TEST REPORT

Tested By

Huayi Lighting Technology Services Co., Ltd.

Report No.:	HYL-FIX-0037/13
Applicant:	Normann Copenhagen
Application No.:	2013030103B
Product Description:	Bell lamp
Main Model:	502100
Test Type:	CE test

CONTENTS

1. Test Summary

Product Description:	**Bell lamp**
Quantity:	**1**
Trademark:	**--**
Standard:	**EN 60598-2-1: 1997 (IEC 60598-1:2008)**
Test Type:	**CE test**
Test Period:	**Feb. 21 — Mar. 6, 2013**
Test Result:	**Pass**

Tested By: Caling Zeng **Date:** Mar. 07, 2013.

Checked By: Benny Zeng **Date:** Mar. 07, 2013.

Approved By: Z Zeng **Date:** Mar. 07, 2013

HUAYI LIGHTING TECHNOLOGY SERVICES CO.,LTD. ZHONGSHAN

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The test results in the report only apply to the tested sample.

2. General Information

2.1 Client Information

Applicant: Normann Copenhagen

Address of Applicant: Osterbrogade 70, 2100 Copenhagen, Denmark

2.2 Test models

The main test model	502100
The covered models	502110, 502105, 502115, 502098, 502107, 502102, 502112
Difference description of the main model and the covered models	Except size and colour, the covered model lamps are the same as the main model one. And therefore, no model difference test is carried out.

2.3 Item Information

Classification according to the protection against electric shock	☑ Class I ☐ Class II ☐ Class III
Classification according to the resistance to dust, solid objects, and moisture	IP 20
Classification according to the material of mounting surface	☑ Marked with F ☐ Marked without F
Classification according to the method of mounting	☑ Pendant luminaires ☐ Fixed luminaires ☐ Portable luminaires ☐ Recessed luminaires
Light source of the luminaire	☐ double-capped fluorescent ☐ single-capped fluorescent ☐ compacted fluorescent ☐ tungsten halogen ☐ metal halide ☐ special bulb ☐ high pressure sodium ☑ incandescent bulb
Rated voltage	220—240 V ~
Supply frequency	50 Hz
Rated wattage	MAX 60 W
Wattage factor	1.0
The function of the item	Illumination
The highest rated operating temperature of wires	☐ Temperature of the transformer (Tw) ☐ Temperature of ballast (Bw)

The highest rated operating temperature of the enclosure of parts	☐ Ballast(TB) ☐ Capacitor(TC) ☐ Starter(TS) ☐ Transformer(TT) ☐ Trigger(TT)
The highest rated ambient temperature(TA)	25 ℃
The main parts of the luminaire	☐ inductance ballast ☐ electric ballast ☐ socket lampholder ☐ inductance transformer ☐ electric transformer ☐ starter holder ☐ fluorescent lampholder ☐ miscellaneous lampholder ☐ starter ☐ trigger ☑ screw lampholder ☐ light-adjusting device ☐ capacitor ☐ switch
The connection method of power supply	Lead connection
Internal wiring	------
Weight (kg)	1.85 kg
Size (Length* height) (mm)	H 37 × Φ35 (cm)
Material of the enclosure	Metal
Grounding continuity	The effective connection between the metal part of the luminaire and the earth wire of the leading-out wire is made by nuts and washers. The connecting surface is bare metal.
The method satisfying to the luminaires marked with F	The temperature of the mounting surface of the luminaire is lower than the temperature specified in the standard.
The method satisfying the class of protection of enclosure	The class is IP20. Required tester shall be used according to the standard and no contact with live parts.
Notes (if any)	------

2.4 Test Location

The test was performed at:

Zhongshan Huayi Lighting Technology Services Co., Ltd.

Huayi Industrial Park, Tongyi Industrial Zone, Guzhen Town, Zhongshan City, Guangdong Province, P. R. China 528421

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3. Equipment list

Equipment List					
Serial No.	No.	Name	Type/model	Next calibration	Checked or not
1	LAB-0001	Pressure-resistance tester	T0S5050A	2013-12-5	√
2	LAB-0002	Current-leakage tester	T0S3200	2013-12-5	√
3	LAB-0003	Grounding resistance tester	T0S6200	2013-12-5	√
4	LAB-0026	Variable frequency power supply	HY-2008-2KVA	2013-12-5	√
5	LAB-0031	Needle flame tester	ZY-2	2013-12-5	
6	LAB-0032	Glowing filament tester	ZRS-2	2013-12-5	
7	LAB-0010	Torque spanner	60DB6	2013-12-5	√
8	LAB-0037	Electric dryer	DHG-9245	2013-12-5	√
9	LAB-0014 /23	Electric shock tester (including test finger)	SH9120	2013-12-5	√
10	LAB-0038	Rain tester	LX-B	2013-12-5	
11	LAB-0009	Electric parameters tester	AN2102W	2013-12-5	
12	LAB-0039	Spray tester	IPX5/IPX6	2013-12-5	
13	LAB-0043	Walk-in constant temperature and humidity room	10 cubes	2013-12-5	√
14	LAB-0044	Dust tester	1 cube	2013-12-5	
15	LAB-0029	Windshield	AKK-GB0918	2013-12-5	√
16	LAB-0095	Luminaire-adjustor	AKK-GB09320	2013-12-5	√
17	LAB-0028	20-channel data collector	MX100	2013-12-5	√
18	LAB-0053	Oscilloscope	DL1620	2013-12-5	
19	LAB-0108	5D spring impact hammer	—	2013-12-5	√
20	LAB-0022	Micrometer	—	2013-12-5	
21	LAB-0007	Angle scale	T29128	2013-12-5	
22	LAB-0008	Push - pull pressure gauge	NK-200	2013-12-5	√
23	LAB-0052	Digital multi-meter	F17B	2013-12-5	
24	LAB-0036	Ball-pressure tester	—	2013-12-5	
25	LAB-0089	Creepage distance test cards	—	2013-12-5	

Notes: 1) Being checked means that the equipment is used in this test.
2) All instruments used in the test are during calibration period. They are pre-heated according to the standards before application.

4. Standard and requirements

EN 60598-2-1 (IEC 60598-1)			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
1.2 (0)	**GENERAL INTRODUCTION**		
1.2 (0.3.1)	Information for luminaire design considered	Standard Yes ☒ No ☐	—
1.2 (0.3.2)	More sections applicable.....:	Yes ☐ No ☒	—
1.4 (2)	**CLASSIFICATION**		
1.4 (2.2)	Type of protection (Class 0 excluded).....:	Class I	—
1.4 (2.3)	Degree of protection against ingress of dust, solid objects and moisture (Requirement: Ordinary).....:	IP 20	—
1.4 (2.4)	Material of supporting surface for which the luminaire is designed		
	Luminaire suitable for direct mounting on normally flammable surfaces.....:	Yes ☐ No ☒	—
	Luminaire not suitable for direct mounting on normally flammable surfaces.....:	Yes ☒ No ☐	—
1.4 (2.5)	Luminaire for normal use .....:	Yes ☒ No ☐	—
	Luminaire for rough service .....:	Yes ☐ No ☒	—

