lighting Limited  
**Address** .....: Room 223-231, 2/F., East Wing, Tsim Sha Tsui Centre, 66 Mody Road, Tsim Sha Tsui East, Kowloon, Hong Kong.

**Test specification:**

**Standard** .....: EN 60598-2-1:1989 used in conjunction with  
EN 60598-1:2008 + A11:2009;  
AS/NZS 60598-2-1:1998 used in conjunction with  
AS/NZS 60598-1:2003  
**Test procedure** .....: LVD  
**Non-standard test method**.....: N/A

**Test Report Form No.**.....: IEC60598\_2\_1B  
**Test Report Form(s) Originator** .....: Intertek Semko AB  
**Master TRF**.....: 2009-03

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<b>Test item description</b> .....	5 Feet LED tube
Trade Mark .....	VIRIBRIGHT
Manufacturer .....	Matrix Lighting Limited
Factory.....	1) Zhong Shan Ban Fu Micami Toys Factory Sha Guo Industrial Zone, Ban Fu Country, ZhongShan City, Guangdong Province, China 2) ZhongShan Wei Heng Plastic Industry Co.,Ltd. 172 North Banfu Road, Banfu town, Zhongshan, Guangdong, China
Model/Type reference .....	T8-150EU
Ratings .....	220-240 Vac; 50 / 60 Hz; 150 mA; 25 W; G13

<b>Testing procedure and testing location:</b>	
<input checked="" type="checkbox"/> <b>Testing Laboratory:</b>	DEKRA Certification Hong Kong Limited
Testing location/ address .....	Unit 1-14, 6/F., Fuk Shing Commercial Building, 28 On Lok Mun Street, On Lok Tsuen, Fanling, N.T., Hong Kong
<input type="checkbox"/> <b>Associated CB Laboratory:</b>	
Testing location/ address .....	
Tested by (name + signature) .....	Roy Yip 
Approved by (+ signature).....	Jimmy Chu 
<input type="checkbox"/> <del>Testing procedure: TMP</del>	
<del>Tested by (name + signature) .....</del>	
<del>Approved by (+ signature).....</del>	
<del>Testing location/ address .....</del>	
<input type="checkbox"/> <del>Testing procedure: WMT</del>	
<del>Tested by (name + signature) .....</del>	
<del>Witnessed by (+ signature) .....</del>	
<del>Approved by (+ signature).....</del>	
<del>Testing location/ address .....</del>	
<input type="checkbox"/> <del>Testing procedure: SMT</del>	
<del>Tested by (name + signature) .....</del>	
<del>Approved by (+ signature).....</del>	
<del>Supervised by (+ signature).....</del>	
<del>Testing location/ address .....</del>	
<input type="checkbox"/> <del>Testing procedure: RMT</del>	
<del>Tested by (name + signature) .....</del>	
<del>Approved by (+ signature).....</del>	
<del>Supervised by (+ signature).....</del>	
<del>Testing location/ address .....</del>	

**Summary of testing:**

**Tests performed (name of test and test clause):**

EN 60598-2-1:1989 used in conjunction with EN 60598-1:2008 + A11:2009

AS/NZS 60598-2-1:1998 used in conjunction with AS/NZS 60598-1:2003

LED driver inside the tubes was additionally tested according with EN 61347-2-13:2006 used in conjunction with EN 61347-1:2008

The 5 Feet LED tube was tested according EN 62471. The model: T8-150EU (3000 K) and T8-150EU (5600 K) are selected for the test, which can represent all models. Model: T8-150EU (3000 K) and T8-150EU (5600 K) have been tested and classified as Exempt Group.

**Testing location:**

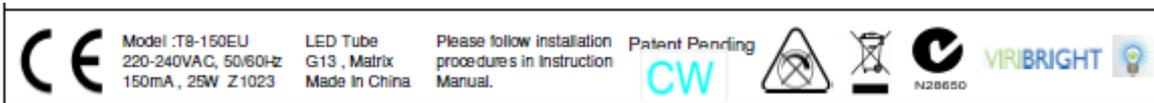
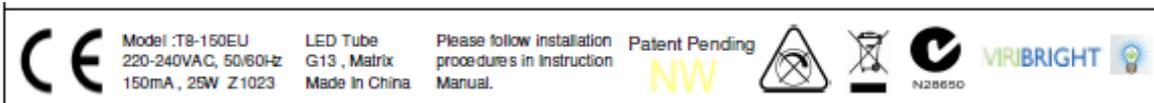
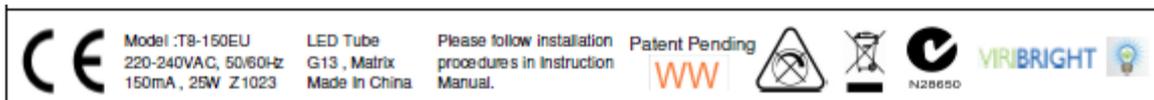
DEKRA Certification Hong Kong Limited  
Unit 1-14, 6/F., Fuk Shing Commercial Building, 28 on Lok Mun Street, On Lok Tsuen, Fanling, N.T. Hong Kong

**Summary of compliance with National Differences:**

The samples tested comply with the requirements of EN standard.

Australia national deviation of AS/NZS 60598-1 was applied. See details in page 27-28.

**Copy of marking plate**



<b>Test item particulars</b> .....	: 5 Feet LED tube
Classification of installation and use .....	: Class II – semi-luminaire
Supply Connection .....	: G13 lampholder
.....	:
.....	:
<b>Possible test case verdicts:</b>	
- test case does not apply to the test object.....	: N/A (Not applicable)
- test object does meet the requirement.....	: P (Pass)
- test object does not meet the requirement.....	: F (Fail)
<b>Testing</b> .....	
Date of receipt of test item .....	: 2011-02-25
Date (s) of performance of tests.....	: 2011-02-25 to 2011-03-25

<b>General remarks:</b>			
<p>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.          "(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.          Clause numbers between brackets refer to clauses in EN 60598-1</p>			
<b>General product information:</b>			
5 Feet LED tube with integral LED driver.			
Models	Rating	Total length	Color of LED
T8-150EU	220-240 V; 50 / 60 Hz; 150 mA; 25 W; G13	1,5 m	3000 K; 4000 K; 5600 K
NOTE: Clear installation instruction and warnings are provided with the products.			

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

<b>1.2 (0)</b>	<b>GENERAL TEST REQUIREMENTS</b>		—
1.2 (0.1)	Information for luminaire design considered	Standard 60598-1 Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
1.2 (0.3)	More sections applicable .....	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—

<b>1.4 (2)</b>	<b>CLASSIFICATION</b>		—
1.4 (2.2)	Type of protection (Class 0 excluded)..... :	Class II	—
1.4 (2.3)	Degree of protection (Requirement: Ordinary) .....	IP20	—
1.4 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces .....	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	Luminaire not suitable for direct mounting on normally flammable surfaces..... :	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
1.4 (2.5)	Luminaire for normal use .....	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	Luminaire for rough service .....	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—

<b>1.5 (3)</b>	<b>MARKING</b>		—
1.5 (3.2)	Mandatory markings		P
	Position of the marking		P
	Format of symbols/text		P
1.5 (3.3)	Additional information		P
	Language of instructions		P
1.5 (3.3.1)	Combination luminaires		P
1.5 (3.3.2)	Nominal frequency in Hz	50/60 Hz	P
1.5 (3.3.3)	Operating temperature		N/A
1.5 (3.3.4)	Symbol or warning notice		N/A
1.5 (3.3.5)	Wiring diagram		N/A
1.5 (3.3.6)	Special conditions		N/A
1.5 (3.3.7)	Metal halide lamp luminaire – warning		N/A
1.5 (3.3.8)	Limitation for semi-luminaires		N/A
1.5 (3.3.9)	Power factor and supply current		N/A
1.5 (3.3.10)	Suitability for use indoors		P
1.5 (3.3.11)	Luminaires with remote control		N/A
1.5 (3.3.12)	Clip-mounted luminaire – warning		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
1.5 (3.3.13)	Specifications of protective shields		N/A
1.5 (3.3.14)	Symbol for nature of supply		N/A
1.5 (3.3.15)	Rated current of socket outlet		N/A
1.5 (3.3.16)	Rough service luminaire		N/A
1.5 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments		N/A
1.5 (3.3.18)	Non-ordinary luminaires with PVC cable		N/A
1.5 (3.3.19)	Protective conductor current in instruction if applicable		N/A
1.5 (3.3.20)	Provided with information if not intended to be mounted within arms reach		N/A
1.5 (3.4)	Test with water		P
	Test with hexane		P
	Legible after test		P
	Label attached		P

