



TEST REPORT
IEC 60598-2-21
Part 2: Particular requirements
Section 21: Rope Lights

Report Number. : 68.140.20.0092.01
Date of issue : 2020-06-02
Total number of pages : 42 pages (not including attachments)

Name of Testing Laboratory preparing the Report : TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch

Applicant's name : HUACAI (SHENZHEN) OPTO-ELECTRONICS Co., Ltd.
Address : Building A5, Qixing Wisdom Park, Shiyan Youth Road, Bao'an District, 518108 Shenzhen, PEOPLE'S REPUBLIC OF CHINA

Test specification:

Standard..... : IEC 60598-2-21:2014 used in conjunction with IEC 60598-1:2014, AMD1:2017
Test procedure..... : CE_LVD
Non-standard test method..... : N/A

Test Report Form No. : IEC60598_2_21B
Test Report Form(s) Originator.... : DEKRA Certification B.V.
Master TRF : 2020-01-31


Copyright © 2020 IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components (IECEE System). All rights reserved.

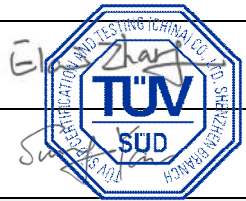
This publication may be reproduced in whole or in part for non-commercial purposes as long as the IECEE is acknowledged as copyright owner and source of the material. IECEE takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

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

General disclaimer:

The test results presented in this report relate only to the object tested.
 This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description :	High Voltage Silicone Extrusion Strip
Trade Mark :	
Original Product/Equipment Manufacturer :	Same as applicant
Branding Manufacturer(s) :	Same as applicant
Model/Type reference :	H852xxx8yy-8aaNSA050zCbbbb; H852xxx10yy-8aaNSA050zCbbbb; H852xxx12yy-8aaNSA050zCbbbb; H878xxx8yy-8aaNSA050zCbbbb; H878xxx10yy-8aaNSA050zCbbbb; H878xxx12yy-8aaNSA050zCbbbb; H8104xxx8yy-8aaNSA050zCbbbb; H8104xxx10yy-8aaNSA050zCbbbb; H8104xxx12yy-8aaNSA050zCbbbb (‘aa’ can be LW, WW, NW or CW, stands for CCT of LED, LW=2200K, WW=3000K, NW=4000K, CW=5700K; ‘bbbb’ can be 0100-5000, stands for the length of strip light 1-50m, in steps of 1m; ‘xxx’ can be 220, 230 or 240; ‘yy’ can be any two letters combination of A-Z; ‘z’ can be any letter of A-Z, ‘xxx’, ‘yy’ and ‘z’ stand for commercial product code)
Ratings :	220-240VAC; 50/60Hz; Other parameters see ‘General product information’

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
<input checked="" type="checkbox"/>	Testing Laboratory:	TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
	Testing location/ address.....:	Building 12&13, Zhiheng Wisdomland Business Park Nantou Checkpoint Road 2, Nanshan District 518052 Shenzhen CHINA
	Tested by (name, function, signature)..... :	Elain Zhang Project Handler
	Approved by (name, function, signature).. :	Sunny Yan Designated Reviewer
		
<input type="checkbox"/>	Testing procedure: CTF Stage 1:	
	Testing location/ address.....:	
	Tested by (name, function, signature).....:	
	Approved by (name, function, signature)....:	
<input type="checkbox"/>	Testing procedure: CTF Stage 2:	
	Testing location/ address.....:	
	Tested by (name + signature)	
	Witnessed by (name, function, signature)..:	
	Approved by (name, function, signature)....:	
<input type="checkbox"/>	Testing procedure: CTF Stage 3:	
<input type="checkbox"/>	Testing procedure: CTF Stage 4:	
	Testing location/ address.....:	
	Tested by (name, function, signature).....:	
	Witnessed by (name, function, signature)..:	
	Approved by (name, function, signature)....:	
	Supervised by (name, function, signature) :	



<p>List of Attachments (including a total number of pages in each attachment):</p> <p>Attachment No. 1: 2 pages of test report for European group differences and national differences for EN 60598-2-21:2015 and EN 60598-1:2015+A1:2018;</p> <p>Attachment No.2: 2 pages of test report for IEC 60598-2-1:1979, IEC 60598-2-1:1979/AMD1:1987; 2 pages of test report for European group differences and national differences for EN 60598-2-1:1989 and EN 60598-1:2015+A1:2018 (particular requirements for fixed general purpose luminaires);</p> <p>Attachment No. 3: 15 pages of test report IEC 62031:2018; 1 page of test report for European group differences and national differences for EN IEC 62031:2020 (for LED module);</p> <p>Attachment No. 4: 3 pages of test report for IEC TR 62778:2014 (for blue light risk);</p> <p>Attachment No. 5: 6 pages of photo documentation.</p>											
<p>Summary of testing:</p>											
<p>Tests performed (name of test and test clause):</p> <table border="0"> <tr> <td>IEC 60598-1:2014</td> <td>EN 60598-2-21:2015</td> </tr> <tr> <td>IEC 60598-1:2014/AMD1:2017</td> <td>EN 60598-2-1:1989</td> </tr> <tr> <td>IEC 60598-2-21:2014</td> <td>EN 60598-1:2015+A1:2018</td> </tr> <tr> <td>IEC 60598-2-1:1979</td> <td>EN 62493:2015</td> </tr> <tr> <td>IEC 60598-2-1:1979/AMD1:1987</td> <td></td> </tr> </table> <p>The LED modules in products were found to comply with the requirements of following standards: IEC 62031:2018 and EN IEC 62031:2020.</p> <p>The submitted samples were classified as RG1 according to IEC TR 62778:2014.</p> <p>The submitted samples were LED-light-source technology, they were found to comply with the requirement of IEC 62493:2015 and EN 62493:2015 without any tests.</p> <p>The submitted samples were found to comply with the above test specification.</p>	IEC 60598-1:2014	EN 60598-2-21:2015	IEC 60598-1:2014/AMD1:2017	EN 60598-2-1:1989	IEC 60598-2-21:2014	EN 60598-1:2015+A1:2018	IEC 60598-2-1:1979	EN 62493:2015	IEC 60598-2-1:1979/AMD1:1987		<p>Testing location: Building 12&13, Zhiheng Wisdomland Business Park Nantou Checkpoint Road 2, Nanshan District 518052 Shenzhen CHINA</p>
IEC 60598-1:2014	EN 60598-2-21:2015										
IEC 60598-1:2014/AMD1:2017	EN 60598-2-1:1989										
IEC 60598-2-21:2014	EN 60598-1:2015+A1:2018										
IEC 60598-2-1:1979	EN 62493:2015										
IEC 60598-2-1:1979/AMD1:1987											
<p>Summary of compliance with National Differences (List of countries addressed):</p> <p>European group differences</p> <p><input checked="" type="checkbox"/> The product fulfils the requirements of</p> <ul style="list-style-type: none"> <input type="checkbox"/> EN 60598-2-21:2015 <input type="checkbox"/> EN 60598-2-1:1989 <input type="checkbox"/> EN 60598-1:2015+A1:2018 <input type="checkbox"/> EN 62493:2015 											

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:

Procedure number, issue date and title:

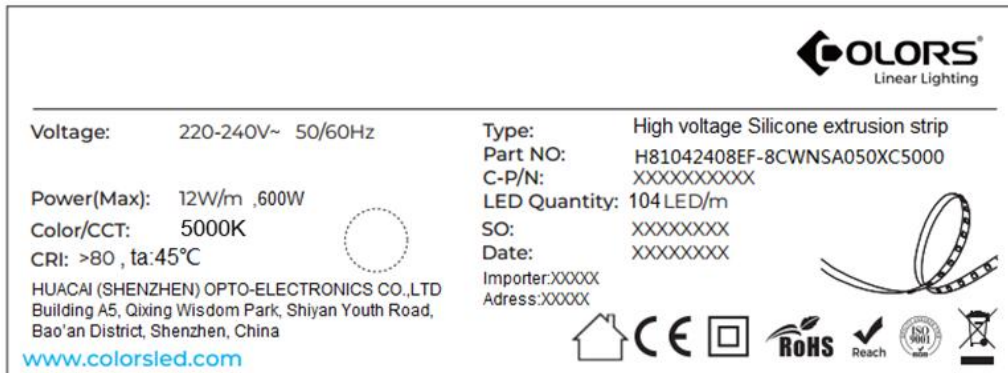
Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

Statement not required by the standard used for type testing

(Note: When IEC or ISO standard requires a statement concerning the uncertainty of the measurement systems used for tests, this should be reported above. The informative text in parenthesis should be delete in both cases after selecting the applicable option)

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



Remark: sticking on the input cord of strip light.

Labels of other models are similar with above label, except that model no., rated power, Color/CCT and LED quantity are different.

Height of WEEE mark at least 7mm, height of other marks at least 5mm, height of letters and numerals at least 2mm.

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

Test item particulars	LED Strip Light
Classification of installation and use	LED strip light for indoor use only
Supply Connection	Supply cord without plug
Protection class	II
Degree of protection	IP20
ta	45°C
Possible test case verdicts:	
- test case does not apply to the test object..... : N/A	
- test object does meet the requirement..... : P (Pass)	
- test object does not meet the requirement..... : F (Fail)	
Testing	
Date of receipt of test item : 2020-04-08	
Date (s) of performance of tests	
: 2020-04-08 to 2020-06-02	
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.	
Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.	
Clause numbers between brackets refer to clauses in IEC 60598-1	
The manufacturer/ Importer has to ensure the appliance placing on the EU market conforms to the applicable EU directives which provide the affixing of the CE marking, such as LVD, EMC, RoHS, ErP, and so on.	
Name and address of factory (ies)	HUACAI (YANGZHOU) OPTO-ELECTRONICS Co., Ltd. Huacai Industrial Park, Zhong'ai Village, Jiangdu District, 225200 Yangzhou, Jiangsu Province, PEOPLE'S REPUBLIC OF CHINA

General product information:

- LED strip light suitable for indoor use only.
- If input cord connects to plug, the length of the cord between the plug and the connection to the strip light shall be not less than 1,5m.

Model list:

Model No.	Max. rated power for whole Strip Light (W)	Max. rated power for per meter (W/m)	Type power for per meter (W/m)	Width of strip light (mm)	LED Quantity (pcs/m)	Circuit and PCB layout
H852xxx8yy-8aaNSA050zCbbbb	6-300	6	5.3	14	52	Same
H852xxx10yy-8aaNSA050zCbbbb						
H852xxx12yy-8aaNSA050zCbbbb						
H878xxx8yy-8aaNSA050zCbbbb	9-450	9	7.9	14	78	Same
H878xxx10yy-8aaNSA050zCbbbb						
H878xxx12yy-8aaNSA050zCbbbb						
H8104xxx8yy-8aaNSA050zCbbbb	12-600	12	10.6	14	104	Same
H8104xxx10yy-8aaNSA050zCbbbb						
H8104xxx12yy-8aaNSA050zCbbbb						

'aa' can be LW, WW, NW or CW, stands for CCT of LED, LW=2200K, WW=3000K, NW=4000K, CW=5700K;

'bbbb' can be 0100-5000, stands for the length of strip light 1-50m, in steps of 1m;

'xxx' can be 220, 230 or 240; 'yy' can be any two letters combination of A-Z; 'z' can be any letter of A-Z, 'xxx', 'yy' and 'z' stand for commercial product code

Unless otherwise specified, model H81042408AC-8CWNSA050AC5000 was chosen as representative model to perform all tests.