1.5 (3)	**MARKING**		
1.5 (3.2)	Marking shall be visible on the outside of the luminaire or behind a cover.		P
	Marking shall be visible during installation.		P
	Marking shall be visible after the installation.		P
1.5 (3.2.1)	Mark of origin	China	P
1.5 (3.2.2)	Rated voltage(s) in volts	220—240 V ~	P
1.5 (3.2.3)	The rated maximum ambient temperature		N
1.5 (3.2.4)	Symbol for class II luminaire		N
1.5 (3.2.5)	Symbol for class III luminaire		N
1.5 (3.2.6)	Marking with IP numbers		N
1.5 (3.2.7)	Model number or type reference	Type: 502100-E27	P
1.5 (3.2.8)	Rated wattage or the designation	MAX 60W	P
1.5 (3.2.9)	The relevant symbol for luminaires not suitable for direct mounting on normally flammable surfaces.		N
1.5 (3.2.10)	Information concerning special lamps, if applicable.		N

1.5 (3.2.11)	Symbol for luminaires for lamps of similar shape to "cool beam" lamps		N
1.5 (3.2.12)	Terminations		N
1.5 (3.2.13)	Symbol for minimum distance from lighted objects		N
1.5 (3.2.14)	Symbol for rough service luminaires		N
1.5 (3.2.15)	Symbol for luminaires for use with bowl mirror lamps		N
1.5 (3.2.16)	A protective shield shall be marked with "Replace any cracked protective shield" or the symbol.		N
1.5 (3.2.17)	The maximum number of luminaires		N
1.5 (3.2.18)	A warning symbol or notice for luminaires with ignitors		N
1.5 (3.2.19)	Symbol for luminaires for the use with self-shield tungsten halogen lamps pr self-shielded metal halide lamps		N
1.5 (3.2.20)	The means of adjustment		N
1.5 (3.2.21)	The relevant symbol for luminaires not suitable for covering with thermally insulated material		N
1.5 (3.2.22)	Symbol for luminaires with internal replaceable fuses.		N
1.5 (3.3)	Additional information		
	Language of instructions	English	P
1.5 (3.3.1)	Combination luminaires		N
1.5 (3.3.2)	Nominal frequency in Hz	50 Hz	P
1.5 (3.3.3)	Operating temperature		N
1.5 (3.3.4)	Symbol or warning notice		P
1.5 (3.3.5)	Wiring diagram		N
1.5 (3.3.6)	Special conditions		N
1.5 (3.3.7)	Warning notice for luminaire with metal halide lamp		N
1.5 (3.3.8)	Limitation for semi-luminaires		N
1.5 (3.3.9)	Power factor and the supply current		N
1.5 (3.3.10)	Suitability for use "indoors"		N
1.5 (3.3.11)	Luminaires with remote control gear		N
1.5 (3.3.12)	A warning for clip-mounted luminaire		N
1.5 (3.3.13)	The specifications of all protective shields		N
1.5 (3.3.14)	Symbol for nature of supply	~	P
1.5 (3.3.15)	The rated current of socket outlet		N

1.5 (3.3.16)	The information about rough service luminaire		N
1.5 (3.3.17)	The mounting instructions for type Y, type Z and some type X attachments		N
1.5 (3.3.18)	Information about non-ordinary luminaires with PVC supply cord		N
1.5 (3.3.19)	Instruction for the protective conductor current in		N
1.5 (3.3.20)	Information to advise the correct installation for wall mounted and adjustable luminaires.		N
1.5 (3.4)	**Test of marking**		
	Test with water		P
	Test with hexane		P
	Legible after test		P
	Label attached		P

1.6 (4)	**CONSTRUCTION**		
1.6 (4.2)	Components replaceable without difficulty		P
1.6 (4.3)	Wireways smooth and free from sharp edges		P
1.6 (4.4)	Lampholders	E 27	P
1.6 (4.4.1)	Integral lampholder		N
1.6 (4.4.2)	Wiring connection		N
1.6 (4.4.3)	Lampholder for end-to-end mounting		N
1.6 (4.4.4)	Positioning		P
	- pressure test (N) .....:		N
	After test the lampholder comply with relevant standard sheets and show no damage		N
	After test on single-capped lampholder the lampholder have not moved from its position and show no permanent deformation		N
	- bending test (N) .....:	2.0 Nm	P
	After test the lampholder have not moved from its position and show no permanent deformation		N
1.6 (4.4.5)	Peak pulse voltage		N
1.6 (4.4.6)	Centre contact point		N
1.6 (4.4.7)	The insulating parts in rough service luminaires shall be of a material resistant to tracking		N
1.6 (4.4.8)	Lamp connectors		P
1.6 (4.4.9)	Caps and bases shall be correctly used		P
1.6 (4.5)	Starter holders		
	Starter holder in luminaires other than class II shall accept starters which comply with IEC 60155		N
	Starter holder of class II construction		N

1.6 (4.6)	Terminal blocks		
	Connecting leads (tails)		N
	Unsecured terminal blocks		N
1.6 (4.7)	Terminals and supply connections		
1.6 (4.7.1)	Metal parts not becoming live due to a detached wire or screw.		P
1.6 (4.7.2)	No risk of contact between live parts and metal parts which can be touched with the standard test finger when the luminaire is fully assembled for use or open for the replacement of lamps or starters.		P
1.6 (4.7.3)	Terminals for supply cords shall be suitable for connection to be made by means of screws, nuts or equally effective devices.		N
1.6 (4.7.3.1)	**Welding method and material**		
	- stranded or solid conductor		N
	- spot welding		N
	- Welding of wire and plate is allowed, but welding of wires together is not allowed.		N
	- Type Z attachment only on welded connections		N
	- mechanical test according to 15.8.2		N
	- electrical test according to 15.9		N
	- heat test according to 15.9.2.3 and 15.9.2.4		N
1.6 (4.7.4)	Terminals other than supply connection shall comply with the requirements of Sections 14 and 15.		N
1.6 (4.7.5)	If the external wiring or supply cord is unsuitable for the temperatures reached inside the luminaire, either a connection s or heat-resisting parts shall be needed.		N
1.6 (4.7.6)	For multi-pole plug and socket, unsafe connections shall be prevented.		N
	- test at 30 N		N
1.6 (4.8)	Switches:		
	- adequate rating and fixing		N
	- Switches in flexible cables or cords and switched lampholers shall not be used in non-ordinary luminaires.		N
	- polarized supply		N
	- compliance with 61058-1 for electronic switches		N
1.6 (4.9)	**Insulating lining and sleeves**		
1.6 (4.9.1)	Retainement		N