<b>1.6 (4)</b>	<b>CONSTRUCTION</b>		—
1.6 (4.2)	Components replaceable without difficulty		N/A
1.6 (4.3)	Wireways smooth and free from sharp edges		P
1.6 (4.4)	Lampholders		N/A
1.6 (4.4.1)	Integral lampholder		N/A
1.6 (4.4.2)	Wiring connection		N/A
1.6 (4.4.3)	Lampholder for end-to-end mounting		N/A
1.6 (4.4.4)	Positioning		N/A
	- pressure test (N) .....		N/A
	After test the lampholder comply with relevant standard sheets and show no damage		N/A
	After test on single-capped lampholder the lampholder have not moved from its position and show no permanent deformation		N/A
	- bending test (N) .....		N/A
	After test the lampholder have not moved from its position and show no permanent deformation		N/A
1.6 (4.4.5)	Peak pulse voltage		N/A
1.6 (4.4.6)	Centre contact		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
1.6 (4.4.7)	Parts in rough service luminaires resistant to tracking		N/A
1.6 (4.4.8)	Lamp connectors		N/A
1.6 (4.4.9)	Caps and bases correctly used		N/A
1.6 (4.5)	Starter holders		N/A
	Starter holder in luminaires other than class II		N/A
	Starter holder class II construction		N/A
1.6 (4.6)	Terminal blocks		N/A
	Tails		N/A
	Unsecured blocks		N/A
1.6 (4.7)	Terminals and supply connections		P
1.6 (4.7.1)	Contact to metal parts		P
1.6 (4.7.2)	Test 8 mm live conductor		N/A
	Test 8 mm earth conductor		N/A
1.6 (4.7.3)	Terminals for supply conductors		N/A
1.6 (4.7.3.1)	Welded connections:		N/A
	- stranded or solid conductor		N/A
	- spot welding		N/A
	- welding between wires		N/A
	- Type Z attachment		N/A
	- mechanical test according to 15.8.2		N/A
	- electrical test according to 15.9		N/A
	- heat test according to 15.9.2.3 and 15.9.2.4		N/A
1.6 (4.7.4)	Terminals other than supply connection		N/A
1.6 (4.7.5)	Heat-resistant wiring/sleeves		N/A
1.6 (4.7.6)	Multi-pole plug		N/A
	- test at 30 N		N/A
1.6 (4.8)	Switches:		P
	- adequate rating		N/A
	- adequate fixing		N/A
	- polarized supply		N/A
	- compliance with 61058-1 for electronic switches		N/A
1.6 (4.9)	Insulating lining and sleeves		P

EN 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.6 (4.9.1)	Retentionment		P
	Method of fixing .....	Heat shrinkage	P
1.6 (4.9.2)	Insulated linings and sleeves		P
	Resistant to a temperature > 20 °C to the wire temperature or		P
	a) & c) Insulation resistance and electric strength		P
	b) Ageing test. Temperature ( °C) .....		N/A
1.6 (4.10)	Insulation of Class II luminaires		P
1.6 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		P
	Safe installation fixed luminaires		P
	Capacitors and switches		P
	Interference suppression capacitors according to IEC 60384-14		P
1.6 (4.10.2)	Assembly gaps:		P
	- not coincidental		P
	- no straight access with test probe		P
1.6 (4.10.3)	Retentionment of insulation:		P
	- fixed		P
	- unable to be replaced; luminaire inoperative		P
	- sleeves retained in position		P
	- lining in lampholder		P
1.6 (4.11)	Electrical connections		P
1.6 (4.11.1)	Contact pressure		P
1.6 (4.11.2)	Screws:		P
	- self-tapping screws		P
	- thread-cutting screws		N/A
1.6 (4.11.3)	Screw locking:		N/A
	- spring washer		N/A
	- rivets		N/A
1.6 (4.11.4)	Material of current-carrying parts		P
1.6 (4.11.5)	No contact to wood or mounting surface		N/A
1.6 (4.11.6)	Electro-mechanical contact systems		N/A
1.6 (4.12)	Mechanical connections and glands		P

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Clause	Requirement + Test	Result - Remark	Verdict
1.6 (4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N/A
	Torque test: torque (Nm); part ..... :		N/A
	Torque test: torque (Nm); part ..... :		N/A
	Torque test: torque (Nm); part ..... :		N/A
1.6 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
1.6 (4.12.4)	Locked connections:		N/A
	- fixed arms; torque (Nm)..... :		N/A
	- lampholder; torque (Nm)..... :		N/A
	- push-button switches; torque 0,8 Nm..... :		N/A
1.6 (4.12.5)	Screwed glands; force (Nm) ..... :		N/A
1.6 (4.13)	Mechanical strength		P
1.6 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm)..... :		N/A
	- other parts; energy (Nm) ..... :	0,35 Nm	P
	1) live parts		P
	2) linings		N/A
	3) protection		P
	4) covers		P
1.6 (4.13.3)	Straight test finger		P
1.6 (4.13.4)	Rough service luminaires		N/A
	- IP54 or higher		N/A
	a) fixed		N/A
	b) hand-held		N/A
	c) delivered with a stand		N/A
	d) for temporary installations and suitable for mounting on a stand		N/A
1.6 (4.13.6)	Tumbling barrel		N/A
1.6 (4.14)	Suspensions and adjusting devices		P
1.6 (4.14.1)	Mechanical load:		N/A
	A) four times the weight		N/A
	B) torque 2,5 Nm		N/A
	C) bracket arm; bending moment (Nm) ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	D) load track-mounted luminaires		N/A
	E) clip-mounted luminaires, glass-shelve. Thickness (mm) .....		N/A
	Metal rod. diameter (mm) .....		N/A
	Fixed luminaire or independent control gear without fixing devices		N/A
1.6 (4.14.2)	Load to flexible cables		N/A
	Mass (kg) .....		N/A
	Stress in conductors (N/mm <sup>2</sup> ) .....		N/A
	Mass (kg) of semi-luminaire .....		N/A
	Bending moment (Nm) of semi-luminaire .....		N/A
1.6 (4.14.3)	Adjusting devices:		N/A
	- flexing test; number of cycles .....		N/A
	- strands broken		N/A
	- electric strength test afterwards		N/A
1.6 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N/A
1.6 (4.14.5)	Guide pulleys		N/A
1.6 (4.14.6)	Strain on socket-outlets		N/A
1.6 (4.15)	Flammable materials:		P
	- glow-wire test 650 C		P
	- spacing $\geq$ 30 mm		N/A
	- screen withstanding test of 13.3.1		N/A
	- screen dimensions		N/A
	- no fiercely burning material		P
	- thermal protection		N/A
	- electronic circuits exempted		N/A
1.6 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		P
	a) construction		P
	b) temperature sensing control		N/A
	c) surface temperature		N/A
1.6 (4.16)	Luminaires for mounting on normally flammable surfaces		N/A
	No lamp control gear	(compliance with Section 12)	N/A
1.6 (4.16.1)	Lamp control gear spacing:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- spacing 35 mm		N/A
	- spacing 10 mm		N/A
1.6 (4.16.2)	Thermal protection:		N/A
	- in lamp control gear		N/A
	- external		N/A
	- fixed position		N/A
	- temperature marked lamp control gear		N/A
1.6 (4.16.3)	Design to satisfy the test of 12.6	(see 12.6)	N/A
1.6 (4.17)	Drain holes		N/A
	Clearance at least 5 mm		N/A
1.6 (4.18)	Resistance to corrosion:		N/A
1.6 (4.18.1)	- rust-resistance		N/A
1.6 (4.18.2)	- season cracking in copper		N/A
1.6 (4.18.3)	- corrosion of aluminium		N/A
1.6 (4.19)	Igniters compatible with ballast		N/A
1.6 (4.20)	Rough service vibration		N/A
1.6 (4.21)	Protective shield:		N/A
1.6 (4.21.1)	Shield fitted		N/A
	Shield of glass if tungsten halogen lamps		N/A
1.6 (4.21.2)	Particles from a shattering lamp not impair safety		N/A
1.6 (4.21.3)	No direct path		N/A
1.6 (4.21.4)	Impact test on shield		N/A
	Glow-wire test on lamp compartment		N/A
1.6 (4.22)	Attachments to lamps	470,1g	P
1.6 (4.23)	Semi-luminaires comply Class II		N/A
1.6 (4.24)	UV radiation for tungsten halogen lamps and metal halide lamps (Annex P)		N/A
1.6 (4.25)	No sharp point or edges		P
1.6 (4.26)	Short-circuit protection:		N/A
1.6 (4.26.1)	Uninsulated accessible SELV parts		N/A
1.6 (4.26.2)	Short-circuit test		N/A
1.6 (4.26.3)	Test chain according to Figure 29		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
<b>1.7 (11)</b>	<b>CREEPAGE DISTANCES AND CLEARANCES</b>		—
	Working voltage (V) .....	220 - 240 V	—
	Voltage form	Sinusoidal <input checked="" type="checkbox"/> Non-sinusoidal <input type="checkbox"/>	—
	PTI	< 600 <input checked="" type="checkbox"/> ≥ 600 <input type="checkbox"/>	—
	Impulse withstand category (Normal category II) (Category III Annex U)	Category II <input checked="" type="checkbox"/> Category III <input type="checkbox"/>	—
	Rated pulse voltage (kV) .....		—
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm) .....	Cr => 2,5 mm Cl => 1,5 mm	P
	(2) Current-carrying parts and accessible parts: cr (mm); cl (mm) .....	Cr => 5,0 mm Cl => 3 mm	P
	(3) Parts becoming live due to breakdown of basic insulation and metal parts: cr (mm); cl (mm) .....	Cr => 2,5 mm Cl => 1,5 mm	P
	(4) Outer surface of cable where it is clamped and metal parts: cr (mm); cl (mm).....		N/A
	(5) Not used		—
	(6) Current-carrying parts and supporting surface: cr (mm); cl (mm) .....	Cr => 5,0 mm Cl => 3 mm	P