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict

21.4 (0)	GENERAL TEST REQUIREMENTS		¾
21.4 (0.3)	More sections applicable	Yes <input checked="" type="checkbox"/> (IEC/EN 60598-2-1) No <input type="checkbox"/>	¾
21.4 (0.5)	Components	(see Annex 1)	¾
21.4 (0.7)	Information for luminaire design in light sources standards		¾
21.4 (0.7.2)	Light source safety standard	EN IEC/IEC 62031	¾
	Luminaire design in the light source safety standard		P

21.5 (2)	CLASSIFICATION		¾
21.5 (2.2)	Type of protection	Class II	P
21.5 (2.3)	Degree of protection	IP20	P
21.5 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	¾
21.5 (2.5)	Luminaire for normal use	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	¾
	Luminaire for rough service	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	¾
21.5.2 (-)	Class II or Class III	Class II	P
21.5.3 (-)	Rope lights for outdoor use shall be IP44 or higher		N/A

21.6 (3)	MARKING		¾
21.6 (3.2)	Mandatory markings		P
	Position of the marking		P
	Format of symbols/text		P
21.6 (3.3)	Additional information		P
	Language of instructions	English	P
21.6 (3.3.1)	Combination luminaires		N/A
21.6 (3.3.2)	Nominal frequency in Hz	50/60Hz	P
21.6 (3.3.3)	Operating temperature		N/A
21.6 (3.3.4)	Symbol or warning notice		N/A
21.6 (3.3.5)	Wiring diagram		N/A
21.6 (3.3.6)	Special conditions		N/A
21.6 (3.3.7)	Metal halide lamp luminaire – warning		N/A
21.6 (3.3.8)	Limitation for semi-luminaires		N/A
21.6 (3.3.9)	Power factor and supply current		N/A
21.6 (3.3.10)	Suitability for use indoors		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
21.6 (3.3.11)	Luminaires with remote control		N/A
21.6 (3.3.12)	Clip-mounted luminaire – warning		N/A
21.6 (3.3.13)	Specifications of protective shields		N/A
21.6 (3.3.14)	Symbol for nature of supply	~	P
21.6 (3.3.15)	Rated current of socket outlet		N/A
21.6 (3.3.16)	Rough service luminaire		N/A
21.6 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments	Type Z	P
21.6 (3.3.18)	Non-ordinary luminaires with PVC cable		N/A
21.6 (3.3.19)	Protective conductor current in instruction if applicable		N/A
21.6 (3.3.20)	Provided with information if not intended to be mounted within arm's reach		N/A
21.6 (3.3.21)	Non replaceable and non-user replaceable light sources information provided	Non replaceable light sources	P
	Cautionary symbol		N/A
21.6 (3.3.22)	Controllable luminaires, classification of insulation provided		N/A
21.6 (3.4)	Test with water		P
	Test with hexane		P
	Legible after test		P
	Label attached		P
21.6.2 (-)	Rope light marking		P
	Rated voltage and wattage marked on the rope light		P
	Durable non-removable label if information on the cable		P
21.6.3 (-)	Rope light and packing marking		P
	Marking if only for indoor use		P
21.6.4 (-)	Marking on the packing or instructions		P
	Marking a) – e)		P

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
21.7 (4)	CONSTRUCTION		¾
21.7 (4.2)	Components replaceable without difficulty		N/A
21.7 (4.3)	Wireways smooth and free from sharp edges		P
21.7 (4.4)	Lampholders		N/A
21.7 (4.4.1)	Integral lampholder		N/A
21.7 (4.4.2)	Wiring connection		N/A
21.7 (4.4.3)	Lampholder for end-to-end mounting		N/A
21.7 (4.4.4)	Positioning		N/A
	- pressure test (N)		—
	After test the lampholder comply with relevant standard sheets and show no damage		N/A
	After test on single-capped lampholder the lampholder have not moved from its position and show no permanent deformation		N/A
	- bending test (N)		—
	After test the lampholder have not moved from its position and show no permanent deformation		N/A
21.7 (4.4.5)	Peak pulse voltage		N/A
21.7 (4.4.6)	Centre contact		N/A
21.7 (4.4.7)	Parts in rough service luminaires resistant to tracking		N/A
21.7 (4.4.8)	Lamp connectors		N/A
21.7 (4.4.9)	Caps and bases correctly used		N/A
21.7 (4.4.10)	Light source for lampholder or connection according IEC 60061 not connected another way		N/A
21.7 (4.5)	Starter holders		N/A
	Starter holder in luminaires other than class II		N/A
	Starter holder class II construction		N/A
21.7 (4.7)	Terminals and supply connections		P
21.7 (4.7.1)	Contact to metal parts		N/A
21.7 (4.7.2)	Test 8 mm live conductor		N/A
	Test 8 mm earth conductor		N/A
21.7 (4.7.3)	Terminals for supply conductors		P
21.7 (4.7.3.1)	Welded method and material		N/A
	- stranded or solid conductor		N/A
	- spot welding		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	- welding between wires		N/A
	- Type Z attachment		N/A
	- mechanical test according to 15.6.2		N/A
	- electrical test according to 15.6.3		N/A
	- heat test according to 15.6.2.3 and 15.6.2.4		N/A
21.7 (4.7.4)	Terminals other than supply connection		P
21.7 (4.7.5)	Heat-resistant wiring/sleeves		N/A
21.7 (4.7.6)	Multi-pole plug		N/A
	- test at 30 N		N/A
21.7 (4.8)	Switches		N/A
	- adequate rating		N/A
	- adequate fixing		N/A
	- polarized supply		N/A
	- compliance with IEC 61058-1 for electronic switches		N/A
21.7 (4.9)	Insulating lining and sleeves		N/A
21.7 (4.9.1)	Retainment		N/A
	Method of fixing		N/A
21.7 (4.9.2)	Insulated linings and sleeves:		N/A
	Resistant to a temperature > 20 °C to the wire temperature or		N/A
	a) & c) Insulation resistance and electric strength		N/A
	b) Ageing test. Temperature (°C)		N/A
21.7 (4.10)	Double or reinforced insulation		P
21.7 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		N/A
	Safe installation fixed luminaires		P
	Capacitors and switches		N/A
	Interference suppression capacitors according to IEC 60384-14		N/A
21.7 (4.10.2)	Assembly gaps:		N/A
	- not coincidental		N/A
	- no straight access with test probe		N/A
21.7 (4.10.3)	Retainment of insulation:		P
	- fixed		P
	- unable to be replaced; luminaire inoperative		P

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	- sleeves retained in position		N/A
	- lining in lampholder		N/A
21.7 (4.10.4)	Protective impedance device		N/A
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		N/A
	Y1 or Y2 capacitors comply with IEC 60384-14		N/A
	Resistors comply with test (a) in 14.1 of IEC 60065		N/A
21.7 (4.11)	Electrical connections and current-carrying parts		P
21.7 (4.11.1)	Contact pressure		P
21.7 (4.11.2)	Screws:		N/A
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
21.7 (4.11.3)	Screw locking:		N/A
	- spring washer		N/A
	- rivets		N/A
21.7 (4.11.4)	Material of current-carrying parts		P
21.7 (4.11.5)	No contact to wood or mounting surface		P
21.7 (4.11.6)	Electro-mechanical contact systems		N/A
21.7 (4.12)	Screws and connections (mechanical) and glands		N/A
21.7 (4.12.1)	Screws not made of soft metal		N/A
	Screws of insulating material		N/A
	Torque test: torque (Nm); part.....:		N/A
	Torque test: torque (Nm); part.....:		N/A
	Torque test: torque (Nm); part.....:		N/A
21.7 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
21.7 (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
21.7 (4.12.5)	Screwed glands; force (Nm)		N/A
21.7 (4.13)	Mechanical strength		P
21.7 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm)		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	- other parts; energy (Nm).....:	Plastic cover for fusible resistor on input cord; Strip light enclosure; Input connector: Input cover; End cover: 0.5Nm	P
	1) live parts		P
	2) linings		N/A
	3) protection		P
	4) covers		P
21.7 (4.13.3)	Straight test finger		N/A
21.7 (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
21.7 (4.13.6)	Tumbling barrel		N/A
21.7 (4.14)	Suspensions, fixings and means of adjusting		P
21.7 (4.14.1)	Mechanical load:		P
	A) four times the weight	Max. 0.48kg/m	P
	B) torque 2,5 Nm		N/A
	C) bracket arm; bending moment (Nm)		N/A
	D) load track-mounted luminaires		N/A
	E) clip-mounted luminaires, glass-shelve. Thickness (mm)		N/A
	Metal rod. diameter (mm)		N/A
	Fixed luminaire or independent control gear without fixing devices		N/A
21.7 (4.14.2)	Load to flexible cables		N/A
	Mass (kg)		—
	Stress in conductors (N/mm ²)		N/A
	Mass (kg) of semi-luminaire		N/A
	Bending moment (Nm) of semi-luminaire		N/A
21.7 (4.14.3)	Adjusting devices:		N/A
	- flexing test; number of cycles.....:		N/A
	- strands broken		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	- electric strength test afterwards		N/A
21.7 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N/A
21.7 (4.14.5)	Guide pulleys		N/A
21.7 (4.14.6)	Strain on socket-outlets		N/A
21.7 (4.15)	Flammable materials		N/A
	- glow-wire test 650°C	See Test Table 21.16 (13.3.2)	N/A
	- spacing ³ 30 mm		N/A
	- screen withstanding test of 13.3.1		N/A
	- screen dimensions		N/A
	- no fiercely burning material		N/A
	- thermal protection		N/A
	- electronic circuits exempted		N/A
21.7 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		N/A
	a) construction		N/A
	b) temperature sensing control		N/A
	c) surface temperature		N/A
21.7 (4.16)	Luminaires for mounting on normally flammable surfaces		N/A
	No lamp control gear	(compliance with Section 12)	N/A
21.7 (4.16.1)	Lamp control gear spacing:		N/A
	- spacing 35 mm		N/A
	- spacing 10 mm		N/A
21.7 (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
21.7 (4.16.3)	Design to satisfy the test of 12.6	(see clause 12.6)	N/A
21.7 (4.17)	Drain holes		N/A
	Clearance at least 5 mm		N/A
21.7 (4.18)	Resistance to corrosion		N/A
21.7 (4.18.1)	- rust-resistance		N/A
21.7 (4.18.2)	- season cracking in copper		N/A
21.7 (4.18.3)	- corrosion of aluminium		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
21.7 (4.19)	Igniters compatible with ballast		N/A
21.7 (4.20)	Rough service vibration		N/A
21.7 (4.21)	Protective shield		N/A
21.7 (4.21.1)	Shield fitted if tungsten halogen lamps or metal halide lamps		N/A
	Shield of glass if tungsten halogen lamps		N/A
21.7 (4.21.2)	Particles from a shattering lamp not impair safety		N/A
21.7 (4.21.3)	No direct path		N/A
21.7 (4.21.4)	Impact test on shield		N/A
	Glow-wire test on lamp compartment.....:	See Test Table 21.16 (13.3.2)	N/A
21.7 (4.22)	Attachments to lamps not cause overheating or damage		N/A
21.7 (4.23)	Semi-luminaires comply Class II		N/A
21.7 (4.24)	Photobiological hazards		P
21.7 (4.24.1)	No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P)		N/A
21.7 (4.24.2)	Retinal blue light hazard		P
	Class of risk group assessed according to IEC/TR 62778	RG1	—
	Luminaires with E_{thr} :		N/A
	a) Fixed luminaires		N/A
	- distance x m, borderline between RG1 and RG2 ..:		N/A
	- marking and instruction according 3.2.23		N/A
	b) Portable and handheld luminaires		N/A
	- marking according 3.2.23 if RG1 exceeded at 200 mm according to IEC/TR 62778		N/A
	Portable luminaires for children IEC 60598-2-10 and Mains socket outlet nightlights IEC 60598-2-12 not exceed RG1 at 200 mm according to IEC/62778		N/A
21.7 (4.25)	Mechanical hazard		P
	No sharp point or edges		P
21.7 (4.26)	Short-circuit protection		N/A
21.7 (4.26.1)	Adequate means of uninsulated accessible SELV parts		N/A
21.7 (4.26.2)	Short-circuit test with test chain according 4.26.3		N/A
	Test chain not melt through		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	Test sample not exceed values of Table 12.1 and 12.2		N/A
21.7 (4.27)	Terminal blocks with integrated screwless earthing contacts		N/A
	Test according Annex V		N/A
	Pull test of terminal fixing (20 N)		N/A
	After test, resistance < 0,05 W		N/A
	Pull test of mechanical connection (50 N)		N/A
	After test, resistance < 0,05 W		N/A
	Voltage drop test, resistance < 0,05 W		N/A
21.7 (4.28)	Fixing of thermal sensing control		N/A
	Not plug-in or easily replaceable type		N/A
	Reliably kept in position		N/A
	No adhesive fixing if UV radiations from a lamp can degrade the fixing		N/A
	Not outside the luminaire enclosure		N/A
	Test of adhesive fixing:		N/A
	Max. temperature on adhesive material (°C).....:		—
	100 cycles between t min and t max		N/A
	Temperature sensing control still in position		N/A
21.7 (4.29)	Luminaires with non-replaceable light source		P
	Not possible to replace light source		P
	Live part not accessible after parts have been opened by hand or tools		P
21.7 (4.30)	Luminaires with non-user replaceable light source		N/A
	If protective cover provide protection against electric shock and marked with "caution, electric shock risk" symbol:		N/A
	Minimum two fixing means		N/A
21.7 (4.31)	Insulation between circuits		P
	Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3		P
	Controllable luminaires requiring same level of insulation for all components, the insulation between control terminals and LV supply fulfil requirements according 4.31.1 – 4.31.3		N/A
21.7 (4.31.1)	SELV circuits		N/A
	Used SELV source		N/A
	Voltage ≤ ELV		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	Insulating of SELV circuits from LV supply		N/A
	Insulating of SELV circuits from other non SELV circuits		N/A
	Insulating of SELV circuits from FELV		N/A
	Insulating of SELV circuits from other SELV circuits		N/A
	SELV circuits insulated from accessible parts according Table X.1		N/A
	Plugs not able to enter socket-outlets of other voltage systems		N/A
	Socket outlets does not admit plugs of other voltage systems		N/A
	Plugs and socket-outlets does not have protective conductor contact		N/A
21.7 (4.31.2)	FELV circuits		N/A
	Used FELV source		N/A
	Voltage \leq ELV		N/A
	Insulating of FELV circuits from LV supply		N/A
	FELV circuits insulated from accessible parts according Table X.1		N/A
	Plugs not able to enter socket-outlets of other voltage systems		N/A
	Socket outlets does not admit plugs of other voltage systems		N/A
	Socket-outlets does not have protective conductor contact		N/A
21.7 (4.31.3)	Other circuits		P
	Other circuits insulated from accessible parts according Table X.1		P
	Class II construction with equipotential bonding for protection against indirect contacts with live parts:		N/A
	- conductive parts are connected together		N/A
	- test according 7.2.3		N/A
	- conductive part not cause an electric shock in case of an insulation fault		N/A
	- equipotential bonding in master/slave applications		N/A
	- master luminaire provided with terminal for accessible conductive parts of slave luminaires		N/A
	- slave luminaire constructed as class I		N/A
21.7 (4.32)	Overvoltage protective devices		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	Comply with IEC 61643-11		N/A
	External to controlgear and connected to earth:		N/A
	- only in fixed luminaires		N/A
	- only connected to protective earth		N/A
21.7.2 (-)	Terminal blocks		N/A
	Clause 4.6 of IEC 60598-1 referring to terminal blocks does not apply		—
21.7.3 (-)	Terminals and supply connections		N/A
	Comply with Annex A		N/A
21.7.4 (-)	Control units		N/A
	Forming an integral part enclosed in non-flammable insulating material tested according 21.16		N/A
	Securely fixed to the cable		N/A
	Electronic control device comply with IEC 61347-2-11		N/A
	LED driver comply with IEC 61347-2-13		N/A
21.7.5 (-)	Mechanical strength		P
	a) Rigid rope lights		N/A
	1) Pull test: force 60 N		N/A
	2) Torque test: torque 0,15 Nm		N/A
	b) Flexible rope lights		P
	1) Pull test: force 60 N		P
	2) Torque test: torque 0,15 Nm		P
	3) Cylinder 150 mm @ 10 times at 25 °C ± 2 °C		P
	For rope lights having an IP number over X0 Additionally: Cylinder 150 mm @ 10 times at -15 °C ± 2 °C		N/A
	4) Mandrel of between 4 and 5 times the diameter of test piece		P
	c) Impact test at low temperature of -15 °C ± 5 °C		P