1.6 (4.9.2)	Insulated linings, sleeves and similar parts shall have adequate mechanical, electrical and thermal strength.		N
	Electric strength test		
	The thermal properties of wire and sleeve		
	a) & c) Insulation resistance and electric strength		P
	b) Resistant to temperature > 20 °C to the wire temperature or other temperature test.		N
1.6 (4.10)	**Double and reinforced insulation**		
1.6 (4.10.1)	For metal encased class II luminaires, contact between: -- mounting surfaces and parts with basic insulation only, -- accessible metal parts and basic insulation shall be prevented.		N
	The wiring includes internal and external wiring of the luminaire, and fixing wiring of the installation.		N
	Degree of protection against electric shock of class II shall not be impaired.		N
	The interference suppression capacitors shall comply with the requirements according to IEC 60384-14 and the method of their connection shall be in accordance with 8.6 of IEC 60065.		N
1.6 (4.10.2)	Assembly gaps greater than 0.3 mm:		
	- neither be coincidental with any gap in basic insulation, nor be straight access to live parts		N
	- Openings larger than 0.3 mm in double or in reinforced insulation shall be so designed that live parts cannot be touched with the conical pin of test probe 13.		N
	The required degree of protection against electric shock shall be in accordance with the IP classification of the luminaire.		
1.6 (4.10.3)	For parts of class II luminaires which serve as supplementary insulation or reinforced insulation:		
	- either be fixed so that they cannot be removed without being seriously damaged;		N
	- or be unable to be replaced in an incorrected position		N
	The sleeving and lining shall be retained in position by positive means		N
1.6 (4.11)	**Electrical connections and current-carrying parts**		
1.6 (4.11.1)	Contact pressure shall be transmitted through non-insulated material		P

1.6 (4.11.2)	Screws:		
	- self-tapping screws not be used for the connection of current-carrying parts		N
	- thread-cutting screws and self-tapping screws not be used for the interconnection of current-carrying parts		N
	- self-tapping screws may be used to provide earth continuity.		N
1.6 (4.11.3)	Screws and rivets shall be locked against loosening		
	- Spring washers may provide satisfactory locking.		N
	- For rivets, a non-circular shank or an appropriate notch may be sufficient.		N
1.6 (4.11.4)	Material of current-carrying parts		P
1.6 (4.11.5)	No direct contact with the mounting surface or wood.		P
1.6 (4.11.6)	Electro-mechanical contact systems shall withstand the electrical stresses in normal use.		N
	After the test, the samples shall show		
	-- no wear impairing their further use;		N
	- no deterioration of enclosures or barriers		N
	- no loosing of electrical or mechanical connections		N
1.6 (4.12)	**Screws and connections (mechanical) and glands**		
1.6 (4.12.1)	The failure of screws and mechanical connections shall withstand the mechanical stresses in normal use		N
	Screws shall not be made of a material which is soft or liable to creep.		N
	Screws which are operated for maintenance purposes shall not be of insulating material.		N
	Changing the screw retaining the ballast is not considered to be maintenance.		N
	Screws on the cable or cord as a replacement shall not be regarded as maintenance.		N
	Torque tests on screw of insulating material:		N
	- For M3, the torque is:		N
	- For M4, the torque is:		N
1.6 (4.12.2)	Screws transmitting contact pressure, operated when mounting or connecting the luminaires and having a nominal diameter less than 3 mm shall screw into metal		N
	Some sort of screws and nuts are excluded.		

1.6 (4.12.4)	Screws and other fixed connections shall not work loose through torsion, bending stresses, vibration, etc.		
	Test with torque not exceeding - 2.5 Nm for thread size≤ M 10 or corresponding diameters; - 5.0 Nm for thread size> M 10 or corresponding diameters;		N
	- Test of lampholder with a torque not exceeding: - 4.0 Nm for E40 lampholders; - 2.0 Nm for E26, E27 and B22 lampholders	2.0 Nm for E27 lamphlder.	N
	- For push-button switches, the torque not exceeding 0,8 Nm.		N
1.6 (4.12.5)	Torque test of screwed glands, and after the test, the luminaire and glands shall show no damage.		N
1.6 (4.13)	**Mechanical strength**		
1.6 (4.13.1)	Luminaires shall have adequate mechanical strength		
	Impact energy and spring compression test for recessed luminaire, fixed general purpose luminaires and portable luminaires for wall mounting	0.35 Nm compression force is imposed on the enclosure.	P
	Portable floor and table luminires, photo and film luminaires		N
	Floodlights, road and street lighting luminaires, swimming-pool luminaires, portable garden luminaires and luminaires for children		N
	Rough services luminaires, handlamps and lighting chains		N
1.6 (4.13.3)	A straight unjointed test finger is used.	30 N	P
1.6 (4.13.4)	**Rough service luminaires**		N
	- IP54 or higher		N
	Rough service luminaires shall have adequate mechanical strength and shall not overturn during normal use. In addition, the fixation means of the stand shall have adequate mechanical strength. Compliance is checked by the following tests:		
	a) Fixed rough service luminaires and portable rough service luminaires (not hand-held)		N
	b) Hand-held luminaires		N
	After the test a) and b), the luminaire shall show no damage impairing safety and its future use.		N
	c) Luminaires delivered with a stand		N
	d) Luminaires for temporary installations and suitable for mounting on a stand		N

	After the test, there shall be no impairing of the safety		N
1.6 (4.13.6)	Plug-ballast/transformers and mains socket-outlet-mounted luminaires shall have adequate mechanical strength.		N
	The test is made in a tumbling barrel. The sample falls from a height of 50 cm onto a steel plate 3 mm thick. After the test, the sample shall show no damage within the sense of this standard, but it need not be operative and any damage to the glass bulb shall be ignored.		N
1.6 (4.14)	**Suspensions and means of adjustment**		
1.6 (4.14.1)	Mechanical suspension shall have adequate factors of safety.		
	Test A: For all suspended luminaires: A constant, evenly distributed load equal to four times the weight of the luminaire shall be added to the luminaire in the normal direction of the load for a period of 1 h. There shall be no appreciable deformation of the components of the suspension system at the end of this period.	1.85×4 kg	P
	Test B: For rigid luminaires: A torque of 2.5 Nm is applied to the luminaire for a period of 1 min, first in a clockwise and then in an anticlockwise direction. Tests for rigid suspension brackets are different.		P
	Test D: For track-mounted luminaires, the mass of the luminaire shall not exceed the value of the maximum loading.		N
	Test E: For clip-mounted luminaires, a pull is used to the cable without jerk for 1 min in the most unfavourable direction in normal use.		N
1.6 (4.14.2)	Load to flexible cables		
	Mass (kg) .....:		N
	Stress in conductors (N/mm²) .....:		N
	Mass (kg) of semi-luminaire .....:		N
	Bending moment (Nm) of semi-luminaire .....:		N
1.6 (4.14.3)	Adjusting devices:		
	Adjusting devices and means of adjustment shall be so constructed that cords or cables are not pressed, clamps, damaged or twisted along the longitudinal axis by more than 360°during operation.		N

	- Luminaires with a means of adjustment intended to be installed within arm's reach, shall allow the operation.		N
	- For luminaires intended to be mounted within arm's reach, the space shall comply with the temperature limits for the means of adjustment.		N
1.6 (4.14.4)	Cords or cables shall not be fixed to the outer tube.		N
1.6 (4.14.5)	Guide pulleys shall be dimensioned to prevent damage to the cords by excessive bending.		N
1.6 (4.14.6)	Plug-ballast/transformers and mains socket-outlet-mounted luminaires shall not impose undue strain on socket-outlets.		N
1.6 (4.15)	**Flammable materials**		P
1.6 (4.15.1)	- glow-wire test 650 °C		N
	- spacing ≥ 30 mm		P
	- screen withstanding test of 13.3.1		N
	- screen dimensions		N
	- no fiercely burning material		N
	- spacing is not required from electronic circuits		N
	- spacing is not required from parts of luminaires incorporating a temperature sensing control		N
1.6 (4.15.2)	Luminaires made of thermoplastic material shall withstand temperature rises.		
	a) constructive measures ensuring that - during failure conditions, the components are lept in place		N
	b) The use of temperature sensing control to limit the temperature of the ballast/transformer and electronic device fixation points and exposed parts.		N
	c) The thermoplastic materials shall be suitable for the maximum surface temperature.		P
1.6 (4.16)	**Luminaires for mounting on normally flammable surfaces**		
	Luminaires classified as suitable for mounting on a normally flammable surface shall comply with one of the following requirements of 4.16.1, 4.16.2, or 4.16.3.		P
1.6 (4.16.1)	The lamp control gear shall be spaced from the mounting surface by a minimum distance of either:		
	- 10 mm		N
	- 35 mm		N