<b>1.8 (7)</b>	<b>PROVISION FOR EARTHING</b>		—
1.8 (7.2.1 + 7.2.3)	Accessible metal parts		N/A
	Metal parts in contact with supporting surface		N/A
	Resistance < 0,5 Ω		N/A
	Self-tapping screws used		N/A
	Thread-forming screws		N/A
	Thread-forming screw used in a groove		N/A
	Earth makes contact first		N/A
1.8 (7.2.2 + 7.2.3)	Earth continuity in joints etc.		N/A
1.8 (7.2.4)	Locking of clamping means		N/A
	Compliance with 4.7.3		N/A
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
1.8 (7.2.5)	Earth terminal integral part of connector socket		N/A
1.8 (7.2.6)	Earth terminal adjacent to mains terminals		N/A
1.8 (7.2.7)	Electrolytic corrosion of the earth terminal		N/A
1.8 (7.2.8)	Material of earth terminal		N/A
	Contact surface bare metal		N/A
1.8 (7.2.10)	Class II luminaire for looping-in		N/A
	Double or reinforced insulation to functional earth		N/A
1.8 (7.2.11)	Earthing core coloured green-yellow		N/A
	Length of earth conductor		N/A

<b>1.9 (14)</b>	<b>SCREW TERMINALS</b>		—
	Separately approved; component list	(see Annex 1)	N/A
	Part of the luminaire	(see Annex 3)	N/A

<b>1.9 (15)</b>	<b>SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS</b>		—
	Separately approved; component list	(see Annex 1)	N/A
	Part of the luminaire	(see Annex 4)	N/A

<b>1.10 (5)</b>	<b>EXTERNAL AND INTERNAL WIRING</b>		—
1.10 (5.2)	Supply connection and external wiring		P
1.10 (5.2.1)	Means of connection.....	G13 caps	P
1.10 (5.2.2)	Type of cable .....		N/A
	Nominal cross-sectional area (mm <sup>2</sup> ).....		N/A
	Cables equal to IEC 60227 or IEC 60245		N/A
1.10 (5.2.3)	Type of attachment, X, Y or Z		N/A
1.10 (5.2.5)	Type Z not connected to screws		N/A
1.10 (5.2.6)	Cable entries:		N/A
	- suitable for introduction		N/A
	- adequate degree of protection		N/A
1.10 (5.2.7)	Cable entries through rigid material have rounded edges		N/A
1.10 (5.2.8)	Insulating bushings:		N/A
	- suitably fixed		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- tubes or guards made of insulating material		N/A
1.10 (5.2.9)	Locking of screwed bushings		N/A
1.10 (5.2.10)	Cord anchorage:		N/A
	- covering protected from abrasion		N/A
	- clear how to be effective		N/A
	- no mechanical or thermal stress		N/A
	- no tying of cables into knots etc.		N/A
	- insulating material or lining		N/A
1.10 (5.2.10.1)	Cord anchorage for type X attachment:		N/A
	a) at least one part fixed		N/A
	b) types of cable		N/A
	c) no damaging of the cable		N/A
	d) whole cable can be mounted		N/A
	e) no touching of clamping screws		N/A
	f) metal screw not directly on cable		N/A
	g) replacement without special tool		N/A
	Glands not used as anchorage		N/A
	Labyrinth type anchorages		N/A
1.10 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment		N/A
1.10 (5.2.10.3)	Tests:		N/A
	- impossible to push cable; unsafe		N/A
	- pull test: 25 times; pull (N) .....		N/A
	- torque test: torque (Nm) .....		N/A
	- displacement $\leq 2$ mm		N/A
	- no movement of conductors		N/A
	- no damage of cable or cord		N/A
1.10 (5.2.11)	External wiring passing into luminaire		N/A
1.10 (5.2.12)	Looping-in terminals		N/A
1.10 (5.2.13)	Wire ends not tinned		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Wire ends tinned: no cold flow		N/A
1.10 (5.2.14)	Mains plug same protection		N/A
	Class III luminaire plug		N/A
1.10 (5.2.16)	Appliance inlets (IEC 60320)		N/A
	Appliance couplers of class II type		N/A
1.10 (5.2.17)	No standardized interconnecting cables properly assembled		N/A
1.10 (5.2.18)	Used plug in accordance with		N/A
	- IEC 60083		N/A
	- other standard		N/A
1.10 (5.3)	Internal wiring		P
1.10 (5.3.1)	Internal wiring of suitable size and type		N/A
	Through wiring		N/A
	- not delivered/ mounting instruction		N/A
	- factory assembled		N/A
	- socket outlet loaded (A) .....		N/A
	- temperatures .....	(see Annex 2)	N/A
	Green-yellow for earth only		N/A
1.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		N/A
	Cross-sectional area (mm <sup>2</sup> ) .....		N/A
	Insulation thickness		N/A
	Extra insulation added where necessary		N/A
1.10 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		P
	Adequate cross-sectional area and insulation thickness	0,34 mm <sup>2</sup>	P
1.10 (5.3.1.3)	Double or reinforced insulation for class II		P
1.10 (5.3.1.4)	Conductors without insulation		N/A
1.10 (5.3.1.5)	SELV current-carrying parts		P
1.10 (5.3.1.6)	Insulation thickness other than PVC or rubber		N/A
1.10 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		P
	Joints, raising/lowering devices		N/A
	Telescopic tubes etc.		N/A
	No twisting over 360		P

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Clause	Requirement + Test	Result - Remark	Verdict
1.10 (5.3.3)	Insulating bushings:		N/A
	- suitable fixed		N/A
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- cables with protective sheath		N/A
1.10 (5.3.4)	Joints and junctions effectively insulated		N/A
1.10 (5.3.5)	Strain on internal wiring		N/A
1.10 (5.3.6)	Wire carriers		N/A
1.10 (5.3.7)	Wire ends not tinned		N/A
	Wire ends tinned: no cold flow		N/A
<b>1.11 (8)</b>	<b>PROTECTION AGAINST ELECTRIC SHOCK</b>		—
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 Ø 50 mm probe from outside, within arms reach, on wall-mounted luminaires		N/A
	Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N/A
	Basic insulation only accessible under lamp or starter replacement		N/A
	Protection in any position		P
	Double-ended tungsten filament lamp		N/A
	Insulation lacquer not reliable		N/A
	Double-ended high pressure discharge lamp		N/A
	Relevant warning according to 3.2.18 fitted to the luminaire		N/A
1.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N/A
1.11 (8.2.3.a)	Class II luminaire:		P
	- basic insulated metal parts not accessible during starter or lamp replacement		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- basic insulation not accessible other than during starter or lamp replacement		P
	- glass protective shields not used as supplementary insulation		N/A
1.11 (8.2.3.b)	BC lampholder of metal in class I luminaires shall be earthed		N/A
1.11 (8.2.3.c)	Class III luminaires with exposed SELV parts:		N/A
	Ordinary luminaire:		N/A
	- touch current .....		N/A
	- no-load voltage .....		N/A
	Other than ordinary luminaire:		N/A
	- nominal voltage .....		N/A
1.11 (8.2.4)	Portable luminaire:		N/A
	- protection independent of supporting surface		N/A
	- terminal block completely covered		N/A
1.11 (8.2.5)	Compliance with the standard test finger or relevant probe		P
1.11 (8.2.6)	Covers reliably secured		P
1.11 (8.2.7)	Discharging of capacitors $\geq 0,5 \text{ F}$		P
	Portable plug connected luminaire with capacitor		N/A
	Other plug connected luminaire with capacitor		P
	Discharge device on or within capacitor		N/A
	Discharge device mounted separately		N/A

<b>1.12 (12)</b>	<b>ENDURANCE TEST AND THERMAL TEST</b>		—
1.12 (12.3)	Endurance test:		P
	- mounting-position .....	Normal	—
	- test temperature ( C).....	35 °C	—
	- total duration (h) .....	240 hours	—
	- supply voltage: Un factor; calculated voltage (V):	264 V	—
	- lamp used .....	Enclosed LED	—
1.12 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- no damage to track system		N/A
	- marking legible		P
	- no cracks, deformation etc.		P
1.12 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
1.12 (12.5)	Thermal test (abnormal operation)	(see Annex 2)	N/A
1.12 (12.6)	Thermal test (failed lamp control gear condition):		N/A
1.12 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A) .....		—
	- case of abnormal conditions.....		—
	- electronic lamp control gear		N/A
	- measured winding temperature ( C): at 1,1 Un ..		—
	- measured mounting surface temperature ( C) at 1,1 Un .....		N/A
	- calculated mounting surface temperature ( C) ..		N/A
	- track-mounted luminaires		N/A
1.12 (12.6.2)	Temperature sensing control		N/A
	- case of abnormal conditions.....		—
	- thermal link		N/A
	- manual reset cut-out		N/A
	- auto reset cut-out		N/A
	- measured mounting surface temperature ( C)...		N/A
	- track-mounted luminaires		N/A
1.12 (12.7)	Thermal test (failed lamp control gear in plastic luminaires):		N/A
1.12 (12.7.1)	Luminaire without temperature sensing control		N/A
1.12 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		N/A
	Test method 12.7.1.1 or Annex V .....		—
	Test according to 12.7.1.1:		N/A
	- case of abnormal conditions		—
	- Ballast failure at supply voltage (V) .....		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
	Test according to Annex V:		N/A
	- case of abnormal conditions		—