21.8 (11)	CREEPAGE DISTANCES AND CLEARANCES		¾
21.8 (11.2.1)	Impulse withstand category (Normal category II)	Category II <input checked="" type="checkbox"/> Category III <input type="checkbox"/>	¾
	Category III according Annex U		N/A
	Protected against pollution, reduced creepage and clearance according Annex P of IEC 61347-1		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict

1.7 (11.2.2)	Creepage distances for frequency up to 30 kHz	See Test Table 1.7 (11.2) I	P
	Creepage distances for frequency over 30 kHz:		N/A
	- Controlgear marked with \hat{U}_{OUT} and f_{UOUT} according IEC 61347-1, clause 7.1, item w	See Test Table 1.7 (11.2) II	N/A
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 1.7 (11.2) II	N/A
1.7 (11.2.3)	Clearances for frequency up to 30 kHz	See Test Table 1.7 (11.2) I	P
	Clearances distances for frequency over 30 kHz:		N/A
	- Controlgear marked with U_p	See Test Table 1.7 (11.2) II	N/A
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 1.7 (11.2) II	N/A

21.10 (14)	SCREW TERMINALS		¾
	Separately approved; component list		N/A
	Part of the luminaire		N/A

21.10 (15)	SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS		¾
	Separately approved; component list	(see Annex 1)	N/A
	Part of the luminaire	(see Annex 4)	P

21.11 (5)	EXTERNAL AND INTERNAL WIRING		¾
21.11 (5.2)	Supply connection and external wiring		P
21.11 (5.2.1)	Means of connection	Supply cord without plug	P
	Outdoor luminaire has not PVC insulated external wiring if not class III or SELV ≤ 25 V a.c./60 V d.c. or protected from outdoor environment		N/A
21.11 (5.2.2)	Type of cable	Replaced by 21.11.2	¾
	Nominal cross-sectional area (mm ²)	Replaced by 21.11.2	¾
	Cables equal to IEC 60227 or IEC 60245	Replaced by 21.11.2	¾
21.11 (5.2.3)	Type of attachment, X, Y or Z	Type Z	P
21.11 (5.2.5)	Type Z not connected to screws		P
21.11 (5.2.6)	Cable entries:		P
	- suitable for introduction		P

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	- adequate degree of protection		P
21.11 (5.2.7)	Cable entries through rigid material have rounded edges		N/A
21.11 (5.2.8)	Insulating bushings:		N/A
	- suitably fixed		N/A
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- tubes or guards made of insulating material		N/A
21.11 (5.2.9)	Locking of screwed bushings		N/A
21.11 (5.2.10)	Cord anchorage:		P
	- covering protected from abrasion		P
	- clear how to be effective		P
	- no mechanical or thermal stress		P
	- no tying of cables into knots etc.		P
	- insulating material or lining		P
21.11 (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
21.11 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment	Type Z	P
21.11 (5.2.10.3)	Tests:		P
	- impossible to push cable; unsafe		P
	- pull test: 25 times; pull (N)..... : 60N		P
	- torque test: torque (Nm) : 0.25Nm		P
	- displacement \pm 2 mm		P

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	- no movement of conductors		P
	- no damage of cable or cord		P
	- function independent of electrical connection		P
21.11 (5.2.11)	External wiring passing into luminaire		P
21.11 (5.2.12)	Looping-in terminals		N/A
21.11 (5.2.13)	Wire ends not tinned		N/A
	Wire ends tinned: no cold flow		P
21.11 (5.2.14)	Mains plug same protection		N/A
	Class III luminaire plug		N/A
	No unsafe compatibility		N/A
21.11 (5.2.16)	Appliance inlets (IEC 60320)		N/A
	Installation couplers (IEC 61535)		N/A
	Other appliance inlet or connector according relevant IEC standard		N/A
21.11 (5.2.17)	No standardized interconnecting cables properly assembled		N/A
21.11 (5.2.18)	Used plug in accordance with		N/A
	- IEC 60083		N/A
	- other standard		N/A
21.11 (5.3)	Internal wiring		N/A
21.11 (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
21.11 (5.3.1.1)	Internal wiring connected directly to fixed wiring		N/A
	Cross-sectional area (mm ²)..... :		N/A
	Insulation thickness		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	Extra insulation added where necessary		N/A
21.11 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		N/A
	Adequate cross-sectional area and insulation thickness		N/A
21.11 (5.3.1.3)	Double or reinforced insulation for class II		N/A
21.11 (5.3.1.4)	Conductors without insulation		N/A
21.11 (5.3.1.5)	SELV current-carrying parts		N/A
21.11 (5.3.1.6)	Insulation thickness other than PVC or rubber		N/A
21.11 (5.3.2)	Sharp edges etc.		N/A
	No moving parts of switches etc.		N/A
	Joints, raising/lowering devices		N/A
	Telescopic tubes etc.		N/A
	No twisting over 360°		N/A
21.11 (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
21.11 (5.3.4)	Joints and junctions effectively insulated		N/A
21.11 (5.3.5)	Strain on internal wiring		N/A
21.11 (5.3.6)	Wire carriers		N/A
21.11 (5.3.7)	Wire ends not tinned		N/A
	Wire ends tinned: no cold flow		N/A
21.11 (5.4)	Test to determine suitability of conductors having a reduced cross-sectional area		N/A
	Under test the temperature of the luminaire wiring insulation not exceed the limits stated in Table 12.2	(see Annex 2)	N/A
	No damage to luminaire wiring after test		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict

21.11.2 (-)	Cables for rope lights		P
	Type of cable	See Annex 1	P
	Cables not lighter than IEC 60227 or IEC 60245 for class II rope lights		P
	Cables not lighter than insulation according to 5.3.1 of part 1 for class III rope lights		N/A
	Nominal cross-sectional area (mm ²)	See Annex 1	P
	Mechanical properties according 4.14.1 and 4.14.2 of part 1		P
21.11.3 (-)	Cord anchorage test		N/A
	Pull test 30 N 25 times on single-core cable		N/A
21.11.4 (-)	Plugs and cable length		P
	Splash-proof plug or permanent connection if for outdoor use		N/A
	Length of the cable between the plug and the connection to the rope light not less than 1,5 m		P
21.11.5 (-)	Maximum length of extendable class II rope lights		N/A
	Maximum length 100 m for 0,5 mm ² cable		N/A
	Maximum length 150 m for 0,75 mm ² cable		N/A