1.6 (4.16.2)	The luminaire shall incorporate a temperature sensing control to limit the temperature of the mounting surface of the luminaire to a safe value.		N
	- The temperature sensing control may be either a self-resetting thermal cut-out, or a manual reset thermal cut-out or a thermal link.		N
	- A temperature sensing control external to the lamp controlgear shall not be of the plug-in type or an otherwise easily replaceable type.		N
1.6 (4.16.3)	Design to satisfy the test of 12.6	(see 12.6)	N
1.6 (4.17)	**Drain holes**		
	If water accumulates in the luminaire it can drain out effectively.		N
1.6 (4.18)	**Resistance to corrosion:**		
1.6 (4.18.1)	- resistant to rust		P
1.6 (4.18.2)	- resistant to stress corrosion		N
1.6 (4.18.3)	- resistant to corrosion		N
1.6 (4.19)	**Ignitors**		N
	Electrically compatible with ballast		
1.6 (4.20)	**Rough service luminaires- Vibration requirements**		N
	Rough service luminaires shall have adequate resistance to vibrations.		
1.6 (4.21)	**Protective shield:**		
1.6 (4.21.1)	Shield fitted with a protective shield against of the possible risk of lamp shattering.		N
1.6 (4.21.2)	Particles from a shattering lamp cannot impair safety		N
1.6 (4.21.3)	No direct path for parts of shattered lamp leaving the luminaire.		P
1.6 (4.21.4)	Test for checking the compliance with 4.21.1 and 4.21.3.		N
1.6 (4.22)	**Attachments to lamps**		N
	No attachments to lamps that might cause overheating or damage to the lamps.		
1.6 (4.23)	Semi-luminaires comply with the requirements for class II luminaires.		N
1.6 (4.24)	**UV radiation**		
	No emission of excessive UV radiation for tungsten halogen lamps and metal halide lamps		N
1.6 (4.25)	**Mechanical hazard**		
	No sharp point or edges		P
1.6 (4.26)	**Short-circuit protection:**		

1.6 (4.26.1)	Adequate means to prevent the impairing of safety due to unintended short-circuiting of uninsulated accessible SELV parts of opposite polarity.		N
1.6 (4.26.2)	The test chain shall not melt through, nor the temperature exceed the values of Tables 12.1 and 12.2.		N
1.6 (4.26.3)	Test chain for an uncoated metal.		N
(4.27)	**Terminal blocks with integrated screwless earthing contacts.**		N

1.7 (11)	**CREEPAGE DISTANCES AND CLEARANCES**		
	Working voltage (V) .....:	220-240V	—
	Voltage form	Sinusoidal ☒ Non-sinusoidal ☒	—
	PTI	< 600 ☒ > 600 ☐	—
	Impulse withstand category (Normal category II) (Category III Annex U)	Category II ☐ Category III ☐	—
	Rated pulse voltage (kV) .....:	——	—
	(1) Live parts of different polarity: cr ≥2.5(mm); cl ≥1.7(mm):	cr : 7.0 mm cl: 5.5 mm	P
	(2) Live parts and accessible metal parts: cr ≥2.5(mm); cl ≥1.7(mm):		P
	(3) Parts becoming live due to the breakdown of basic insulation in luminaires of class II and accessible metal parts: cr (mm); cl (mm).....:		N
	(4) The outer surface of a flexible cord or cable and an accessible metal part: cr (mm); cl (mm) :		N
	(5) Not used		—
	(6) Live parts and other metal parts, between them and the supporting surface: cr ≥3.6(mm); cl ≥3.6(mm):		P

1.8 (7.2)	**PROVISION FOR EARTHING**		
1.8 (7.2.1 + 7.2.3)	The following metal parts of class I luminaires shall be permanently and reliably connected to an earthing terminal or earthing contact.		P
	a) Accessible metal parts		P
	b) Metal parts in contact with supporting surface		P
	The earthing connections shall be of low resistance:		P
	a) Resistance < 0,5 Ω	0.137 Ω	P

	Self-tapping screws may b e used to provide earthing continuity.		N
	Thread-forming screws ay b e used to provide earthing continuity.		P
	A thread forming screw used in a grove of metallic material could provide continuity of earthing.		N
	For class I luminaire with detachable parts, the earth connection shall be made before the current-carrying contacts are made and the current-carrying contacts shall separate before the earth connection is made.		N
1.8 (7.2.2 + 7.2.3)	A good electrical contact of surfaces in adjustable joints, telescopic tubes, etc. is provided.		P
1.8 (7.2.4)	Earthing terminals shall comply with the requirements of 4.7.3.The connection shall be adequately locked against accidental loosening.		P
	For terminal blocks with integrated screwless earthing contacts, the additional tests of Annex V apply.		N
1.8 (7.2.5)	For a luminaire provided with a connect socket for a mains supply, the earth contact shall be integral part of the socket.		P
1.8 (7.2.6)	For a luminaire to be connected to supply cables (fixed wiring) or to a supply cord, the earth terminal shall be adjacent to the mains terminal.		P
1.8 (7.2.7)	For the luminaires which are other than ordinary luminaires, all parts of an earth terminal shall be least of electrolytic corrosion.		P
1.8 (7.2.8)	Material of earth terminal and the screw.		N
	Contact surface shall be bare metal.		P
1.8 (7.2.10)	Class II luminaire for looping-in shall be insulated from accessible metal parts by double or reinforced insulation.		N
	Class II luminaire for functional purposes, the functional earth circuits shall be separated from live parts or accessible metal parts by double or reinforced insulation.		N
1.8 (7.2.11)	The supply cord of a class I luminaire shall have an earthing core coloured green-yellow.		P

	The green-yellow core shall be connected to the earthing terminal and to the earthing contact of a plug.		P
	All conductors, whether internal or external shall be connected to an earthing terminal.		P
	The current-carrying conductor shall be taut before the earthing conductor.		P

1.9 (14)	**SCREW TERMINALS**		
	Definitions of screws		N
	General requirements and basic principles		N
	Mechanical tests of different screws		N
1.9 (15)	**SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS**		
	Definitions of screwsless terminals		N
	General requirements		N
	General instructions on tests		N
	Terminal and connections for internal wiring		N
1.10 (5)	**EXTERNAL AND INTERNAL WIRING**		
1.10 (5.2)	Supply connection and other external wiring		
1.10 (5.2.1)	Means of connection.....:	External wiring	P
1.10 (5.2.2)	Requirements of supply cords used as a means of connection to the supply.		
	Materials of supply cord		N
	Nominal cross-sectional area (mm^2).....:		N
1.10 (5.2.3)	Methods of type X, type Y or type Z for the supply cord.	Type Y	P
1.10 (5.2.5)	Type Z attachment shall not be made by means of screwed connections.		N
1.10 (5.2.6)	Cable entries shall:		
	- be suitable for introduction of the circuit or the protective covering of the cable or flexible cords		P
	- provide the degree of protection against dust or moisture.		P
1.10 (5.2.7)	Cable entries through rigid material shall have smoothly rounded edges of minimum radius 0.5 mm.		P
1.10 (5.2.8)	The opening shall be provided with a tough bushing of insulating materials:		
	- suitably fixed		P
	- material in bushings		N
	- material not likely to deteriorate		P