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Clause	Requirement + Test	Result - Remark	Verdict
	- measured winding temperature ( C): at 1,1 Un.. :		—
	- measured temperature of fixing point/exposed part ( C): at 1,1 Un..... :		—
	- calculated temperature of fixing point/exposed part ( C) ..... :		—
	Ball-pressure test:		N/A
	- part tested; temperature ( C)..... :		N/A
	- part tested; temperature ( C)..... :		N/A
1.12 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		N/A
	- case of abnormal conditions		—
	- measured winding temperature ( C): at 1,1 Un.. :		—
	- measured temperature of fixing point/exposed part ( C): at 1,1 Un..... :		—
	- calculated temperature of fixing point/exposed part ( C) ..... :		—
	Ball-pressure test:		N/A
	- part tested; temperature ( C)..... :		N/A
	- part tested; temperature ( C)..... :		N/A
1.12 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N/A
	- case of abnormal conditions		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
1.12 (12.7.2)	Luminaire with temperature sensing control		N/A
	- thermal link	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- manual reset cut-out	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- auto reset cut-out	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- case of abnormal conditions		—
	- highest measured temperature of fixing point/exposed part ( C):..... :		—
	Ball-pressure test:		N/A
	- part tested; temperature ( C)..... :		N/A
	- part tested; temperature ( C)..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
<b>1.13 (9)</b>	<b>RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE</b>		—
1.13 (9.2)	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP .....	IP20	—
	- mounting position during test .....	Normal	—
	- fixing screws tightened; torque (Nm).....		—
	- tests according to clauses .....	9.2.0	—
	- electric strength test afterwards		N/A
	a) no deposit in dust-proof luminaire		N/A
	b) no talcum in dust-tight luminaire		N/A
	c) no trace of water on current-carrying parts or SELV parts or where it could become a hazard		N/A
	d) i) For luminaires without drain holes – no water entry		N/A
	d) ii) For luminaires with drain holes – no hazardous water entry		N/A
	e) no water in watertight luminaire		N/A
	f) no contact with live parts (IP 2X)		P
	f) no entry into enclosure (IP 3X and IP 4X)		N/A
	f) no contact with live parts (IP3X and IP4X)		N/A
	g) no trace of water on part of lamp requiring protection from splashing water		N/A
	h) no damage of protective shield or glass envelope		N/A
1.13 (9.3)	Humidity test 48 h	23 °C 93 %	P

<b>1.14 (10)</b>	<b>INSULATION RESISTANCE AND ELECTRIC STRENGTH</b>		—
1.14 (10.2.1)	Insulation resistance test		P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø .....		—
	Insulation resistance (MΩ)		—
	SELV:		P
	- between current-carrying parts of different polarity .....		N/A
	- between current-carrying parts and mounting surface .....		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- between current-carrying parts and metal parts of the luminaire .....		N/A
	Other than SELV:		P
	- between live parts of different polarity .....		N/A
	- between live parts and mounting surface .....	99 GΩ	P
	- between live parts and metal parts .....	99 GΩ	P
	- between live parts of different polarity through action of a switch .....		N/A
1.14 (10.2.2)	Electric strength test		P
	Dummy lamp		N/A
	Luminaires with ignitors after 24 h test		N/A
	Luminaires with manual ignitors		N/A
	Test voltage (V):		P
	SELV:		N/A
	- between current-carrying parts of different polarity .....		N/A
	- between current-carrying parts and mounting surface .....		N/A
	- between current-carrying parts and metal parts of the luminaire .....		N/A
	Other than SELV:		P
	- between live parts of different polarity .....		N/A
	- between live parts and mounting surface .....	2960 V	P
	- between live parts and metal parts .....	2960 V	P
	- between live parts of different polarity through action of a switch .....		N/A
1.14 (10.3)	Touch current (mA) .....	0,0068 mA	P

<b>1.15 (13)</b>	<b>RESISTANCE TO HEAT, FIRE AND TRACKING</b>		—
1.15 (13.2.1)	Ball-pressure test:		P
	- part tested; temperature ( C) .....	Lamp cap; 125 °C; 1,15 mm	P
	- part tested; temperature ( C) .....	Lampholder terminal; 125 °C; 1,29 mm	P
	- part tested; temperature ( C) .....	LED PCB; 125 °C; 1,18 mm	P
	- part tested; temperature ( C) .....	Main PCB; 125 °C; 0,77 mm	P

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Clause	Requirement + Test	Result - Remark	Verdict
1.15 (13.3.1)	Needle flame test (10 s):		P
	- part tested..... : Lamp cap		P
	- part tested..... : Lampholder terminal		P
	- part tested..... : LED PCB		P
	- part tested..... : Main PCB		P
1.15 (13.3.2)	Glow-wire test (650 C):		P
	- part tested..... : LED PCB		P
	- part tested..... : Main PCB		P
	- part tested..... : Lamp cover		P
	- part tested..... : Tube enclosure		P
1.15 (13.4.1)	Tracking test: part tested .....		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

<b>ANNEX 1: components</b>
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object/part No.	code	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity
Lamp cap	C	ZhongShan Wei Heng	G13	--	EN 60061	Tested in appliance
LED driver	C	ZhongShan Wei Heng	--	--	EN 61347-2-13	Tested in appliance
Internal wire	C	Zhongshan Ruihua	1185	22 AWG 300 V 80 °C, double layer	EN 60598-1	Tested in appliance
Fuse	B	XC electronics (Shen Zhen)	3F-Series	250 V 1 A	EN 60127-1, EN 60127-3	VDE
Varistor	B	Brightking (Shenzhen) / Jomnspge	07D471K	2,5 A	IEC 61051-1, IEC 61051-2-2	VDE
LED	C	-	ES-CEDBV10F	InGaN Venus Blue LED Chip	IEC 62471	Test with appliance

The codes above have the following meaning:

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

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Clause	Requirement + Test	Result - Remark	Verdict

	<b>ANNEX 2: temperature measurements, thermal tests of Section 12</b>		—
--	---	--	---

Type reference .....	T8-150EU	—
Lamp used.....	Enclosed LED	—
Lamp control gear used .....	Integral	—
Mounting position of luminaire .....	Mounted in luminaire	—
Supply wattage (W) .....	254,4 W	—
Supply current (A) .....	128,5 mA	—
Calculated power factor .....	0,748	—
Table: measured temperatures corrected for $t_a = 25$ C:		P
- abnormal operating mode .....	--	—
- test 1: rated voltage .....	--	—
- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....	1,06 x 240 V	—
- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage .....	--	—
- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....	--	—
Through wiring or looping-in wiring loaded by a current of A during the test .....	--	—

temperature ( C) of part	Clause 12.4 – normal				Clause 12.5 – abnormal	
	test 1	test 2	test 3	limit	test 4	limit
Capacitor C3	--	74,8	--	105	--	--
Capacitor C7	--	88,4	--	105	--	--
Varistor	--	52,7	--	85	--	--
Internal wire	--	44,8	--	80	--	--
Housing	--	62,8	--	75		
Lamp cap	--	38,5	--	70	--	--
LED	--	57,1	--	Ref	--	--
Lamp cap terminal	--	54,0	--	70	--	--
Mounting surface	--	28,4	--	90	--	--

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Clause	Requirement + Test	Result - Remark	Verdict

	<b>ANNEX 3: screw terminals (part of the luminaire)</b>		—
(14)	<b>SCREW TERMINALS</b>		N/A

	<b>ANNEX 4: screwless terminals (part of the luminaire)</b>		—
(15)	<b>SCREWLESS TERMINALS</b>		N/A

	<b>ANNEX 5: National Differences for (country name) or Group Differences</b>		—
	<b>CENELEC COMMON MODIFICATIONS (EN)</b>		—
1.5 (3)	<b>MARKING</b>		N/A
1.5 (3.3.101)	Adequate warning on the package		N/A
1.10 (5)	<b>EXTERNAL AND INTERNAL WIRING</b>		—
1.10 (5.2.1)	Connecting leads		N/A
	- without a means for connection to the supply		N/A
	- terminal block specified		N/A
	- relevant information provided		N/A
	- compliance with 4.6, 4.7.1, 4.7.2, 4.10.1, 11.2, 12 and 13.2 of Part 1		N/A
1.10 (5.2.2)	Cables equal to HD21 S2 or HD22 S2		N/A

<b>ZB</b>	<b>ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)</b>		—
(3.3)	DK: power supply cord with label		N/A
	IT: warning label on Class 0 luminaire		N/A
(4.5.1)	DK: socket-outlets		N/A
(5.2.1)	CY, DK, FI, SE, GB: type of plug		N/A

<b>ZC</b>	<b>ANNEX ZC, NATIONAL DEVIATIONS (EN)</b>		—
(4 & 5)	FR: Shuttered socket-outlets 10/16A		N/A
(13.3)	DK: Needle flame test during 30 s		N/A
(13.3)	GB: Requirements according to United Kingdom Building Regulation		N/A
(13.3.2)	FR: Glow-wire test 850 C alt. 750 C for luminaires in premises open to public or 960°C for luminaires in emergency exits		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