21.12 (8)	PROTECTION AGAINST ELECTRIC SHOCK		¾
21.12 (8.2.1)	Live parts not accessible		P
	Basic insulated parts not used on the outer surface without appropriate protection		P
	Basic insulated parts not accessible with standard test finger on portable, settable and adjustable luminaires		N/A
	Basic insulated parts not accessible with Ø 50 mm probe from outside, other types of luminaires		P
	Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N/A
	Basic insulation only accessible under lamp or starter replacement		N/A
	Protection in any position		P
	Double-ended tungsten filament lamp		N/A
	Insulation lacquer not reliable		N/A
	Double-ended high pressure discharge lamp		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	Relevant warning according to 3.2.18 fitted to the luminaire		N/A
21.12 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N/A
21.12 (8.2.3.a)	Class II luminaire:		N/A
	- basic insulated metal parts not accessible during starter or lamp replacement		N/A
	- basic insulation not accessible other than during starter or lamp replacement		N/A
	- glass protective shields not used as supplementary insulation		N/A
21.12 (8.2.3.b)	BC lampholder of metal in class I luminaires shall be earthed		N/A
21.12 (8.2.3.c)	SELV circuits with exposed current carrying parts:		N/A
	Ordinary luminaire:		N/A
	- touch current		N/A
	- no-load voltage.....		N/A
	- touch current if applicable (mA)		N/A
	Other than ordinary luminaire:		N/A
	- nominal voltage		N/A
	Class III luminaire only for connection to SELV		N/A
	Class III luminaire not provided with means for protective earthing		N/A
21.12 (8.2.4)	Portable luminaire have protection independent of supporting surface		N/A
21.12 (8.2.5)	Compliance with the standard test finger or relevant probe		P
21.12 (8.2.6)	Covers reliably secured		P
21.12 (8.2.7)	Discharging of capacitors ³ 0,5 mF	3,2V	P
	Portable plug connected luminaire with capacitor		N/A
	Other plug connected luminaire with capacitor		N/A
	Discharge device on or within capacitor		N/A
	Discharge device mounted separately		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
21.13 (12)	ENDURANCE TEST AND THERMAL TEST		¾
21.13.1 (-)	If IP > IP 20 relevant test of (12.4), (12.5) and (12.6) after (9.2) before (9.3) specified in 21.14		¾
21.13 (12.3)	Endurance test:		P
	- mounting-position.....:	As normal use	¾
	- test temperature (°C).....:	55°C	¾
	- total duration (h).....:	240h	¾
	- supply voltage: Un factor; calculated voltage (V)....:	264V	¾
	- lamp used	LED	¾
21.13 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N/A
	- marking legible		P
	- no cracks, deformation etc.		P
21.13 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
21.13 (12.5)	Thermal test (abnormal operation)	(see Annex 2)	N/A
21.13 (12.6)	Thermal test (failed lamp control gear condition):		N/A
21.13 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A)		¾
	- case of abnormal conditions		¾
	- electronic lamp control gear		N/A
	- measured winding temperature (°C): at 1,1 Un		¾
	- measured mounting surface temperature (°C) at 1,1 Un		N/A
	- calculated mounting surface temperature (°C)		N/A
	- track-mounted luminaires		N/A
21.13 (12.6.2)	Temperature sensing control		N/A
	- case of abnormal conditions		¾
	- thermal link		N/A
	- manual reset cut-out		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	- auto reset cut-out		N/A
	- measured mounting surface temperature (°C).....:		N/A
	- track-mounted luminaires		N/A
21.13 (12.7)	Thermal test (failed lamp control gear in plastic luminaires):		N/A
21.13 (12.7.1)	Luminaire without temperature sensing control		N/A
21.13 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		N/A
	Test method 12.7.1.1 or Annex W		¾
	Test according to 12.7.1.1:		N/A
	- case of abnormal conditions		¾
	- Ballast failure at supply voltage (V)		¾
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
	Test according to Annex W:		N/A
	- case of abnormal conditions		¾
	- measured winding temperature (°C): at 1,1 Un		¾
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un		¾
	- calculated temperature of fixing point/exposed part (°C)		¾
	Ball-pressure test.....:	See Table 21.16 (13.2.1)	N/A
21.13 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		N/A
	- case of abnormal conditions		¾
	- measured winding temperature (°C): at 1,1 Un		¾
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un		¾
	- calculated temperature of fixing point/exposed part (°C)		¾
	Ball-pressure test.....:	See Table 21.16 (13.2.1)	N/A
21.13 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N/A
	- case of abnormal conditions		¾
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
21.13 (12.7.2)	Luminaire with temperature sensing control		N/A
	- thermal link.....: Yes <input type="checkbox"/> No <input type="checkbox"/>		¾
	- manual reset cut-out.....: Yes <input type="checkbox"/> No <input type="checkbox"/>		¾
	- auto reset cut-out: Yes <input type="checkbox"/> No <input type="checkbox"/>		¾
	- case of abnormal conditions:		¾
	- highest measured temperature of fixing point/ exposed part (°C):		¾
	Ball-pressure test:.....:	See Table 21.16 (13.2.1)	N/A
21.13.2 (-)	Test voltage		N/A
	Provision of 12.3.1 d) of part 1 and if class III rope lights 1,1 x rated voltage of transformer/convertor		¾
	Provision of 12.4.1 d) of part 1 and if class III rope lights 1,06 x rated voltage of transformer/convertor		¾
21.13.3 (-)	Short-circuit test of rectifier		N/A
	No emission of flames or molten material or production of flammable gases and no live parts accessible when short-circuit output of the rectifier		N/A

21.14 (9)	RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE		¾
21.14 (-)	If IP > IP 20 the order of tests as specified in clause 21.13		¾
21.14 (9.2)	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP.....: IP20		¾
	- mounting position during test.....: As in normal used		¾
	- fixing screws tightened; torque (Nm).....: N/A		¾
	- tests according to clauses: N/A		¾
	- electric strength test afterwards	Clause 9.2.0	P
	a) no deposit in dust-proof luminaire		N/A
	b) no talcum in dust-tight luminaire		N/A
	c) no trace of water on current-carrying parts or on insulation where it could become a hazard		N/A
	c) i) For luminaires without drain holes – no water entry		N/A
	c) ii) For luminaires with drain holes – no hazardous water entry		N/A
	d) no water in watertight luminaire		N/A
	e) no contact with live parts (IP 2X)	IP20	P

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	e) no entry into enclosure (IP 3X and IP 4X)		N/A
	e) no contact with live parts (IP3X and IP4X)		N/A
	f) no trace of water on part of lamp requiring protection from splashing water		N/A
	g) no damage of protective shield or glass envelope		N/A
21.14 (9.3)	Humidity test 48 h	25°C; 93%Rh	P

21.15 (10)	INSULATION RESISTANCE AND ELECTRIC STRENGTH		¾
21.15 (10.2.1)	Insulation resistance test		P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø		¾
	Insulation resistance (MW)		¾
	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
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts		N/A
	- Insulation bushings as described in Section 5		N/A
	Other than SELV		P
	- between live parts of different polarity	100MW (required: 2MW)	P
	- between live parts and mounting surface	100MW (required: 4MW)	P
	- between live parts and metal parts.....	100MW (required: 4MW)	P
	- between live parts of different polarity through action of a switch.....		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts		N/A
	- Insulation bushings as described in Section 5		N/A
21.15 (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

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	Test voltage (V)		N/A
	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
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts		N/A
	- Insulation bushings as described in Section 5		N/A
	Other than SELV		P
	- between live parts of different polarity	1480V	P
	- between live parts and mounting surface	2960V	P
	- between live parts and metal parts.....	2960V	P
	- between live parts of different polarity through action of a switch.....		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts		N/A
	- Insulation bushings as described in Section 5		N/A
21.15 (10.3)	Touch current or protective conductor current (mA):	Touch current: max.0.01mA (limit: 0.7mA)	P

21.16 (13)	RESISTANCE TO HEAT, FIRE AND TRACKING		¾
21.16 (13.2.1)	Ball-pressure test.....	See Test Table 21.16 (13.2.1)	P
21.16 (13.3.1)	Needle-flame test (10 s)	See Test Table 21.16 (13.3.1)	P
21.16 (13.3.2)	Glow-wire test (650°C).....	See Test Table 21.16 (13.3.2)	P
21.16 (13.4)	Proof tracking test (IEC 60112).....	See Test Table 21.16 (13.4)	N/A
20.16 (-)	Flexible pipes of rope lights in compliance with IEC 60811-508		P

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict

21.8 (11.2)	TABLE I: Creepage distances and clearances						P
	Minimum distances (mm) for a.c. up to 30 kHz sinusoidal voltages						P
	Applicable part of IEC 60598-1 Table 11.1.A*, 11.1.B* and 11.2*						P
	Insulation type **	Measured clearance	Required		Measured creepage	Required	
			clearance	*Table		creepage	*Table
Distance 1:	B	3.09	1.5	9	3.09	2.5	7
Distance 2:	B	2.65	1.5	9	2.65	2.5	7
Distance 3:	R	6.05	3.0	9	6.05	5.0	7
Working voltage (V)					240V	¾	
PTI					< 600 <input checked="" type="checkbox"/> ≥ 600 <input type="checkbox"/>	¾	
Pulse voltage or U_p if applicable (kV)					¾	¾	
Supplementary information: Min. values were recorded. Distance 1: between different polarity of L/N. Distance 2: between two pins of fusible resistor (F1). Distance 3: Between live parts to accessible parts.							

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

21.8 (11.2)	TABLE II: Creepage distances and clearances						N/A
	Minimum distances (mm) for a.c. higher than 30 kHz sinusoidal voltages						
	Applicable part of IEC 61347-1 Table 7 and 8* or IEC 60664-4 Table 1 and 2						
Distances	Insulation type **	Measured clearance	Required		Measured creepage	Required	
			clearance	*Table		creepage	*Table
Distance 1:							
Working voltage (V)						¾	
Frequency if applicable (kHz)						¾	
PTI					< 600 <input type="checkbox"/> ≥ 600 <input type="checkbox"/>	¾	
Peak value of the working voltage \hat{U}_{out} if applicable (kV)						¾	
Supplementary information:							

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

21.16 (13.2.1)	TABLE: Ball Pressure Test of Thermoplastics		P
Allowed impression diameter (mm)	≤2mm		¾

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict

Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)
Plastic cover for fusible resistor on input cord; Input connector enclosure	KINGFA SCI & TECH	125	1.20
PCB for fusible resistor on input cord	ShenZhen JinMeiHui Electronic Technology	125	1.01

Supplementary information:

21.16 (13.3.1)	TABLE: Needle-flame test (IEC 60695-11-5)				P
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Plastic cover for fusible resistor on input cord; Input connector enclosure	KINGFA SCI & TECH	10	No	0	Pass

Supplementary information:

21.16 (13.3.2)	TABLE: Glow-wire test (IEC 60695-2-11)				P
Glow wire temperature		650°C		¾	
Object/ Part No./ Material	Manufacturer/ trademark	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict	
Strip light enclosure; Input cover; End cover	HUIZHOU ANPIN	No	0	Pass	
Any flame or glowing of the sample extinguished within 30 s of withdrawing the glow-wire, and any burning or molten drop did not ignite the underlying parts (Yes/No).....				Yes	

Supplementary information:

21.16 (13.4)	TABLE: Proof tracking test (IEC 60112)				N/A
Test voltage PTI		175 V		¾	
Object/ Part No./ Material	Manufacturer/ trademark	Withstand 50 drops without failure on three places or on three specimens			Verdict
¾	¾	¾	¾	¾	¾

Supplementary information:

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX A	Requirements for interconnecting connectors for use in rope lights		¾
	This Annex A consist relevant requirements and modifications of IEC 61984		N/A
5.2	Classification according to protection against electric shock		N/A
	Only enclosed connectors		N/A
5.3	Classification according to the style of connector		N/A
	Only free connectors		N/A
5.4	Classification according to additional characteristics of connectors		N/A
	According b), d), e), f), h), and j)		N/A
6.2.1	Identification		N/A
	According a) and b)		N/A
6.4.1	Non accessibility of live parts		N/A
	Test with test finger on class II rope lights		N/A
6.9.1	Polarisation		N/A
	Improper connection of mating parts is prevented		N/A
	No unsafe compatibility between connectors for class II and class III rope lights of the same manufacturer		N/A
	Male part of class III rope lights not make contact in the female contact of low voltage connectors (e.g. IEC 60320)		N/A
	Manufacturer designed connectors, no unsafe compatibility with systems according IEC 60320 and IEC 60906 and national domestic plug and socket-outlet systems in the country where the rope light is placed on the market		N/A
6.9.3	Connection of conductors		N/A
	Cross sectional area of the contact making part of the interconnecting coupler not less than the corresponding conductor in the interconnected cable		N/A
6.10	Design of a CBC		N/A
	Adequate breaking capacity		N/A
	Female part at the end of the rope light, other than ordinary, provided with sealing device securely fixed to the coupler		N/A
6.13	Dielectric strength		N/A
	Test according clause 21.15 of this standard		N/A
6.14.2	Electrical endurance (CBC)		N/A
	Meet the specified breaking capacity		N/A
	Number of cycles 50		¾

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict
	Test according 7.3.5		N/A
6.14.3	Bendings (non-rewirable connectors)		N/A
	Meet the specified number of bendings		N/A
	Number of cycles 1000		¾
	Test according 7.3.10		N/A
6.17	Cable clamp		N/A
	Test according clause 21.11.3 of this standard		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 1	TABLE: Critical components information						P
Object / part No.	Code	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾	
Plastic cover for fusible resistor on input cord	B	KINGFA SCI & TECH	PA66-R10G25	V-0; 125°C	UL 746+ IEC/EN 60598-1 IEC/EN 60598-2-21 IEC/EN 60598-2-1	UL E171666* +Tested with appliance#	
PCB for fusible resistor on input cord	B	ShenZhen JinMeiHui Electronic Technology	JMH -AL01	V-0; 130°C	UL 796+ IEC/EN 60598-1 IEC/EN 60598-2-21 IEC/EN 60598-2-1	UL E476789* +Tested with appliance#	
Fusible resistor on input cord	B	SART FUSE	S2512-F2	250V; 3,15A	UL 248+ EN IEC/IEC 62031	UL E319512* +Tested with appliance#	
Input cord	B	Shenzhen Tongyuan	H03VV-F	2*0.75mm ²	DIN EN 50525-2-11	VDE 101980*	
Alt.	B	zhongshan Guangli	H03VV-F	2*0.75mm ²	DIN EN 50525-2-11	VDE 40048913*	
Alt.	B	DONGGUAN YUXIN	H03VV-F	2*0.75mm ²	DIN EN 50525-2-11	VDE 40012386*	
Fusible resistor on strip light	B	SART FUSE	S2512-F2	250V; 1A	UL 248+ EN IEC/IEC 62031	UL E319512* +Tested with appliance#	
LED	B	COLORS	2835	I _r : 30mA; V _f : 9.0-9.6V; CCT: 2200-6700K; View angle: 120°	IEC TR 62778	Tested with appliance#	
LED module PCB	B	GROWZING(HUI ZHOU)	L-D	V-0	UL 796+ IEC/EN 60598-1 IEC/EN 60598-2-21 IEC/EN 60598-2-1	UL E310296* +Tested with appliance#	

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict

Strip light enclosure; Input cover; End cover	B	HUIZHOU ANPIN	AP8120	V-0	UL 94 UL 746 UL 723 UL 1694+ IEC/EN 60598-1 IEC/EN 60598-2-21 IEC/EN 6-509-2-1	UL E257078* +Tested with appliance#
Heat-shrinkable tube for input cover and end cover	B	CHANGYUAN ELECTRONICS GROUP	CYG-FEP-S	600V; 200°C; VW-1	UL 94+ IEC/EN 60598-1 IEC/EN 60598-2-21 IEC/EN 60598-2-1	UL E180908* +Tested with appliance#
Input connector enclosure	B	KINGFA SCI & TECH	PA66-R10G25	PA; 1.5mm; V-0	UL 94 UL 746 UL 723 UL 1694+ IEC/EN 60598-1 IEC/EN 60598-2-21 IEC/EN 6-509-2-1	UL E171666* +Tested with appliance#
Input connector pins		KINGFA SCI & TECH	--	Cu>58%	IEC/EN 60598-1 IEC/EN 60598-2-21 IEC/EN 6-509-2-1	Tested with appliance#

Supplementary information:

¹⁾ Provided evidence ensures the agreed level of compliance. See OD-CB2039.

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

* License available upon request;

Please refer summary of testing in TRF for the test standard publication year.

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12		P
	Type reference	H81042408AC-8CWNSA050AC5000 (with input cover)	¾
	Lamp used.....	LED	¾
	Lamp control gear used	N/A	¾
	Mounting position of luminaire.....	As in normal use	¾
	Supply wattage (W)	590W (240V)	¾
	Supply current (A).....	2.6A (240V)	¾
	Calculated power factor	0.998 (240V)	¾
	Table: measured temperatures corrected for ta = 45 °C:		P
	- abnormal operating mode	N/A	¾
	- test 1: rated voltage	N/A	¾
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....	1.06 x 240V = 254.4V	¾
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage	N/A	¾
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....	N/A	¾
	Through wiring or looping-in wiring loaded by a current of A during the test	N/A	¾

Temperature measurements, (°C)

Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Plastic cover for fusible resistor on input cord (inside)	45	¾	49.6	¾	Ref.	¾	¾
PCB for fusible resistor on input cord	45	¾	57.7	¾	130	¾	¾
Input cord (clamp position)	45	¾	55.4	¾	75	¾	¾
Input cord near LED	45	¾	64.5	¾	90	¾	¾
LED module PCB	45	¾	66.0	¾	Ref.	¾	¾
Strip light enclosure (inside)	45	¾	65.5	¾	Ref.	¾	¾

IEC 60598-2-21							
Clause	Requirement + Test				Result - Remark		Verdict
Strip light enclosure (outside)	45	¾	63.9	¾	Ref.	¾	¾
End cover	45	¾	53.8	¾	Ref.	¾	¾
Mounting surface	45	¾	54.6	¾	90	¾	¾
Object lighted (0.1m)	45	¾	50.2	¾	90	¾	¾
Supplementary information: max. values were recorded.							

Type reference	H81042408AC-8CWNSA050AC5000 (with input connector)		¾				
Lamp used.....	LED		¾				
Lamp control gear used	N/A		¾				
Mounting position of luminaire.....	As in normal use		¾				
Supply wattage (W)	590W (240V)		¾				
Supply current (A).....	2.6A (240V)		¾				
Calculated power factor	0.998 (240V)		¾				
Table: measured temperatures corrected for ta = 45 °C:			P				
- abnormal operating mode	N/A		¾				
- test 1: rated voltage	N/A		¾				
- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....	1.06 x 240V = 254.4V		¾				
- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage	N/A		¾				
- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....	N/A		¾				
Through wiring or looping-in wiring loaded by a current of A during the test	N/A		¾				
Temperature measurements, (°C)							
Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Input connector (inside)	45	¾	55.0	¾	Ref.	¾	¾
Input cord near LED	45	¾	65.2	¾	90	¾	¾
LED module PCB	45	¾	66.6	¾	Ref.	¾	¾

IEC 60598-2-21							
Clause	Requirement + Test				Result - Remark		Verdict

Strip light enclosure (inside)	45	¾	65.2	¾	Ref.	¾	¾
Strip light enclosure (outside)	45	¾	63.5	¾	Ref.	¾	¾
End cover	45	¾	54.0	¾	Ref.	¾	¾
Mounting surface	45	¾	54.3	¾	90	¾	¾
Object lighted (0.1m)	45	¾	50.0	¾	90	¾	¾

Supplementary information: max. values were recorded.

Type reference	H8522408AA-8CWNSA050AC5000		¾				
Lamp used.....	LED		¾				
Lamp control gear used	N/A		¾				
Mounting position of luminaire.....	As in normal use		¾				
Supply wattage (W)	279W (240V)		¾				
Supply current (A).....	1.25A (240V)		¾				
Calculated power factor	0.938 (240V)		¾				
Table: measured temperatures corrected for $t_a = 45\text{ }^\circ\text{C}$:			P				
- abnormal operating mode	N/A		¾				
- test 1: rated voltage	N/A		¾				
- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....	1.06 x 240V = 254.4V		¾				
- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage	N/A		¾				
- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....	N/A		¾				
Through wiring or looping-in wiring loaded by a current of A during the test	N/A		¾				
Temperature measurements, ($^\circ\text{C}$)							
Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit

IEC 60598-2-21							
Clause	Requirement + Test			Result - Remark			Verdict
Input cord (clamp position)	45	$\frac{3}{4}$	53.6	$\frac{3}{4}$	75	$\frac{3}{4}$	$\frac{3}{4}$
Input cord near LED	45	$\frac{3}{4}$	55.8	$\frac{3}{4}$	90	$\frac{3}{4}$	$\frac{3}{4}$
LED module PCB	45	$\frac{3}{4}$	56.1	$\frac{3}{4}$	Ref.	$\frac{3}{4}$	$\frac{3}{4}$
Strip light enclosure (inside)	45	$\frac{3}{4}$	56.0	$\frac{3}{4}$	Ref.	$\frac{3}{4}$	$\frac{3}{4}$
Strip light enclosure (outside)	45	$\frac{3}{4}$	53.7	$\frac{3}{4}$	Ref.	$\frac{3}{4}$	$\frac{3}{4}$
End cover	45	$\frac{3}{4}$	53.8	$\frac{3}{4}$	Ref.	$\frac{3}{4}$	$\frac{3}{4}$
Mounting surface	45	$\frac{3}{4}$	50.0	$\frac{3}{4}$	90	$\frac{3}{4}$	$\frac{3}{4}$
Object lighted (0.1m)	45	$\frac{3}{4}$	47.2	$\frac{3}{4}$	90	$\frac{3}{4}$	$\frac{3}{4}$
Supplementary information: max. values were recorded.							