	- tubes or guards made of insulating material		P
1.10 (5.2.9)	Bushings shall be locked in position, and of self-hardening resin type.		P
1.10 (5.2.10)	Cord anchorage:		
	- covering protected from abrasion		P
	- clear how to be effective		P
	- no mechanical or thermal stress		P
	- tying the cable or cord into a knot or tying the ends with string shall not be used.		P
	- insulating material or lining		P
1.10 (5.2.10.1)	Cord anchorage for type X attachment:		
	a) at least one part fixed to, or integral with, the luminaire;		N
	b) suitable for the different types of supply cord		N
	c) no damaging of the supply cord and unlikely to be damaged when tightened or loosened in normal use;		N
	d) the whole supply cord with its covering can be mounted into the cord anchorage;		N
	e) no touching of clamping screws		N
	f) no clamping of metal screw		N
	g) replacement without requiring the use of a tool		N
	Glands not used as anchorage		N
	Labyrinth type anchorages		N
1.10 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment	Type Y	N
1.10 (5.2.10.3)	Tests:		
	- not easily changing the position once tightened		P
	- being tightened with a torque		P
	- pull test: 25 times; pull (N).....:		P
	- torque test: torque (Nm) .....:		N
	- displacement ≤ 2 mm		P
	- no noticeable movement of conductors		P
	- no damage of cable or cord		P
1.10 (5.2.11)	External wiring passing into luminaire		P
1.10 (5.2.12)	Looping-in terminals		N

1.10 (5.2.13)	Wire ends may be tinned	Wire ends are not tinned.	P
1.10 (5.2.14)	Plug with the same protection		N
	Class III luminaire plug		N
1.10 (5.2.16)	AC mains appliance inlets shall comply with the requirements of IEC 60320.		N
1.10 (5.2.17)	Inter-connecting cables shall consist of a defined assembly.		N
1.10 (5.2.18)	All portable luminaires shall be fitted with a plug.		N
1.10 (5.3)	**Internal wiring**		
1.10 (5.3.1)	Internal wiring of a suitable size and type		P
	Cables used as through wiring not delivered if the mounting instruction is offered.		N
	Wires coloured green and yellow shall be used for making earth connections only.		P
	Socket outlet loaded with the declared value.		N
	Stable conditions shall be checked in accordance with the requirements of 12.4.		P
1.10 (5.3.1.1)	For wiring directly connected to the fixed wiring		
	For mechanical protected wiring carrying normal operating currents lower than 2A,		N
	Cross-sectional area (mm^2) .....:		N
	Insulation thickness		N
	The required mechanical protection is adequate when extra insulation is added		N
1.10 (5.3.1.2)	For wiring which is connected to the fixed wiring via internal current-limiting device and limiting the current to 2 A maximum		
	The minimum cross-sectional area and insulation thickness are applicable.		N
1.10 (5.3.1.3)	The internal wiring of class II luminaire shall comply with the requirements of double or reinforced insulation relevant to the voltage stress.		N
1.10 (5.3.1.4)	Conductors without insulation shall be provided adequate precautions.		N
1.10 (5.3.1.5)	The SELV current-carrying parts do not have to be insulated.		N
1.10 (5.3.1.6)	Insulation thickness shall be selected.		N

1.10 (5.3.2)	Internal wiring shall not be damaged by		
	Sharp edges etc.;		P
	No moving parts of switches etc.;		P
	Wirings shall not be twisted along the longitudinal axis of the cable through an angle exceeding 360°		P
1.10 (5.3.3)	The opening shall be provided with a tough bushing of insulating material:		
	- having smoothly rounded edges,		P
	- not easily moved		P
	- Bushings of material likely to deteriorate with age shall not be used in openings with sharp edges.		P
	The following requirements are also met by the use of a separate protective sheath over a cable.		P
1.10 (5.3.4)	Joints and junctions in internal wiring shall be effectively insulated		N
1.10 (5.3.5)	The requirements for external wiring if the internal wiring is subjected to strain.		P
1.10 (5.3.6)	Wire of adjustable luminaires		N
1.10 (5.3.7)	The ends of flexible stranded conductors may be tinned but shall not have additional solder.		P

1.11 (8)	**PROTECTION AGAINST ELECTRIC SHOCK**		
1.11 (8.2.1)	Live parts are not accessible when the luminaire is in normal use.		P
	No access to live parts with the standard test finger.		P
	Lampholders and starter holders shall comply to the electrical strength test and creepage distance and clearance requirements for double or reinforced insulation.		N
	A component for building-in shall comply with the relevant requirements of an independent component.		P
	Protection against electric shock shall be maintained.		P
	Covers in fixed luminaires that cannot be removed by a single action with one hand are not removed.		P

	Supply conductors held by screwless terminals with push-button releasing devices shall not be moved for this test.		N
	The use of push-button type terminal blocks without the use of a cover is not precluded by this requirement.		N
	Tubular tungsten filament lamps having a cap/base at each end shall be of automatic double-pole disconnection operative.		N
	The insulating properties of lacquer and similar materials shall not be relied upon to give the required protection against electric shock and protection against short-circuit.		P
	Luminaires with ignitors for use with double ended high pressure discharge lamps shall be tested according to Figure 26.		N
	If the voltage exceeds 34 V (peak), the ignitor shall only be active if the lamp is fully inserted, or a warning shall be fitted to the luminaire.		N
	Luminaires for double-capped Fa8 tubular lamps shall comply with the marking requirement of 3.2.18.		N
1.11 (8.2.2)	For portable luminaires, protection against electric shock shall also be maintained after movable parts of the luminaires have been placed in the most unfavourable position.		N
1.11 (8.2.3.a)	- Insulated metal parts of class II luminaires are live parts for the purpose of this section		N
1.11 (8.2.3.b)	Metal lamp holders for bayonet cal lamps in class I luminaires shall be earthed.		N
1.11 (8.2.3.c)	Class III luminaires may have exposed current carrying parts in the SELV circuits.		N
	Ordinary luminaire:		
	- voltage under load .....:		N
	- no-load voltage.....:		N
	For luminaires which are other than ordinary luminaire:		
	- nominal voltage .....:		N
	Class III luminaires are accepted only for connection to a SELV source.		
1.11 (8.2.4)	Portable luminaire connecting to the supply shall have protection against electric shock which is independent of the supporting surface		N