<b>ZZ</b>	<b>ANNEX ZZ – AS/NZS 60598-1</b>		—
<b>ZZ1</b>	<b>Introduction</b>		—
<b>ZZ2</b>	<b>Variations</b>		—
<b>1.1 (0)</b>	<b>SCOPE</b>		—
1.1 (0.2)	Normative references		—
1.1 (0.4.2)	Rated voltage of 240V / 415V	240V	—
1.1 (1.2.41)	Flammable material		—
1.1 (1.2.62)	Mains socket-outlet-mounted luminaire		—
<b>1.4 (2)</b>	<b>CLASSIFICATION</b>		—
1.4(2.2)	Type of protection (restricted) .....	Class II	—
<b>1.5 (3)</b>	<b>MARKING</b>		P
1.5 (3.2)	Mandatory markings		P
1.5 (3.3)	Additional information		P
	Language of instruction	English	P
1.5 (3.3.10)	Indoor and outdoor use		P
<b>1.6 (4)</b>	<b>CONSTRUCTION</b>		P
1.6 (4.4.1)	G5 lampholder		N/A
1.6 (4.16)	Luminaires for mounting on normally flammable surface		N/A
	No lamp control gear		N/A
<b>1.7 (11)</b>	<b>CREEPAGE DISTANCES AND CLEARANCES</b>		P
<b>1.9 (14)</b>	<b>SCREW TERMINALS</b>		N/A
<b>1.9 (15)</b>	<b>SCREWLESS TERMINALS</b>		N/A
<b>1.10 (5)</b>	<b>EXTERNAL AND INTERNAL WIRING</b>		P
1.10 (5.2.1)	Non-detachable cables or cords		N/A
1.10.1 (5.2.2)	Type of cable .....		N/A
	Nominal cross-sectional area (mm <sup>2</sup> ) .....		N/A
1.10 (5.2.16)	Installation couplers		N/A
<b>1.11 (8)</b>	<b>PROTECTION AGAINST ELECTRIC SHOCK</b>		P
1.11 (8.2.1)	G5 lampholder		N/A
1.11 (8.2.4)	Portable luminaire:		N/A
	- Class I portable luminaires and luminaires for wall mounting within arm's reach and terminal block		N/A
<b>1.12 (12)</b>	<b>ENDURANCE TEST AND THERMAL TEST</b>		P
<b>1.13 (9)</b>	<b>RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE</b>		P
<b>1.14 (10)</b>	<b>INSULATION RESISTANCE AND ELECTRIC STRENGTH</b>		P

<b>EN 60598-2-1</b>			
Clause	Requirement + Test	Result - Remark	Verdict
<b>1.15 (13)</b>	<b>RESISTANCE TO HEAT, FIRE AND TRACKING</b>		P
1.15 (13.3.1)	Glow wire test (750 C):	lamp cover; tube enclosure; PCB	P
1.15 (13.3.2)	Glow wire test (650 C):		P
1.15 (13.3.3)	Needle flame test (30 s):		P

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Clause	Requirement + Test	Result - Remark	Verdict
<b>4 (4)</b>	<b>GENERAL REQUIREMENTS</b>		—
	Compliance of independent controlgear enclosure with EN 60 598-1		N/A
	Independent SELV controlgear comply with Annex I	(see Annex I)	N/A
<b>6 (6)</b>	<b>CLASSIFICATION</b>		—
	Independent controlgear.....	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	Built-in 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"/>	—
<b>7</b>	<b>MARKING</b>		—
7.1 (7.1)	Mandatory markings:		N/A
	- mark of origin		N/A
	- model number, type reference .....		N/A
	- symbol for independent controlgear, if applicable		N/A
	- correlation between interchangeable parts and controlgear marked		N/A
	- rated supply voltage (V) .....		N/A
	- earthing symbol		N/A
	- wiring diagram		N/A
	- value of $t_c$		N/A
	- symbol for declared temperature		N/A
	Constant voltage type:	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- rated supply voltage (V) .....		N/A
	Constant current type:	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- rated output current (A) .....		N/A
	- rated maximum output voltage (V) .....		N/A
	- indication if for LED modules only		N/A
7.2 (7.1)	- information to be provided, if applicable		N/A
	- declaration on protection against accidental contact		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- cross-section of conductors (mm <sup>2</sup> ) .....		N/A
	- number, type and wattage of lamp(s)		N/A
	- directly mains-connected windings		N/A
	SELV-equivalent controlgear		N/A
- (7.2)	Marking durable and legible		N/A
	Rubbing 15 s water, 15 s petroleum; marking legible		N/A

8 (10)	PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS		—
- (10.1)	Controlgear protected against accidental contact with live parts		P
- (A2)	The current flowing between the part concerned and earth is measured and does not exceed 0,7 mA (peak) or 2 mA d.c. .... :	0,1 mA	P
- (A2)	For frequencies above 1 kHz, the current does not exceed 0,7 mA (peak) multiplied by the value of the frequency in kilohertz or 70 mA (peak) .....		N/A
- (A3)	The voltage between the part concerned and any accessible part is measured and does not exceed 34 V (peak) .....		N/A
- (10.1)	Lacquer or enamel not used for protection or insulation		P
	Adequate mechanical strength on parts providing protection		P
- (10.2)	Capacitors > 0,5 F: voltage after 1 min (V): < 50 V:	0,04 V	P
8.1 (-)	SELV-equivalent controlgear accessible parts are insulated from live parts by double or reinforced insulation according 8.6 and 13.1 in IEC 60065		N/A
8.2 (-)	Exposed terminals of SELV or SELV-equivalent controlgear are allowed if: - the rated or maximum output voltage does not exceeding 25 V r.m.s. - the no-load output voltage does not exceed 30 V r.m.s. or 33 $\sqrt{2}$ V peak		N/A
	Insulated terminals if rated output voltage >25 V		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	One capacitor Y1 or two capacitors Y2 of the same values used in series between SELV or SELV-equivalent output and primary circuits - Capacitor complying with IEC 60384-14 - Other components bridging the separating transformer complying with IEC 60065, clause 14		N/A
<b>9 (8)</b>	<b>TERMINALS</b>		—
	Screw terminals: compliance with Section 14 of IEC 60598-1		N/A
	Screwless terminals: compliance with Section 15 of IEC 60598-1		N/A
<b>10 (9)</b>	<b>PROVISION FOR EARTHING</b>		—
	External metal parts connected to the earth-terminal:		N/A
	- compliance with 7.2.1 in IEC 60598-1		N/A
	Test with a current of 10 A between earthing terminal and each of the accessible metal parts; measured resistance ( $\Omega$ ): $< 0,5 \Omega$ .....		N/A
	Protective earth, symbol		N/A
	Terminal complying with clause 8 in Part 1		N/A
	Locked against loosening and not possible to loosen by hand		N/A
	Not possible to loosen clamping means unintentionally on screwless terminals		N/A
	Earthing via means of fixing		N/A
	Earthing terminal only used for the earthing of the control gear		N/A
	All parts of material minimizing the danger of electrolytic corrosion		N/A
	Made of brass or equivalent material		N/A
	Contact surface bare metal		N/A
	Conductors by tracks on printed circuit boards:		N/A
	- a.c. current of 25 A for 1 min between earthing terminal and accessible metal parts		N/A
	- compliance with clause 7.2.1 in IEC 60598-1		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

<b>11 (11)</b>	<b>MOISTURE RESISTANCE AND INSULATION</b>		—
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (MΩ):		P
	≥ 2 MΩ for basic insulation .....		N/A
	≥ 4 MΩ for double or reinforced insulation .....	99 GΩ	P
11 (-)	Adequate insulation between input and output terminals not bounded together in SELV-equivalent controlgear		P

<b>12 (12)</b>	<b>ELECTRIC STRENGTH</b>		—
	Immediately after clause 11 electric strength test for 1 min		P
	Working voltage ≤ 42 V, test voltage 500 V		N/A
	Working voltage > 42 V ≤ 1000 V, test voltage (V):		P
	Basic insulation, 2U + 1000 V		N/A
	Supplementary insulation, 2U + 1750 V		N/A
	Double or reinforced insulation, 2U + 2750 V		P
	No flashover or breakdown		P
	Windings in separating transformers in SELV-equivalent control gear according to 14.3.2 of EN 60065		P

<b>13 (13)</b>	<b>THERMAL ENDURANCE FOR WINDINGS (Not applicable)</b>		—
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<b>14 (14)</b>	<b>FAULT CONDITIONS</b>		—
	When operated under fault conditions the controlgear:		P
	- does not emit flames or molten material		P
	- does not produce flammable gases		P
	- protection against accidental contact not impaired		P
	Thermally protected controlgear does not exceed the marked temperature value		N/A
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected	(see appended table)	P
- (14.1)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (except between live parts and accessible metal parts)	(see appended table)	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Distances on printed boards provided with coating according to IEC 60664-3		N/A
- (14.2)	Short-circuit or interruption of semiconductor devices	(see appended table)	P
- (14.3)	Short-circuit across insulation consisting of lacquer, enamel or textile	(see appended table)	N/A
- (14.4)	Short-circuit across electrolytic capacitors	(see appended table)	P
- (14.5)	After the tests the insulation resistance with d.c. 500 V (MΩ) are $\geq 1 \text{ M}\Omega$ .....		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
	Temperature declared thermally protected controlgear fulfil the requirements in Annex C		N/A