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 3	Screw terminals (part of the luminaire)		N/A
(14)	SCREW TERMINALS		¾
(14.2)	Type of terminal.....:		¾
	Rated current (A).....:		¾
(14.3.2.1)	One or more conductors		N/A
(14.3.2.2)	Special preparation		N/A
(14.3.2.3)	Terminal size		N/A
	Cross-sectional area (mm ²).....:		¾
(14.3.3)	Conductor space (mm).....:		N/A
(14.4)	Mechanical tests		N/A
(14.4.1)	Minimum distance		N/A
(14.4.2)	Cannot slip out		N/A
(14.4.3)	Special preparation		N/A
(14.4.4)	Nominal diameter of thread (metric ISO thread).....:	M	N/A
	External wiring		N/A
	No soft metal		N/A
(14.4.5)	Corrosion		N/A
(14.4.6)	Nominal diameter of thread (mm).....:		N/A
	Torque (Nm).....:		N/A
(14.4.7)	Between metal surfaces		N/A
	Lug terminal		N/A
	Mantle terminal		N/A
	Pull test; pull (N).....:		N/A
(14.4.8)	Without undue damage		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 4	Screwless terminals (part of the luminaire)		P
(15)	SCREWLESS TERMINALS		¾
(15.2)	Type of terminal.....:	Permanent terminal	¾
	Rated current (A).....:	Max. 2.6A (tested with appliance)	¾
(15.3.1)	Material		P
(15.3.2)	Clamping		P
(15.3.3)	Stop		P
(15.3.4)	Unprepared conductors		N/A
(15.3.5)	Pressure on insulating material		N/A
(15.3.6)	Clear connection method		P
(15.3.7)	Clamping independently		N/A
(15.3.8)	Fixed in position		P
(15.3.10)	Conductor size	Assembled by manufacturer	N/A
	Type of conductor		N/A
(15.5)	Terminals and connections for internal wiring		P
(15.5.1)	Mechanical tests		P
(15.5.1.1.1)	Pull test spring-type terminals (4 N, 4 samples).....:		N/A
(15.5.1.1.2)	Pull test pin or tab terminals (4 N, 4 samples)		N/A
	Insertion force not exceeding 50 N		N/A
(15.5.1.2)	Permanent connections: pull-off test (20 N)		P
(15.5.2)	Electrical tests		P
	Voltage drop (mV) after 1 h (4 samples).....:	1#: 9.1mV; 2#: 9.0Vm; 3#: 9.2mV; 4#: 9.0mV	P
	Voltage drop of two inseparable joints		N/A
	Number of cycles:		¾
	Voltage drop (mV) after 10th alt. 25th cycle (4 samples)	1#: 9.7mV; 2#: 9.7mV; 3#: 10.0mV; 4#: 9.6mV	P
	Voltage drop (mV) after 50th alt. 100th cycle (4 samples)		N/A
	After ageing, voltage drop (mV) after 10th alt. 25th cycle (4 samples).....:	1#: 10.5mV; 2#: 10.4mV; 3#: 10.7mV; 4#: 10.3mV	P
	After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples).....:		N/A
(15.6)	Terminals and connections for external wiring		N/A

IEC 60598-2-21			
Clause	Requirement + Test	Result - Remark	Verdict

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

(15.6.3.1) (15.6.3.2)	TABLE: Contact resistance test / Heating tests										N/A
	Voltage drop (mV) after 1 h										¾
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Voltage drop of two inseparable joints										
	Voltage drop after 10th alt. 25th cycle										
	Max. allowed voltage drop (mV)..... :										¾
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Voltage drop after 50th alt. 100th cycle										
	Max. allowed voltage drop (mV)..... :										¾
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Continued ageing: voltage drop after 10th alt. 25th cycle										
	Max. allowed voltage drop (mV)..... :										¾
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Continued ageing: voltage drop after 50th alt. 100th cycle										
	Max. allowed voltage drop (mV)..... :										¾
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
Supplementary information:											

Attachment No. 1

IEC60598_2_21B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 60598-2-21 EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES Luminaires Part 2: Particular requirements Section 21: Lighting chains			
Differences according to..... : EN 60598-2-21:2015 used in conjunction with EN 60598-1:2015+A1:2018			

	CENELEC COMMON MODIFICATIONS (EN)		¾
--	--	--	---

20.6 (3)	MARKING		¾
20.6 (3.3.101)	For luminaires not supplied with terminal block: Adequate warning on the package		P

20.7 (4)	CONSTRUCTION		¾
20.7 (4.11.6)	Electro-mechanical contact systems		N/A

20.11 (5)	EXTERNAL AND INTERNAL WIRING		¾
20.11 (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
20.11 (5.2.2)	Cables equal to EN 50525		P
	Replace table 5.1 – Supply cord		P

20.13 (12)	ENDURANCE TESTS AND THERMAL TESTS		¾
20.13 (12.4.2c)	Thermal test (normal operation) see footnote c to table 12.2 relating to unsleeved fixed wiring		P

ZB	ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)		¾
(3.3)	DK: power supply cords of class I luminaires with label		N/A
(4.5.1)	DK: socket-outlets		N/A
(5.2.1)	CY, DK, FI, SE, GB: type of plug		N/A



Attachment No. 1

Page 2 of 2

Report No.: 68.140.20.0092.01

IEC60598_2_21B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
ZC	ANNEX ZC, NATIONAL DEVIATIONS (EN)		¾
(4 & 5)	FR: Shuttered socket-outlets 10/16A		N/A
(13.3)	GB: Requirements according to United Kingdom Building Regulation		N/A



Attachment No. 2

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

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

1.2 (0)	GENERAL TEST REQUIREMENTS		¾
1.2 (0.3)	More sections applicable	Yes <input checked="" type="checkbox"/> (IEC/EN 60598-2-21) No <input type="checkbox"/>	¾
1.2 (0.5)	Components	(See 'ANNEX 1')	¾
1.2 (0.7)	Information for luminaire design in light sources standards		¾
1.2 (0.7.2)	Light source safety standard	IEC/EN 62031	¾
	Luminaire design in the light source safety standard		P
1.4 (2)	CLASSIFICATION		¾
1.4 (2.2)	Type of protection	Class II	¾
1.4 (2.3)	Degree of protection	IP20	¾
1.4 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	¾
1.4 (2.5)	Luminaire for normal use	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	¾
	Luminaire for rough service	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	¾
1.5 (3)	MARKING		P
1.6 (4)	CONSTRUCTION		P
1.7 (11)	CREEPAGE DISTANCES AND CLEARANCES		P
1.8 (7)	PROVISION FOR EARTHING		N/A
1.9 (14)	SCREW TERMINALS		N/A
1.9 (15)	SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS		P
1.10 (5)	EXTERNAL AND INTERNAL WIRING		P
1.11 (8)	PROTECTION AGAINST ELECTRIC SHOCK		P



Attachment No. 2

Page 2 of 2

Report No.: 68.140.20.0092.01

IEC 60598-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
1.12 (12)	ENDURANCE TEST AND THERMAL TEST		P
1.13 (9)	RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE		P
1.14 (10)	INSULATION RESISTANCE AND ELECTRIC STRENGTH		P
1.15 (13)	RESISTANCE TO HEAT, FIRE AND TRACKING		P



Attachment No. 2

Page 1 of 2

Report No.: 68.140.20.0092.01

IEC60598_2_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

<p>ATTACHMENT TO TEST REPORT IEC 60598-2-1 EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES Luminaires Part 2: Particular requirements: Section One – Fixed general purpose luminaires</p>			
<p>Differences according: EN 60598-2-1:1989 used in conjunction with EN 60598-1:2015+A1:2018</p>			
<p>Annex Form No.: EU_GD_IEC60598_2_1F</p>			
<p>Annex Form Originator: IMQ S.p.A.</p>			
<p>Master Annex Form.....: 2018-08-28</p>			
<p>Copyright © 2018 IEC System for Conformity Testing and Certification of Electrical Equipment (IECEE), Geneva, Switzerland. All rights reserved.</p>			

	CENELEC COMMON MODIFICATIONS (EN)		¾
--	--	--	---

1.5 (3)	MARKING		¾
1.5 (3.3.101)	For luminaires not supplied with terminal block: Adequate warning on the package		P

1.6 (4)	CONSTRUCTION		¾
1.6 (4.11.6)	Electro-mechanical contact systems		N/A

1.10 (5)	EXTERNAL AND INTERNAL WIRING		¾
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 EN 50525		P
	Replace table 5.1 – Supply cord		P

1.12 (12)	ENDURANCE TESTS AND THERMAL TESTS		¾
1.12 (12.4.2c)	Thermal test (normal operation) see footnote c to table 12.2 relating to unsleeved fixed wiring		P

Attachment No. 2

Page 2 of 2

Report No.: 68.140.20.0092.01

IEC60598_2_1F - ATTACHMENT

Clause	Requirement + Test	Result - Remark	Verdict
--------	--------------------	-----------------	---------

ZB	ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)		$\frac{3}{4}$
(3.3)	DK: power supply cords of class I luminaires with label		N/A
(4.5.1)	DK: socket-outlets		N/A
(5.2.1)	CY, DK, FI, GB: type of plug		N/A

ZC	ANNEX ZC, NATIONAL DEVIATIONS (EN)		$\frac{3}{4}$
(4 & 5)	FR: Shuttered socket-outlets 10/16A		N/A
	FR: Safety requirements for high buildings (Arrêté du 30 décembre 2011 portant règlement de sécurité pour la construction des immeubles de grande hauteur et leur protection contre les risques d'incendie et de panique; Section VIII; Article GH 48, Eclairage) Glow-wire test for outer parts of luminaires:		N/A
	- 850°C for luminaires in stairways and horizontal travel paths		N/A
	- 650°C for indoor luminaires		N/A
(13.3)	GB: Requirements according to United Kingdom Building Regulation		N/A



Attachment No. 3

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

TEST REPORT IEC 62031 LED modules for general lighting – Safety specifications

4	GENERAL REQUIREMENTS	¾
4.2	Classification	¾
	Built-in module: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	¾
	Independent module: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	¾
	Integral module: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	¾
4.6	Independent modules comply with requirements in IEC 60598-1:2014/AMD1:2017	N/A
4.8	Modules with integrated controlgear providing SELV comply with requirements according to IEC 61347-1:2015/AMD1:2017 clause L.5 to L.11.	(see Annex 1) N/A

6	MARKING	¾
6.2	Contents of marking for built-in and for independent LED modules	N/A
	a) mark of origin	N/A
	b) model number, type reference	N/A
	c1) constant voltage module; rated supply voltage and supply frequency	N/A
	c2) constant current module; rated supply current and supply frequency	N/A
	d) rated power	N/A
	e) indication of connections, wiring diagram	N/A
	f) value of t_c and place on the module	N/A
	g) E_{thr} if required	N/A
	h) symbol for built-in modules	N/A
	i) heat transfer temperature t_d	N/A
	j) power for heat-conduction P_d	N/A
	k) working voltage for insulation	N/A
6.3	Location of marking for built-in LED modules	N/A
	- marking of a) and b) in 6.2 on the modules	N/A
	- marking of other applicable items in 6.2 on the modules or in data sheet, leaflet or website	N/A
6.4	Location of marking for independent LED modules	N/A



Attachment No. 3

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	- marking of a), b), c) and f) in 6.2 on the modules		N/A
	- marking of other applicable items in 6.2 on the modules or in data sheet, leaflet or website		N/A
6.5	Marking of integral LED modules		N/A
	- information in 6.2 a) to g) in data sheet, leaflet or website		N/A
6.6	Durable and legibility of marking		N/A
	- marking on the LED module legible after test with water		N/A
	- marking not on the LED module legible		N/A
7	TERMINALS		¾
7.1	Integral terminals		N/A
	Screw terminals comply with section 14 of IEC 60598-1	(see Annex 3)	N/A
	Screwless terminals comply with section 15 of IEC 60598-1	(see Annex 4)	N/A
7.2	Terminals other than integral terminals		N/A
	Separately approved; component list	(see Annex 2)	N/A
	Ratings suit the conditions		N/A
	Satisfy additional relevant requirements of this standard		N/A
8 (9)	EARTHING		¾
- (9.1)	Provisions for protective earthing		N/A
	Terminal complying with clause 8		N/A
	Locked against loosening and not possible to loosen by hand		N/A
	Not possible to loosen clamping means unintentionally on screwless terminals		N/A
	Earthing via means of fixing		N/A
	Earthing terminal only used for the earthing of the control gear		N/A
	All parts of material minimizing the danger of electrolytic corrosion		N/A
	Made of brass or equivalent material		N/A
	Contact surface bare metal		N/A
	Test according 7.2.3 of IEC 60598-1		N/A
- (9.2)	Provision for functional earthing		N/A