1.11 (8.2.5)	Compliance with the requirements of 8.2.1 to 8.2.4 is checked by inspection and, if necessary, by the test with the relevant test probe or by means of the specific test probe.		P
2.11 (8.2.6)	Covers and other parts shall have adequate mechanical strength and shall be reliably secured.		P
2.11 (8.2.7)	Luminaires incorporating a capacitor of capacitance exceeding 0.5 μF shall be provided with a discharge device so that the voltage across the capacitor 1 min after disconnection of the luminaire from the source of supply at rated voltage does not exceed 50 V.		N
	Portable luminaires connected to the supply, or with supply connector shall be provided with a discharge device so that 1 s after disconnection, the voltage between the pins of the plug or adaptor/connector contacts does not exceed 34 V.		N
	Other luminaires connected to the supply shall discharge so that after 5 s, the voltage between the pins of the plug does not exceed 60 V r.m.s.		N
	The lamp shall be in circuit when the measurement of the voltage from the compensation capacitor is made for the sub-clause 0.4.2.		N
	The residual voltages shall be measured on only one luminaire.		N
1.12 (12)	**ENDURANCE TEST AND THERMAL TEST**		
1.12 (12.3)	Endurance test:		
	- mounting-position..... :	Normal mounting position	—
	- test temperature (°C) ..... :	(33-37) °C	—
	- total duration (h)..... :	240 h	—
	- supply voltage: Un factor; calculated voltage (V)..... :	1.05 ×240 V ac	—
	When the luminaire ceases to operate because of a failure:	Incandescent lamp	—
1.12 (12.3.2)	After endurance test:		
	- no part unserviceable		P
	- luminaire not unsafe		P

	- no damage to track system		N
	- marking legible		P
	- no cracks, deformation etc.		P
1.12 (12.4)	**Thermal test (normal operation)**	(see Annex 1)	P
1.12 (12.5)	**Thermal test (abnormal operation)**	(see Annex 1)	N
1.12 (12.6)	**Thermal test (failed windings in lamp control gear):**		
1.12 (12.6.1)	Test for luminaires without thermal cut-outs		
	- measured mounting surface temperature (°C) at 1,1 times rated voltage		N
	- calculated mounting surface temperature (°C)		N
	- track-mounted luminaires		N
1.12 (12.6.2)	Test for luminaires with temperature sensing controls external to the ballast or transformer and luminaires with temperature.		
	- During any cycle of operation of the protector during the test, the surface temperature may be more than 135 °C.		—
	- The highest temperature of any part of the mounting surface shall not exceed 180 °C at any time during tests for thermal links and manual-reset thermal cut-outs, or 130 °C during tests for auto-reset thermal cut-outs.		N
	- During the test, the temperature of any part of the mounting surface shall not exceed 135 °C and shall not be more than 110 °C when the protector recloses the circuit.		N
1.12 (12.7)	**Thermal test in regard to fault conditions in lamp control gear or electronic devices incorporated in thermoplastic luminaires**		
1.12 (12.7.1)	Test for luminaire without temperature sensing control		
1.12(12.7.1.1)	**Test for luminaire incorporating ballast(s) of fluorescent lamps with a lamp load ≤ 70W**		
	Test method 12.7.1.1 or Annex W ..... :		—
	Test according to 12.7.1.1:		
	- The ballast under test shall be supplied directly at 1.1 times the rated supply voltage, in normal operation with the relevant lamp (s) in the circuit (up to the end of the test).		—
	- The supply voltage to the ballast under test shall be increased by 20 % of the rated supply voltage and left for a period of 15 min.		—

	- If no failure of the ballast occurs during the period, the supply voltage to the ballast under test shall be increased repeatedly in steps of 10 % of the rated supply voltage at 15 min intervals until ballast failure occurs.		N
	- After the ballast failure, the luminaire shall be allowed to cool to ambient temperature.		N
	Annex W provides an alternative method to the tests. The reference is given in 12.7.1.1		
1.12 (12.7.1.2)	**Test for luminaires incorporating discharge lamp, fluorescent lamps (> 70W), transformer of power > 10 VA**		
	- 20% of the lamp circuits in the luminaire and not less than one lamp circuit shall be subjected to abnormal conditions		N
	- The circuit which have the most thermal influence on the fixing point and exposed parts shall be chosen and other lamp circuits shall be operated at rated voltage under normal conditions.		N
	- The circuit subjected to abnormal conditions, shall be operated at 0, 9, 1, 0 and 1,1 times the rated voltage.		N
1.12 (12.7.1.3)	Test for luminaires with inherently short-circuit proof transformer of power ≤ 10 VA		N
	- The fault test shall be carried out to small transformers with power up to 10 VA; at the end of the first period of 4 h, the secondary winding shall be short circuited.		N
	- The short circuit shall be allowed to continue until transformer failure occurs;		N
1.12 (12.7.2)	**Test for luminaires with temperature sensing control internal/external to the ballast or transformer**		
	- The circuits subjected to abnormal conditions shall be operated with a slowly and steadily increasing current through the windings, until the temperature sensing control operates.		N
	- Time intervals and increments in current shall be such that the thermal equilibrium between winding temperatures and temperature of fixing points and most thermally exposed parts is achieved as far as practicable.		N

	- For luminaires fitted out with manual-reset thermal cut-outs, the test shall be repeated six times, allowing 30 min intervals between tests. At the end of each 30 min interval, the cut-out shall be reset.		N
1.13 (9)	**RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE**		
1.13 (9.2)	**Tests for ingress of dust, solid objects and moisture:**		
	The enclosure of a luminaire shall provide the degree of protection against ingress of dust, solid objects and moisture in accordance with		N
	the classification of the luminaire marked on the luminaire		N
	- IP number marked on the luminaire	——	N
	- Where connection is made by a plug or a similar device, then this shall be regarded as part of the complete luminaire and shall be included in the tests and similarly for any separate controlgear.	——	N
	- tests for the luminaires mounted and wired as in normal use and placed in the most unfavourable position, complete with their protective translucent covers, the clauses are..	9.2.0 to 9.2.9	—
	Electric strength test after completion of the tests:		P
	a) no deposit of talcum powder in dust-proof luminaires		N
	b) no deposit of talcum powder inside enclosures for dust-tight luminaires		N
	c) no trace of water on current-carrying parts or SELV parts		N
	d) i) For luminaires without drain holes – no water entry		N
	d) ii) For luminaires with drain holes – can drain effectively, does not reduce the creepage and clearances below minimum levels.		N
	e) no trace of water in watertight or pressure watertight luminaire		N
	f) i)no contact with live parts (IP 2X)	IP 20	P
	f) ii)no entry into enclosure (IP 3X and IP 4X)		N
	f) iii)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 a protective shield or glass envelope		N
1.13 (9.3)	**Humidity test**		P
	All luminaires shall be proof against humid conditions which may occur in normal use.		P
	The sample shall be kept in the cabinet for 48 h.		P

1.14 (10)	**INSULATION RESISTANCE AND ELECTRIC STRENGTH, TOUCH CURRENT AND PROTECTIVE CONDUCT CURRENT**		
1.14 (10.2.1)	**Test - Insulation resistance**		
	The insulation resistance shall be measured with a d.c. voltage of approximately 500 V, 1 min after the application of the voltage.		—
	For the insulation of SELV parts of luminaires, the d.c. voltage to be used for the measurement is 100 V.		—
	SELV:		
	- between current-carrying parts of different polarity .....:		N
	- between current-carrying parts and the mounting surface .....:		N
	- between current-carrying parts and metal parts of the luminaire .....:		N
	Other than SELV:		
	- between live parts of different polarity ≥2MΩ:.:	9999 MΩ	P
	- between live parts and the mounting surface ≥2MΩ:	9999 MΩ	P
	- between live parts and metal parts of the lumianaire ≥2MΩ:	9999 MΩ	P
	- between live parts which can become of different polarity through action of a switch ....:		N
1.14 (10.2.2)	**Test - Electric strength**		
	Dummy lamp		N
	The luminaires with ignitors is connected to a supply of 100% rated voltage, for a period of 24 h. Ignitors that become defective during this period are replaced immediately.		N