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

16	ABNORMAL CONDITIONS	—
	Safety not impaired when the controlgear is operated at any voltage between 90% and 110% of rated voltage	P
16.1	Control gear which are of the constant voltage output type:	—
	a) No LED module inserted	P
	b) Double LED modules or equivalent load connected to the output terminals	P
	c) Output terminal short-circuited (20 cm and 200 cm or declared length)	P

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Clause	Requirement + Test	Result - Remark	Verdict
	During and at the end of the tests no defect impairing safety, nor any smoke or flammable gases produced		P
16.2	Control gear which are of the constant current output type:		—
	a) No LED module connected		N/A
	b) Double the LED modules or equivalent load connected in series to the output terminals		N/A
	c) Output terminal short-circuited (20 cm and 200 cm or declared length )		N/A
	Maximum output voltage not exceeded		N/A
	During and at the end of the tests no defect impairing safety, nor any smoke or flammable gases produced		N/A
<b>17 (15)</b>	<b>CONSTRUCTION</b>		—
- (15.1)	Wood, cotton, silk, paper and similar fibrous material not used as insulation		P
- (15.2)	Printed boards used as internal connections complies with clause 14 of IEC 61347-1		P
	Socket-outlet in the output circuit does not accept plugs complying with IEC 60083 and IEC 60906		N/A
	Not possible to engage plugs accepted by socket-outlet in the output circuit with socket-outlets complying with IEC 60083 and IEC 60906		N/A
<b>18 (16)</b>	<b>CREEPAGE DISTANCES AND CLEARANCES</b>		—
	Creepage distances and clearances according to Table 3 and 4, as appropriate	(see cl. 11 of EN 60598-1)	P
	Printed boards see clause 14 of IEC 61347-1		P
	Insulating lining of metallic enclosures		N/A
<b>19 (17)</b>	<b>SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS</b>		—
	Screws, current-carrying parts and connections in compliance with IEC 60598-1 (clause numbers between parentheses refer to IEC 60598-1)		P
(4.11)	Electrical connections		P
(4.11.1)	Contact pressure		P
(4.11.2)	Screws:		P
	- self-tapping screws		P
	- thread-cutting screws		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- at least two self-tapping screws		N/A
(4.11.3)	Screw locking:		N/A
	- spring washer		N/A
	- rivets		N/A
(4.11.4)	Material of current-carrying parts		P
(4.11.5)	No contact to wood		P
(4.12)	Mechanical connections and glands		P
(4.12.1)	Mechanical stress		N/A
	Screws not made of soft metal		N/A
	Screws of insulating material		N/A
	Torque test: part; torque (Nm) ..... :		N/A
	Torque test: part; torque (Nm) ..... :		N/A
	Torque test: part; torque (Nm) ..... :		N/A
(4.12.2)	Screw diameter < 3 mm screwed into metal		N/A
(4.12.3)	Void		—
(4.12.4)	Locked connections		N/A
(4.12.5)	Screwed glands: force (N) ..... :		N/A

<b>20 (18)</b>	<b>RESISTANCE TO HEAT, FIRE AND TRACKING</b>		—
20 (18.1)	Parts of insulating material retaining live parts in position, ball-pressure test:		P
	- part; test temperature ( C) ..... :	PCB; 125 C	P
	- part; test temperature ( C) ..... :		N/A
20 (18.2)	Printed boards in accordance with IEC 60249-1, 4.3		P
20 (18.3)	External parts of insulating material preventing electric shock glow-wire test 650 C		P
20 (18.4)	Parts of insulating material retaining live parts in position, needle-flame test 10 s:		N/A
	- flame extinguished within 30 s		N/A
	- no flaming drops igniting tissue paper		N/A
20 (18.5)	Tracking test		N/A

<b>21 (19)</b>	<b>RESISTANCE TO CORROSION</b>		—
	Rust protection:		N/A
	- test according 4.18.1 of IEC 60598-1		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- adequate varnish on the outer surface		N/A
<b>- (20)</b>	<b>NO-LOAD OUTPUT VOLTAGE</b>		—
	No load output voltage not differ more than 10 % from rated voltage		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

14	TABLE: tests of fault conditions		—
Part	Simulated fault		Hazard
C10	Short-circuited	LED switched off, can be resumed to normal	NO
C9	Short-circuited	Fuse operated	NO
C8	Short-circuited	Fuse operated	NO
C3	Short-circuited	Normal operation	NO
C4	Short-circuited	Fuse operated	NO
RV1	Short-circuited	Fuse operated	NO

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Clause	Requirement + Test	Result - Remark	Verdict

18 (16)	TABLE: creepage distances and clearances						—
	Minimum distances for a.c. (50/60 Hz) sinusoidal voltages						
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.	-	-	-	-	-	-	
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.	-	-	-	-	-	-	
- required creepage distances (mm), insulation PTI $\geq$ 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						
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	-	-	-	-	-	-	-

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

<b>A</b>	<b>ANNEX A (NORMATIVE), TEST TO ESTABLISH WHETHER A CONDUCTIVE PART IS A LIVE PART WHICH MAY CAUSE AN ELECTRIC SHOCK</b>		—
A.2	See clause 8 A.2 in this Test Report		P
A.3	See clause 8 A.3 in this Test Report		N/A

<b>C</b>	<b>ANNEX C – PARTICULAR REQUIREMENTS FOR ELECTRONIC LAMP CONTROLGEAR WITH MEANS OF PROTECTION AGAINST OVERHEATING</b>		—
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<b>C3</b>	<b>GENERAL REQUIREMENTS</b>		—
C3.1	Thermal protection means integral with the controlgear, protected against mechanical damage		N/A
	Renewable only by means of a tool		N/A
	If function depending on polarity, for cord-connected equipment protection means in both leads		N/A
	Thermal links comply with IEC 60691		N/A
	Electrical controls comply with IEC 60730-2-3		N/A
C3.2	No risk of fire by breaking (clause C7)		N/A

<b>C5</b>	<b>CLASSIFICATION</b>		—
	a) automatic resetting type		—
	b) manual resetting type		—
	c) non-renewable, non-resetting type		—
	d) renewable, non-resetting type		—
	e) other type of thermal protection; description .....		N/A

<b>C6</b>	<b>MARKING</b>		—
C6.1	Symbol for temperature declared thermally protected ballasts		N/A
C6.2	Declaration of the type of protection provided		N/A
<b>C7</b>	<b>LIMITATION OF HEATING</b>		—
C7.1	Preselection test		N/A
	Test sample placed for at least 12 h in an oven having temperature (tc - 5) K		N/A
	No operation of the protection device		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

C7.2	Functioning of protection means		N/A
	Normal operation of the sample in a test enclosure according to Annex D at an ambient temperature such that ( $t_c +0; -5$ ) C is obtained		N/A
	No operation of the protection device		N/A
	Introducing of the most onerous test condition determined during test of clause 14		N/A
	Output of windings connected to the mains supply short-circuited, and other part of the controlgear operated under normal conditions		N/A
	Increasing of the current through the windings continuously until operation of the protection means		N/A
	Continuous measuring of the highest surface temperature		N/A
	Controlgear according to C5 a) or C5 e) operated until stable conditions are achieved		N/A
	Automatic-resetting thermal protectors working 3 times		N/A
	Controlgear according to C5 b) working 6 times		N/A
	Controlgear according to C5 c) and C5) d) working once		N/A
	Highest temperature does not exceed the marked value		N/A
	Any overshoot of 10% over the marked value within 15 min		N/A

<b>D</b>	<b>ANNEX D – REQUIREMENTS FOR CARRY OUT THE HEATING TESTS OF THERMALLY PROTECTED LAMP CONTROLGEAR</b>		—
	Tests in C7 performed in accordance with Annex D, if applicable		N/A

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

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Clause	Requirement + Test	Result - Remark	Verdict
	Compliance with the failure criteria for procedure B		N/A
E3	Procedure B		N/A
	Claimed value of $T_1$		N/A
	Claimed value of $T_2$		N/A
	Endurance test carried out at:		N/A
	$T_1$ (7 samples)		N/A
	$T_2$ (7 samples)		N/A
	Duration of test calculated from equation (2)		N/A
	$T_1$		N/A
	$T_2$		N/A
	During the test: - No open circuit - No breakdown insulation		N/A
	The claimed constant S is deemed to be verified		N/A

<b>F</b>	<b>ANNEX F - DRAUGHT-PROOF ENCLOSURE</b>	—
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	Draught-proof enclosure in accordance with the description		N/A
	Dimensions of the enclosure		N/A
	Other design; description		N/A

<b>H</b>	<b>ANNEX H - TESTS</b>	—	
	All tests performed in accordance with the advise given in Annex H, if applicable		P

<b>I</b>	<b>ANNEX I - PARTICULAR ADDITIONAL REQUIREMENTS FOR INDEPENDENT SELV D.C. OR A.C. SUPPLIED ELECTRONIC CONTROLGEAR FOR LED MODULES</b>	—	
I.3	Classification		—
I.3.1	Class I	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	Class II	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
I.3.2	a) non-inherently short circuit proof controlgear	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	b) non-inherently open circuit proof controlgear	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	c) inherently short circuit proof controlgear	Yes <input type="checkbox"/> No <input type="checkbox"/>	—