Attachment No. 3

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	Comply with clause 8 and 9.1		N/A
	Functional earth insulated from live parts by double or reinforced insulation		N/A
- (9.3)	Lamp controlgear with conductors for protective earthing by tracks on printed circuit board		N/A
	Test with a current of 25 A between earthing terminal and each of the accessible metal parts; measured resistance (W) at ³ 10 A according 7.2.3 of IEC 60598-1: < 0,5 W		N/A
- (9.4)	Earthing of built-in lamp controlgear		N/A
	Earth by means of fixing to earthed metal of luminaire in compliance of 7.2 of IEC 60598-1		N/A
	Earthing terminal only for earthing the built-in controlgear		N/A
- (9.5)	Earthing via independent controlgear		N/A
- (9.5.1)	Earth connection to other equipment		N/A
	Looping or through connection, conductor min. 1,5 mm ² and of copper or equivalent		N/A
	Protective earthing wires in line with 5.3.1.1 and clause 7		N/A
- (9.5.2)	Earthing of the lamp compartments powered via the independent lamp controlgear		N/A
	Test with a current of 25 A between input and output earth terminals; measured resistance (W) between earthing terminal and each of the accessible metal parts at ³ 10 A according 7.2.3 of IEC 60598-1: < 0,5 W		N/A
	Output earthing terminal marked as in 7.1 t) of IEC 61347-1		N/A
9 (10)	PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS		$\frac{3}{4}$
- (10.1)	Controlgear protected against accidental contact with live parts	Rely on luminaire enclosure for providing reinforced insulation	P
- (A2)	Voltage measured with 50 kW	(see Annex A)	N/A
- (A3)	Voltage > 35 V peak or > 60 V d.c. or protective impedance device	(see Annex A)	N/A
- (10.1)	Lacquer or enamel not used for protection or insulation		N/A
	Adequate mechanical strength on parts providing protection		N/A
- (10.2)	Capacitors > 0,5 nF: voltage after 1 min (V): < 50 V		N/A
- (10.3)	Controlgear providing SELV		N/A



Attachment No. 3

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	Accessible conductive parts are insulated from live parts by double or reinforced insulation in SELV controlgear		N/A
	No connection between output circuit and the body or protective earthing circuit		N/A
	No possibility of connection between output circuit and the body or protective earthing circuit through other conductive parts		N/A
	SELV outputs separated from earth by at least basic insulation		N/A
	ELV conductive parts insulated as live parts		N/A
	Tests according Annex L of IEC 61347-1		N/A
- (10.4)	Accessible conductive parts in SELV circuits		N/A
	Output voltage under load ≤ 25 V r.m.s. or ≤ 60 V d.c.		N/A
	If output voltage > 25 V r.m.s. or > 60 V d.c.; No load output ≤ 35 V peak or ≤ 60 V d.c and touch current does not exceed 0,7 mA (peak) or 2 mA d.c.:		N/A
	One conductive part is insulated if output voltage or current exceeding the values above and withstand test voltage 500 V		N/A
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		N/A
	Y1 or Y2 capacitors comply with IEC 60384-14		N/A
	Resistors comply with test (a) in 14.1 of IEC 60065		N/A
10 (11)	MOISTURE RESISTANCE AND INSULATION		$\frac{3}{4}$
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (MW):		P
	For basic insulation ≥ 2 MW		N/A
	For double or reinforced insulation ≥ 4 MW.....	100 MW	P
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		N/A
11 (12)	ELECTRIC STRENGTH		$\frac{3}{4}$
	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V		N/A



Attachment No. 3

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	Working voltage ≤ 50 V, test voltage 500 V		N/A
	Working voltage > 50 V ≤ 1000 V, test voltage (V):		P
	Basic insulation, 2U + 1000 V		N/A
	Supplementary insulation, 2U + 1000 V		N/A
	Double or reinforced insulation, 4U + 2000 V	2960V	P
	No flashover or breakdown		P
	Solid or thin sheet insulation for double or reinforced insulation fulfil the requirements in Annex N in IEC 61347-1		N/A

12 (14)	FAULT CONDITIONS		¾
- (14.1)	When operated under fault conditions the controlgear:		P
	- does not emit flames or molten material		P
	- does not produce flammable gases		P
	- protection against accidental contact not impaired		P
	Thermally protected controlgear does not exceed the marked temperature value		N/A
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected	(see appended table)	P
- (14.2)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (after any reduction in 14.2 - 14.5)	(see appended table)	N/A
- (14.3)	Short-circuit or interruption of semiconductor devices	(see appended table)	N/A
- (14.4)	Short-circuit across insulation consisting of lacquer, enamel or textile	(see appended table)	N/A
- (14.5)	Short-circuit across electrolytic capacitors	(see appended table)	P
	Short-circuit or interruption of SPDs	(see appended table)	N/A
- (14.6)	After the tests has been carried out on three samples:		P
	The insulation resistance ³ 1 MW	100 MW	P
	No flammable gases		P
	No accessible parts have become live		P
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
- (14.7)	Relevant fault condition tests with high-power a.c. supply and in turn to a d.c. supply		¾
12.2	Overpower condition		P
	Module withstands overpower condition >15 min.		N/A



Attachment No. 3

Page 6 of 15

Report No.: 68.140.20.0092.01

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		P
	No fire, smoke or flammable gas is produced		P
	Molten material does not ignite tissue paper, spread below the module		N/A
14 (15)	CONSTRUCTION		$\frac{3}{4}$
- (15.1)	Wood, cotton, silk, paper and similar fibrous material		N/A
	Wood, cotton, silk, paper and similar fibrous material not used as insulation		N/A
- (15.2)	Printed circuits		N/A
	Printed circuits used as internal connections complies with clause 14		N/A
15 (16)	CREEPAGE DISTANCES AND CLEARANCES		$\frac{3}{4}$
- (16.1)	General		P
	Creepage distances and clearances according to 16.2 and 16.3		P
	Controlgears providing SELV comply with additional requirements in Annex L		N/A
	Insulating lining of metallic enclosures		N/A
	Controlgear protected against pollution comply with Annex P		N/A
- (16.2)	Creepage distances		P
- (16.2.2)	Minimum creepage distances for working voltages		P
	Creepage distances according to Table 7	(see appended table)	P
- (16.2.3)	Creepage distances for working voltages with frequencies above 30 kHz		N/A
	Creepage distances according to Table 8	(see appended table)	N/A
- (16.3)	Clearances		P
- (16.3.2)	Clearances for working voltages		P
	Clearances distances according to Table 9	(see appended table)	P
- (16.3.3)	Clearances for ignition voltages and working voltages with higher frequencies		N/A
	Clearances distances for basic or supplementary insulation according to Table 10		N/A
	Clearances distances for reinforced insulation according to Table 11		N/A
16 (17)	SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS		$\frac{3}{4}$

Attachment No. 3

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	Screws, current-carrying parts and connections in compliance with IEC 60598-1 (clause numbers between parentheses refer to IEC 60598-1)		¾
(4.11)	Electrical connections		P
(4.11.1)	Contact pressure		N/A
(4.11.2)	Screws:		N/A
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
(4.11.3)	Screw locking:		N/A
	- spring washer		N/A
	- rivets		N/A
(4.11.4)	Material of current-carrying parts		P
(4.11.5)	No contact to wood or mounting surface		P
(4.11.6)	Electro-mechanical contact systems		N/A
(4.12)	Mechanical connections and glands		N/A
(4.12.1)	Screws not made of soft metal		N/A
	Screws of insulating material		N/A
	Torque test: torque (Nm); part.....:		N/A
	Torque test: torque (Nm); part.....:		N/A
	Torque test: torque (Nm); part.....:		N/A
(4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
(4.12.4)	Locked connections:		N/A
	- fixed arms; torque (Nm).....:		N/A
	- lampholder; torque (Nm).....:		N/A
	- push-button switches; torque 0,8 Nm.....:		N/A
(4.12.5)	Screwed glands; force (Nm).....:		N/A
17 (18)	RESISTANCE TO HEAT, FIRE AND TRACKING		¾
- (18.1)	Ball-pressure test	See Test Table 17 (18.1)	N/A
- (18.2)	Test of printed boards	See Test Table 17 (18.2)	N/A
- (18.3)	Glow-wire test (650°C)	See Test Table 17 (18.3)	N/A
- (18.4)	Needle-flame test (10 s)	See Test Table 17 (18.4)	N/A
- (18.5)	Proof tracking test	See Test Table 17 (18.5)	N/A
18	RESISTANCE TO CORROSION		¾
	Comply with requirements according 4.18 of IEC 60598-1		N/A



Attachment No. 3

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

20	HEAT MANAGEMENT		¾
20.1	General		N/A
	Fulfil clause 20 if replaceable LED module and when heat conducting thermal interface is needed.		N/A
20.2	Thermal interface material		N/A
	Thermal interface material delivered with the module if necessary		N/A
20.3	Heat protection		N/A
	Not impair safety when operated under poor heat-conduction conditions according Annex D		N/A

22	PHOTOBIOLOGICAL SAFETY		¾
22.1	UV radiation		N/A
	Luminous radiation not exceed 2mW/klm		N/A
22.2	Blue light hazard		P
	Assessed according to IEC TR 62778	RG1	P
22.3	Infrared radiation		N/A
	Requirements for infrared radiation when required		N/A

A	ANNEX A - TESTS		¾
	All tests performed in accordance with the advice given in Annex H of IEC 61347-1, if applicable		P

12 (14)	TABLE: tests of fault conditions		P
Part	Simulated fault		Hazard
D1	220/240V; Short circuited, fuse opened immediately, unrecoverable		NO
C1	220/240V; Short circuited, input power increased a little, recoverable		NO
R1	220/240V; Short circuited, input power increased a little, recoverable		NO
U1(1-2)	220/240V; Short circuited, input power increased, recoverable		NO
U1(2-3)	220/240V; Short circuited, input power increased, recoverable		NO
LED1	220/240V; Short circuited, LED1 not working, input power increased a little recoverable		NO

Attachment No. 3

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

15 (16)	TABLE: clearance and creepage distance measurements (mm)						P
Applicable part of IEC 61347-1 Table 7 – 11*							
Distances	Insulation type **	Measured clearance	Required		Measured creepage	Required	
			clearance	*Table		creepage	*Table
Distance 1:	B	3.09	1.5	9	3.09	2.5	7
Distance 2:	B	2.65	1.5	9	2.65	2.5	7
Distance 3:	R	6.0	3.0	9	6.0	5.0	7
Working voltage (V).....:					240V		
Frequency if applicable (kHz)					50Hz		
PTI					< 600 <input checked="" type="checkbox"/>	≥ 600 <input type="checkbox"/>	
Peak value of the working voltage \hat{U}_{out} if applicable (kV)					N/A		
Pulse voltage if applicable (kV)					N/A		
Supplementary information: Min. values were recorded. Distance 1: between different polarity of L/N. Distance 2: between two pins of fuse. Distance 3: Between live parts to accessible parts.							