	For luminaires with manual ignitors, the luminaire is connected to a supply of 100% rated voltage and subjected to a "3 s on/10 s off" switching cycle for a total period of 1 h. Only one ignitor is used for this test.		N
	Test voltage (V) of insulation of parts of SELV:		N
	- between current-carrying parts of different polarity .....:		N
	- between current-carrying parts and the mounting surface .....:		N
	- between current-carrying parts and metal parts of the luminaire .....:		N
	Other than SELV:		
	- between live parts of different polarity.....:	between live and neutral polarity --1480 V	P
	- between live parts and the mounting surface .:	1480 V	P
	- between live parts and metal parts of the luminaire .....:	1480 V	P
	- between live parts which can become of different polarity through action of a switch ....:		N
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts		N
1.14 (10.3)	Touch current (mA).....:	0.017 mA	P

1.15 (13)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		N
4.15 (13.2)	Resistance to heat		
1.15 (13.2.1)	Ball-pressure test:		
	- a heating cabinet with a temperature 25 °C ± 5 °C, with a minimum temperature of 125 °C when parts retaining current-carrying parts or SELV parts in position are tested, and 75 °C for other parts.		N
	- After 1 h, the ball shall be removed from the sample, and the sample shall be cooled by immersion in cold water for 10 s. The diameter of the impression shall be measured and shall not exceed 2mm:		N
4.15 (13.3)	Resistance to flame and ignition		
1.15 (13.3.1)	Needle flame test (10 s):		N

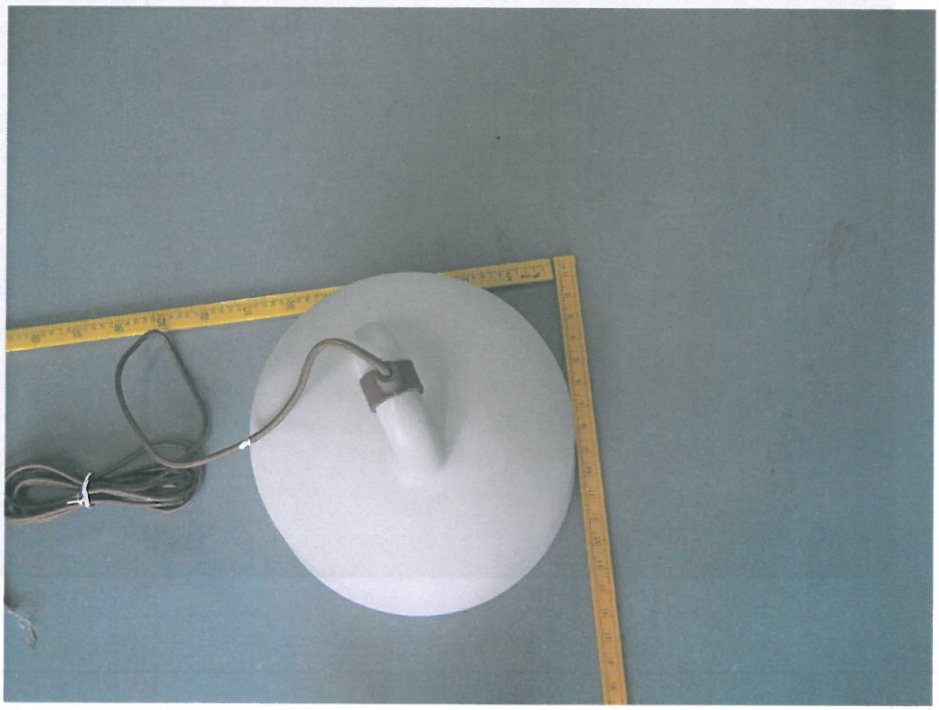
	The duration of burning shall not exceed 30 s after removal of the test flame, and any burning drop from the sample shall not ignite the underlying parts or tissue paper in 4.187 of ISO 4046-4, spread out horizontally 200 mm ± 5 mm below the sample.		
1.15 (13.3.2)	A test using a nickel-chromium glow-wire heated to 650 °C.		
	- Any flame or glowing of the sample shall extinguish within 30 s of withdrawing the glow-wire, and any burning or molten drop shall not ignite a single layer of or tissue paper in 4.187 of ISO 4046-4, spread out horizontally 200 mm ± 5 mm below the sample.		N
1.15 (13.4)	**Resistance to tracking**		
1.15 (13.4.1)	For materials other than ceramic, compliance is checked by the proof tracking test.		N

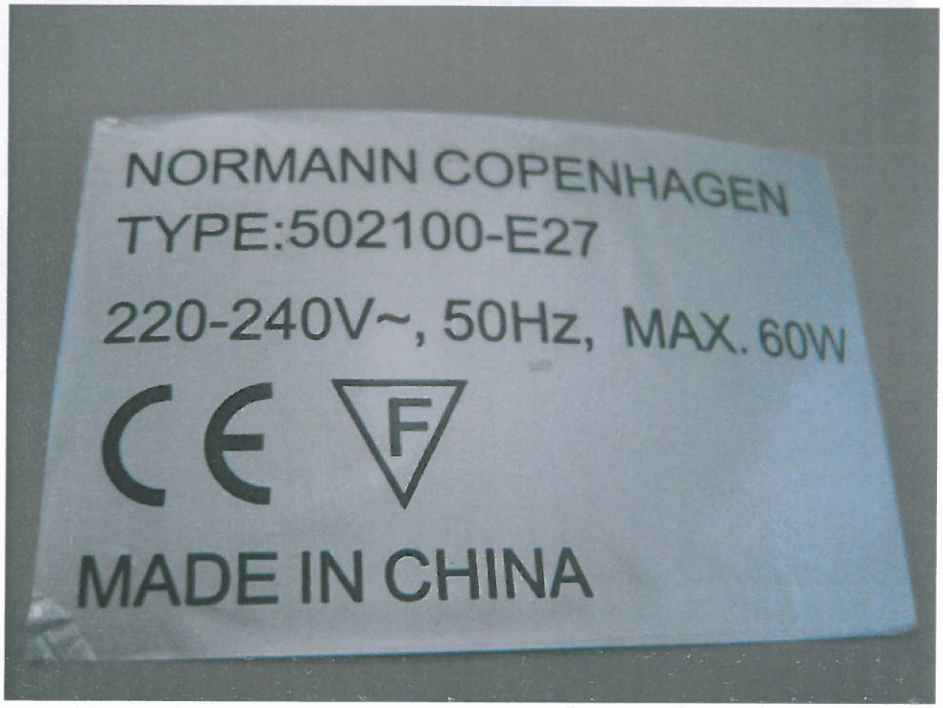
ANNEX 1—12(12.4) Thermal test (Normal operating)		
	- mounting position..... :	Normal mounting position
	- Ambient temperature (°C)..... :	21.9 °C
	- Humidity..... :	43%
	- test voltage (V)..... :	1.06 ×240 V ac