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Clause	Requirement + Test	Result - Remark	Verdict
	d) inherently open circuit proof controlgear	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	e) fail safe controlgear	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	f) non-short-circuit proof controlgear	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	g) non-open-circuit proof controlgear	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
I.4	Marking		N/A
	Adequate symbols are used		N/A
I.5	Protection against electric shock		N/A
I.5.1	No connection between output winding and body		N/A
	No connection between output winding and protective earthing circuit		N/A
I.5.2	Input and output circuits electrically separated from each other		N/A
I.5.2.1	Insulation between input and output winding of the HF-transformer consists of double or reinforced insulation		N/A
	Class II: insulation between input/output and body consists of double or reinforced insulation		N/A
	Class I: insulation between input and body consists of basic and between output and body supplementary insulation		N/A
I.5.2.2	Insulation between input and output winding via the core consists of double or reinforced insulation		N/A
	Insulation between cord and windings of the HF-transformer consists of basic insulation		N/A
I.5.2.3	Serrated tape, additional layer		N/A
I.5.2.4	Class I controlgear for fixed connection provided with basic insulation plus protective screening comply with the following conditions:		N/A
	a) Insulation between the input winding and the protective screen complies with the requirements for basic insulation		N/A
	b) Insulation between the protective screen and the output winding complies with the requirements for basic insulation		N/A
	c) Metal screen consists of a metal foil or of a wire wound screen		N/A
	d) Metal screen so arranged that both edges cannot simultaneously touch a magnetic core		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	e) Metal screen and its lead-out wire have a cross-section sufficient to ensure that an overload device will open the circuit before the screen is destroyed		N/A
	f) Lead-out wire sufficiently fixed to the metal screen		N/A
I.5.2.5	Last turn of each winding of the transformer retained by positive means		N/A
	Impregnated winding		N/A
	Winding held together by means of insulating material		N/A
I.5.3	Components bridging between input and output circuit		N/A
I.5.3.1	Used capacitors and resistors comply with 8.2		N/A
I.5.3.2	Used opto-couplers		N/A
I.6	Heating		—
I.6.1	No excessive temperatures in normal use		N/A
	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 - Secondary: _____ K - Limit max: _____ K		N/A
	After the test:		N/A
	- no connections have worked loose		N/A
	- no reduction of creepage distances and clearances		N/A
	- no flow of sealing compound		N/A
	- no operation of protecting devices		N/A
	- electric strength test between input and output windings		N/A
I.6.3	Cycling test (10 cycles):		N/A
I.6.3.1	- heat run at _____ K		N/A
I.6.3.2	- moisture treatment 48 h		N/A
I.6.3.3	- vibration test 1 h; 1,5 g		N/A
I.6.3.4	After the tests:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- insulation resistance		N/A
	- dielectric strength test at 35 % of specified value; test voltage _____ V		N/A
	- Current or the ohmic component does not deviates by more than 30 %		N/A
I.7	Short-circuit and overload protection		N/A
I.7.1	U <sub>pri</sub> : 1.06 times rated voltage or 0.94 and 1.06 times rated supply voltage - used voltage _____ V		N/A
I.7.2 I.7.3 I.7.4	Determined temperature rise in windings and on other parts:		N/A
	- test according to Clause _____		N/A
	- Primary winding _____ K		N/A
	- Limit max _____ K		N/A
	- Secondary winding _____ K		N/A
	- Limit max _____ K		N/A
	- External enclosure _____ K		N/A
	- Limit max 80 K		N/A
	- Rubber insulation of wiring _____ K		N/A
	- Limit max 60 K		N/A
	- PVC insulation of wiring _____ K		N/A
	- Limit max 60 K		N/A
	- Supports _____ K		N/A
	- Limit max 80 K		N/A
I.7.5	Fail-safe convertors		N/A
I.7.5.1	- U <sub>pri</sub> : 1.06 times rated supply voltage .....V:		—
	- I <sub>sec</sub> : 1.5 times rated output current .....A:		—
	- time until steady-state conditions t <sub>1</sub> (h) ..... :		—
	- time until failure t <sub>2</sub> (h): ≤ t <sub>1</sub> ; ≤ 5 h..... :		N/A
I.7.5.2	During the test:		N/A
	- no flames, molten material, etc.		N/A
	- temperature rise of enclosure ≤ 150 K		N/A
	- temperature rise of plywood support ≤ 100 K		N/A
	After the test:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- electric strength (test voltage; 35 % of specified value); no flashover or breakdown for primary-to-secondary and for primary-to-body		N/A
	- live parts not accessible by test finger through holes of enclosure		N/A
I.8	Insulation resistance and electric strength		N/A
I.8.1	Conditioned 48 h between 91 % and 95 %		N/A
I.8.2	Adequate insulation (500 V d.c. for 1 min) between:		N/A
	Live parts and the body -for basic insulation not less than 2 MΩ .....		N/A
	Live parts and the body -for reinforced insulation not less than 4 MΩ .....		N/A
	Input- and output circuits not less than 5 MΩ .....		N/A
	Metal parts of class II controlgear which are separated from live parts by basic insulation only and the body not less than 5 MΩ .....		N/A
	Metal foil in contact with the inner and outer surfaces of enclosures of insulating material not less than 2 MΩ .....		N/A
I.8.3	Electric strength test:		N/A
	1) Between live parts of input circuits and live parts of output circuits .....		N/A
	2) Over basic or supplementary insulation between:		N/A
	a) live parts which are or may become of different polarity .....		N/A
	b) live parts and body if intended to be connected to protective earth .....		N/A
	c) accessible metal parts and a metal rod of the same diameter as the flexible cable or cord .....		N/A
	d) live parts and an intermediate metal part .....		N/A
	e) intermediate metal parts and the body .....		N/A
	3) Over reinforced insulation between the body and live parts .....		N/A
	No flashover or breakdown occurred		N/A
I.9	Construction		N/A
I.9.1	Comply with all requirements		N/A
I.9.2	The distance between input and output terminals shall not be less than 25 mm .....		N/A
I.10	Components		N/A
I.10.1	Socket-outlets in the output circuit does not accept plugs complying with IEC 60083 and IEC 60906-1		N/A
I.10.2	Self-resetting protective devices shall not be used unless it is certain that there will be no hazards		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Compliance is checked by connecting the controlgear for 48 h at 1.06 times the rated voltage with the output short-circuited		N/A
I.11	<b>Creepage distances and clearances</b>		N/A
	1. Insulation between input and output circuits:		N/A
	a) measured values $\geq$ specified values (mm) .....		N/A
	b) measured values $\geq$ specified values (mm) .....		N/A
	c) measured values $\geq$ specified values (mm) .....		N/A
	2. Insulation between adjacent input circuits: measured values $\geq$ specified values (mm) .....		N/A
	2. Insulation between adjacent output circuits: measured values $\geq$ specified values (mm) .....		N/A
	3. Insulation between terminals for external connection:		N/A
	a) measured values $\geq$ specified values (mm) .....		N/A
	b) measured values $\geq$ specified values (mm) .....		N/A
	c) measured values $\geq$ specified values (mm) .....		N/A
	4. Basic or supplementary insulation:		N/A
	a) measured values $\geq$ specified values (mm) .....		N/A
	b) measured values $\geq$ specified values (mm) .....		N/A
	c) measured values $\geq$ specified values (mm) .....		N/A
	5. Reinforced insulation: measured values $\geq$ specified values (mm) .....		N/A
	6. Distanse through insulation:		N/A
	a) measured values $\geq$ specified values (mm) .....		N/A
	b) measured values $\geq$ specified values (mm) .....		N/A
	c) measured values $\geq$ specified values (mm) .....		N/A
	d) measured values $\geq$ specified values (mm) .....		N/A