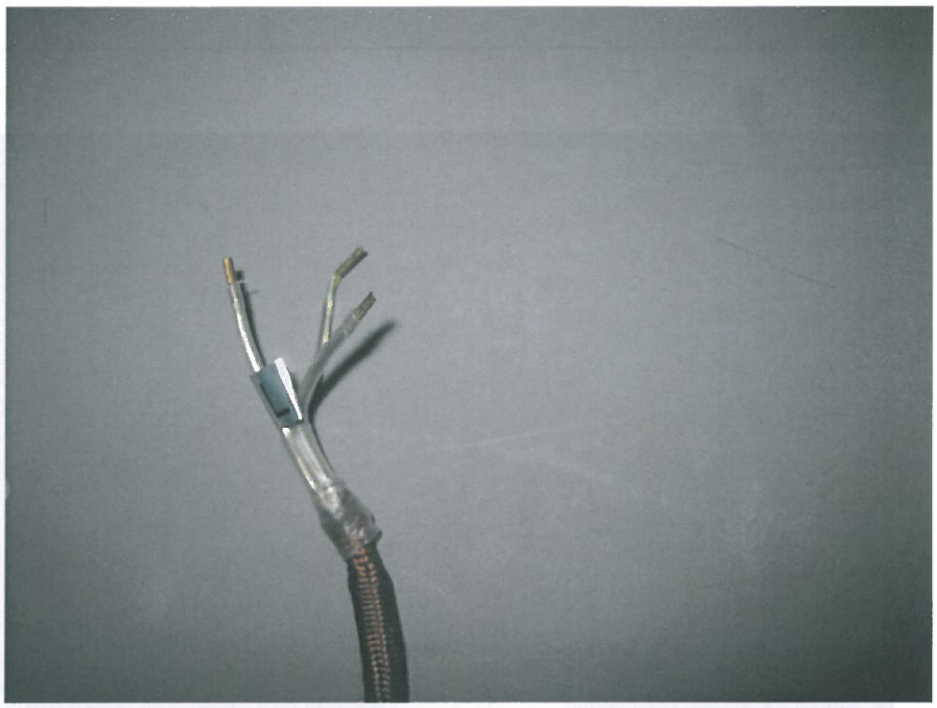
The tested part	Temperature (℃)	Limit value (℃)
Supply cord	29.4	95
Rubber ring	23.5	95
The interior of the enclosure	32.8	75
The exterior of the lampholder	87.5	95

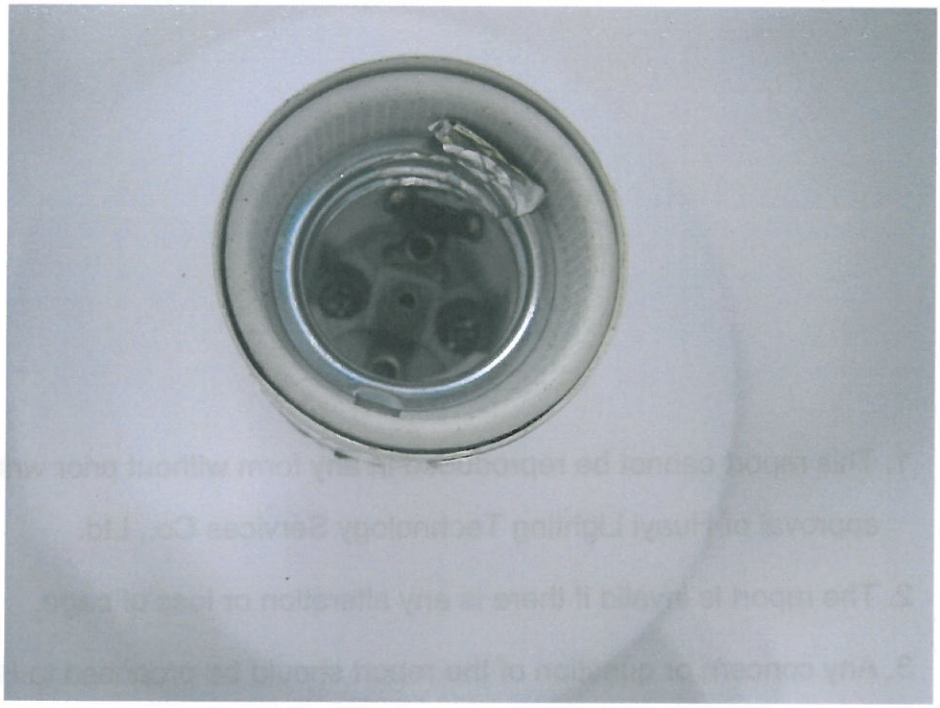
Test case verdicts:
Test case does not apply to the test object..... : N (.A.)
Test item does meet the requirement..... : P (ass)
Test item does not meet the requirement..... : F (ail)

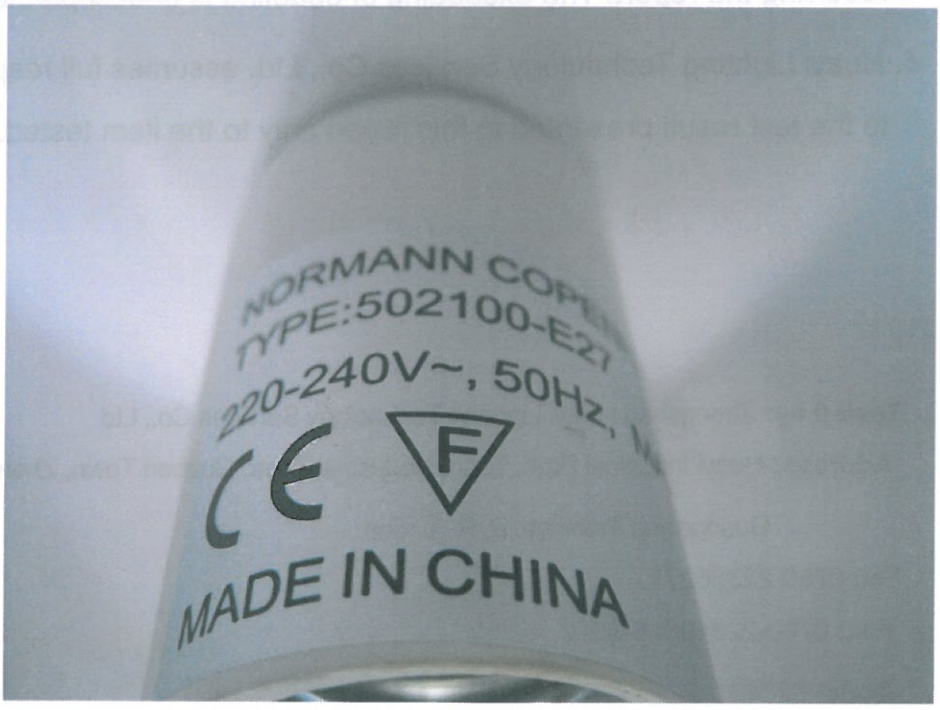
5. Photographs











-----END OF REPORT-----

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