Sample Photo

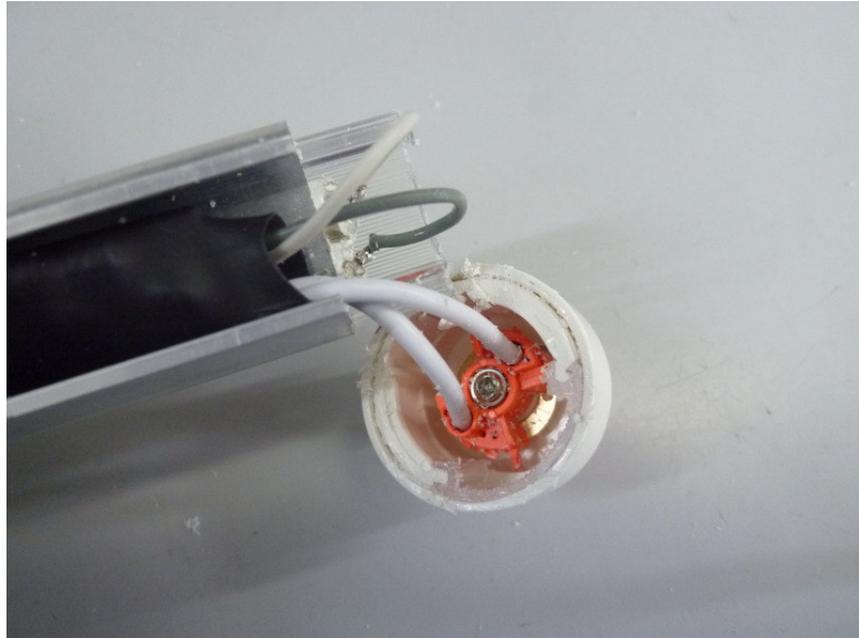


Outlook - T8-150EU

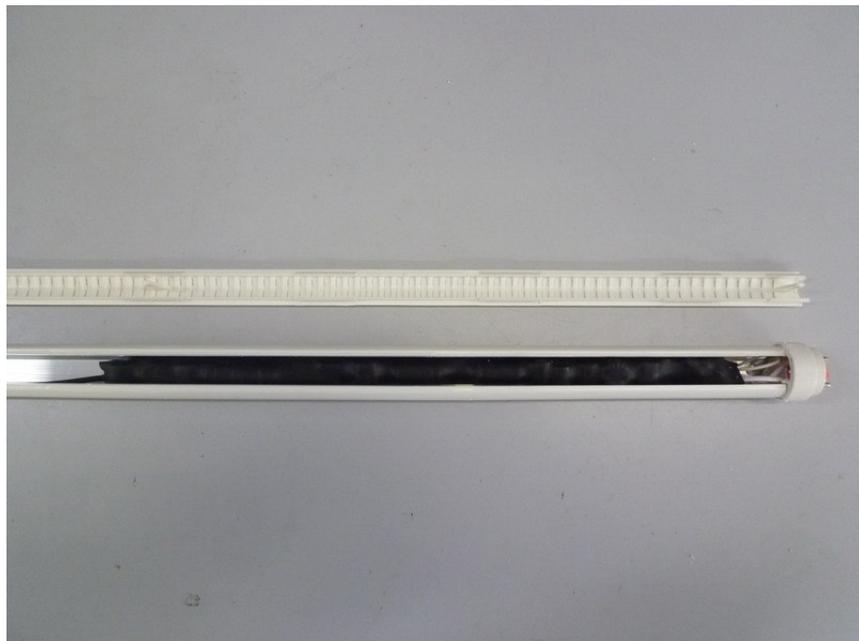


Lamp cap

Sample Photo



Construction

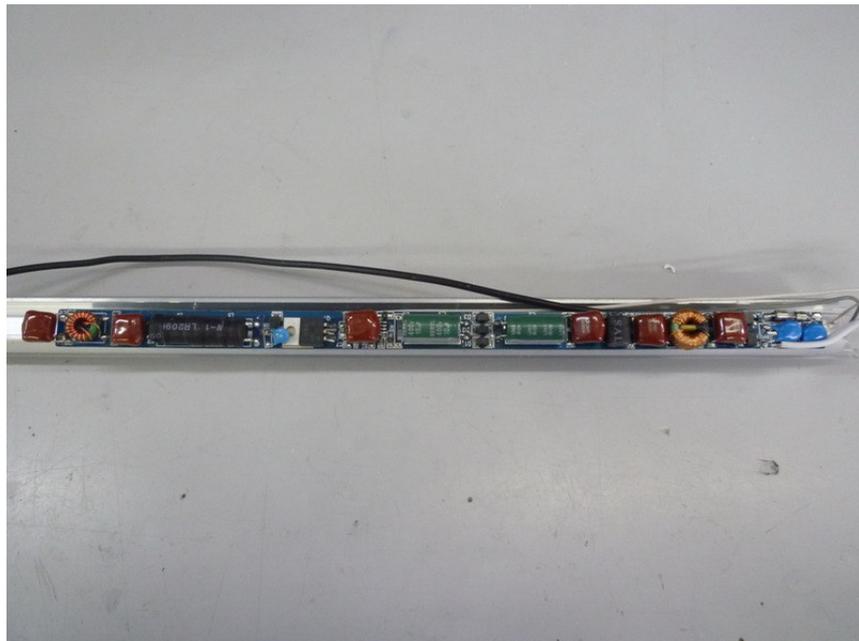


Construction

Sample Photo



Construction

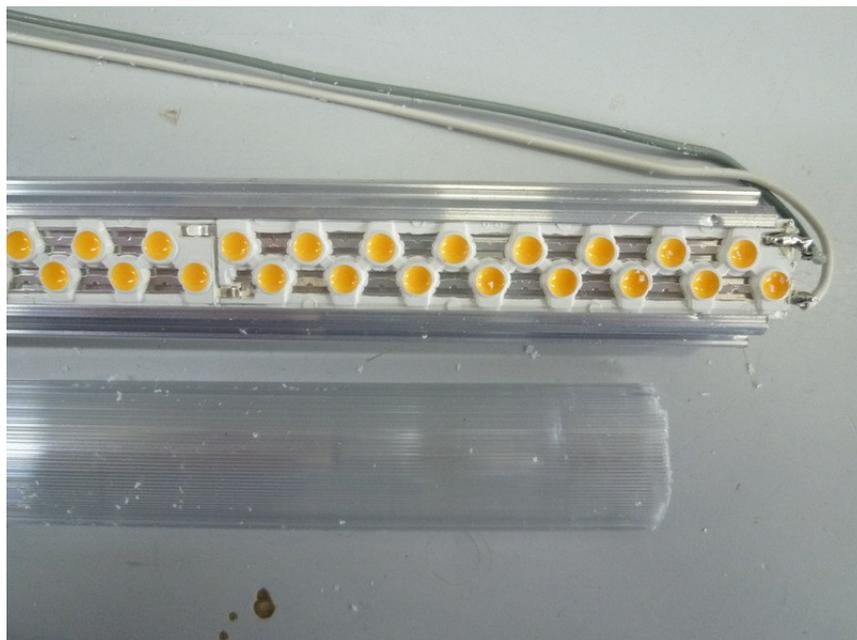


Construction

Sample Photo

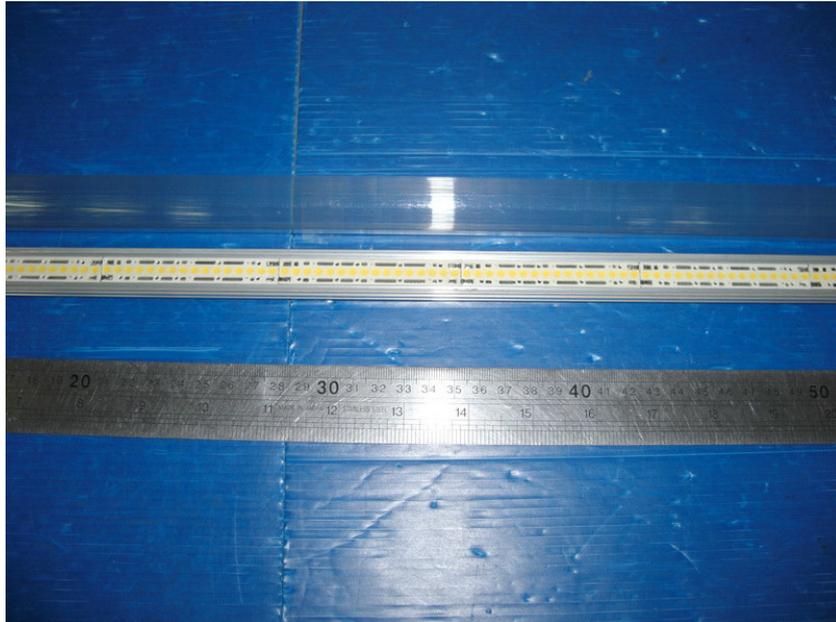


Construction

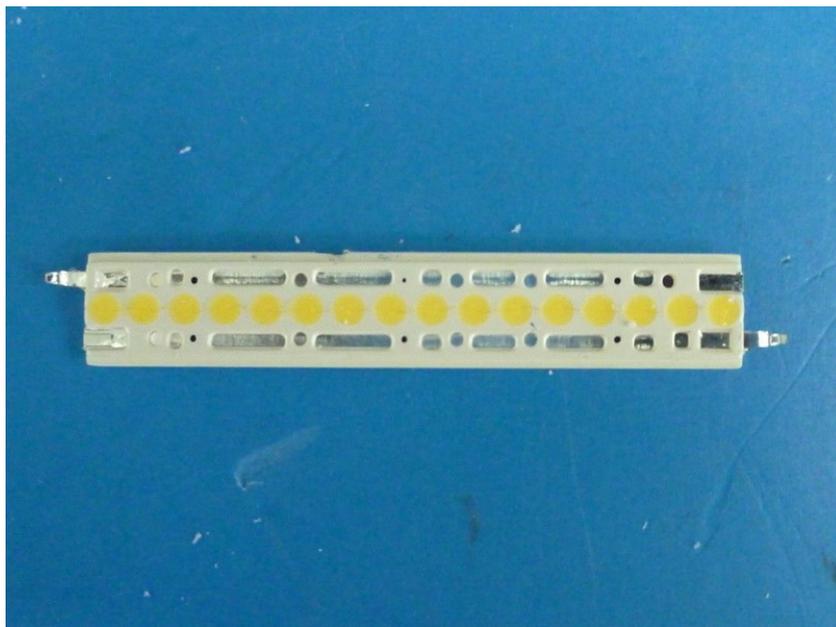


LED

Sample Photo



LED



LED