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

17 (18.1)	TABLE: Ball Pressure Test of Thermoplastics				N/A
Allowed impression diameter (mm)		2			
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)		
Supplementary information:					

17 (18.2)	TABLE: Test of printed boards				N/A
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (s)	Ignition of specified layer Yes/No	Duration of burning (s)	Verdict
Supplementary information:					

17 (18.3)	TABLE: Glow-wire test			N/A
Glow wire temperature		650°C		



Attachment No. 3

IEC 62031					
Clause	Requirement + Test	Result - Remark			Verdict
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Any flame or glowing of the sample extinguished within 30 s of withdrawing the glow-wire, and any burning or molten drop did not ignite the underlying parts (Yes/No).....:					
Supplementary information:					

17 (18.4)	TABLE: Needle-flame test				N/A
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Supplementary information:					

17 (18.5)	TABLE: Proof tracking test			N/A
Test voltage PTI	175 V			¾
Object/ Part No./ Material	Manufacturer/ trademark	Withstand 50 drops without failure on three places or on three specimens		Verdict
Supplementary information:				

(A)	ANNEX A - TEST TO ESTABLISH WHETHER A CONDUCTIVE PART IS A LIVE PART WHICH MAY CAUSE AN ELECTRIC SHOCK			¾
(A.1)	Comply with A.2 or A.3			N/A
(A.2)				N/A

ANNEX 1	LED MODULES WITH INTEGRAL CONTROLGEAR PROVIDING SELV			¾
(L.5)	Protection against electric shock			N/A
	Comply with 9.2 of IEC 61558-1			N/A
(L.6)	Heating			N/A
	No excessive temperatures in normal use			N/A
	Value if capacitor tc marked			¾
	Winding insulation classified as Class			¾



Attachment No. 3

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	Comply with tests of clause 14 of IEC 61558-1 with adjustments		N/A
(L.7)	Short-circuit and overload protection		N/A
	Comply with tests of clause 15 of IEC 61558-1 with adjustments		N/A
(L.8)	Insulation resistance and electric strength		N/A
(L.8.1)	Conditioned 48 h between 91 % and 95 %		N/A
(L.8.2)	Insulation resistance		N/A
	Between input- and output circuits not less than 5 MW		N/A
	Between metal parts of class II convertors which are separated from live parts by basic insulation only and the body not less than 5 MW		N/A
	Between metal foil in contact with the inner and outer surfaces of enclosures of insulating material not less than 2 MW		N/A
(L.8.3)	Electric strength		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 having 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
	f) each input circuit and all other input circuits		N/A
	3) Over reinforced insulation between the body and live parts		N/A
(L.9)	Construction		N/A
(L.9.1)	Transformer comply with 19.12 of IEC 61558-1 and 19 of IEC 61558-2-6		N/A
	HF transformer comply with 19 of IEC 61558-2-16		N/A
(L.10)	Components		N/A
	Protective devices comply with 20.6 – 20.11 of IEC 61558-1		N/A
(L.11)	Creepage distances, clearances and distances through insulation		N/A
	Creepage distances and clearances not less than in Clause 16		N/A

Attachment No. 3

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	Distance through insulation according Table L.5 in IEC 61347-1		N/A
	1) Basic distance through insulation		N/A
	Required distance (mm)		¾
	Measured (mm)		N/A
	Supplementary information		¾
	2) Supplementary distance through insulation		N/A
	Required distance (mm)		¾
	Measured (mm)		N/A
	Supplementary information		¾
	3) Reinforced distance through insulation		N/A
	Required distance (mm)		¾
	Measured (mm)		N/A
	Supplementary information		¾

ANNEX 2	TABLE: Critical components information					P
Object / part No.	Code	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
<p>Supplementary information:</p> <p>¹⁾ Provided evidence ensures the agreed level of compliance. See OD-CB2039.</p> <p>The codes above have the following meaning:</p> <ul style="list-style-type: none"> 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 <p>See main report of IEC 60598-2-21.</p>						



Attachment No. 3

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 3	Screw terminals (part of the luminaire)		¾
(14)	SCREW TERMINALS		N/A
(14.2)	Type of terminal.....:		¾
	Rated current (A).....:		¾
(14.3.2.1)	One or more conductors		N/A
(14.3.2.2)	Special preparation		N/A
(14.3.2.3)	Terminal size		N/A
	Cross-sectional area (mm ²)		¾
(14.3.3)	Conductor space (mm)		N/A
(14.4)	Mechanical tests		N/A
(14.4.1)	Minimum distance		N/A
(14.4.2)	Cannot slip out		N/A
(14.4.3)	Special preparation		N/A
(14.4.4)	Nominal diameter of thread (metric ISO thread)	M	N/A
	External wiring		N/A
	No soft metal		N/A
(14.4.5)	Corrosion		N/A
(14.4.6)	Nominal diameter of thread (mm).....:		N/A
	Torque (Nm).....:		N/A
(14.4.7)	Between metal surfaces		N/A
	Lug terminal		N/A
	Mantle terminal		N/A
	Pull test; pull (N)		N/A
(14.4.8)	Without undue damage		N/A

Attachment No. 3

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 4	Screwless terminals (part of the luminaire)		N/A
(15)	SCREWLESS TERMINALS		¾
(15.2)	Type of terminal.....:		¾
	Rated current (A).....:		¾
(15.3.1)	Material		N/A
(15.3.2)	Clamping		N/A
(15.3.3)	Stop		N/A
(15.3.4)	Unprepared conductors		N/A
(15.3.5)	Pressure on insulating material		N/A
(15.3.6)	Clear connection method		N/A
(15.3.7)	Clamping independently		N/A
(15.3.8)	Fixed in position		N/A
(15.3.10)	Conductor size		N/A
	Type of conductor		N/A
(15.5.1)	Terminals internal wiring		N/A
(15.5.1.1)	Pull test spring-type terminals (4 N, 4 samples).....:		N/A
(15.5.1.2)	Pull test pin or tab terminals (4 N, 4 samples)		N/A
	Insertion force not exceeding 50 N		N/A
(15.5.1.2)	Permanent connections: pull-off test (20 N)		N/A
(15.5.2)	Electrical tests		N/A
	Voltage drop (mV) after 1 h (4 samples).....:		N/A
	Voltage drop of two inseparable joints		N/A
	Number of cycles:		¾
	Voltage drop (mV) after 10th alt. 25th cycle (4 samples)		N/A
	Voltage drop (mV) after 50th alt. 100th cycle (4 samples)		N/A
	After ageing, voltage drop (mV) after 10th alt. 25th cycle (4 samples).....:		N/A
	After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples).....:		N/A
(15.6)	Terminals and connections for external wiring		N/A
(15.6.1)	Conductors		N/A
	Terminal size and rating		N/A
(15.6.2)	Mechanical tests		N/A



Attachment No. 3

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
(15.6.2.1)	Pull test spring-type terminals or welded connections (4 samples); pull (N)		N/A
(15.6.2.2)	Pull test pin or tab terminals (4 samples); pull (N)		N/A
(15.6.3)	Electrical tests		N/A
	Tests according 15.6.3.1 + 15.6.3.2 in IEC 60598-1		N/A

(15.6.3.1)	TABLE: Contact resistance test / Heating tests										N/A
(15.6.3.2)											Voltage drop (mV) after 1 h
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Voltage drop of two inseparable joints										N/A
	Voltage drop after 10th alt. 25th cycle										N/A
	Max. allowed voltage drop (mV)..... :										¾
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Voltage drop after 50th alt. 100th cycle										N/A
	Max. allowed voltage drop (mV)..... :										¾
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Continued ageing: voltage drop after 10th alt. 25th cycle										N/A
	Max. allowed voltage drop (mV)..... :										¾
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Continued ageing: voltage drop after 50th alt. 100th cycle										N/A
	Max. allowed voltage drop (mV)..... :										¾
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
Supplementary information:											



Attachment No. 3

EN IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 62031 EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES LED modules for general lighting – Safety specifications			
Differences according to..... : EN IEC 62031:2020			

	CENELEC COMMON MODIFICATIONS (EN)		¾
	No Common modifications		N/A

ZB	ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)		¾
	No special National conditions		N/A

ZC	ANNEX ZC, NATIONAL DEVIATIONS (EN)		¾
	No National deviations		N/A



Attachment No. 4

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

TEST REPORT
IEC TR 62778
Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires

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



Attachment No. 4

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE: Spectroradiometric measurement			P
	Measurement performed on:	<input type="checkbox"/> LED package <input type="checkbox"/> LED module <input type="checkbox"/> Lamp <input checked="" type="checkbox"/> Luminaire	
	Model number.....:	H81042408AC-8CWNSA050AC5000	
	Test voltage (V).....:	240V	¾
	Test current (A).....:	2.6A	¾
	Test frequency (Hz).....:	50Hz	¾
	Ambient, t (°C).....:	25.3°C	¾
	Measurement distance.....:	<input checked="" type="checkbox"/> 20 cm <input type="checkbox"/> ... cm	¾
	Source size	<input checked="" type="checkbox"/> Non-small <input type="checkbox"/> Small: mm	¾
	Field of view	<input type="checkbox"/> 100 mrad <input checked="" type="checkbox"/> 11 mrad <input type="checkbox"/> 1.7 mrad (for small sources)	¾

Item	Symbol	Units	Result	Remark
Correlated colour temperature	CCT	K	/	--
x/y colour coordinates	--	--	/	--
Blue light hazard radiance	L _B	W/(m ² •sr ¹)	233	RG1
Blue light hazard irradiance	E _B	W/m ²	/	--
Luminance	L	cd/m ²	2.299x10 ⁵	--
Illuminance	E	lx		--

Supplementary information:

Measurement uncertainty statement for IEC TR 62778:2014			
	Risk	Units	Expanded Uncertainty; coverage factor (k)
L _B	Blue light hazard radiance	W/(m ² •sr ¹)	U= 7.50%; k=2



Attachment No. 4

IEC TR 62778			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: Angular light distribution	N/A



Attachment No. 5

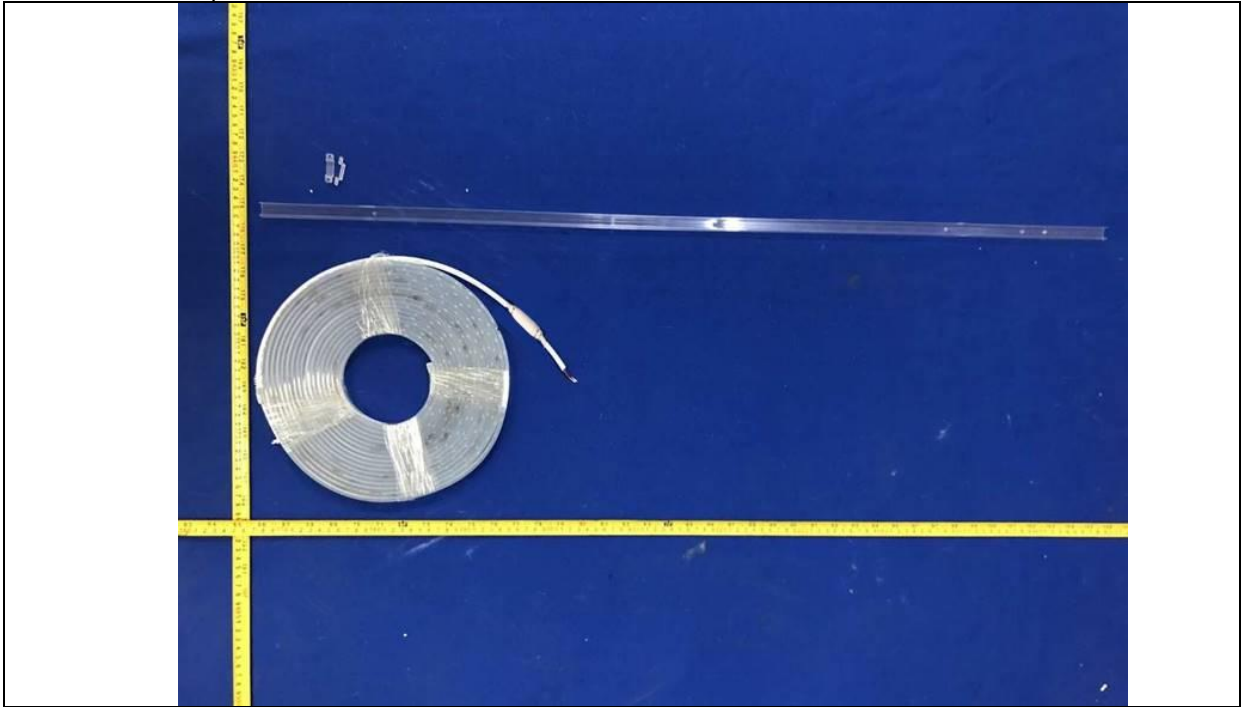
Photo documentation

Page 1 of 6

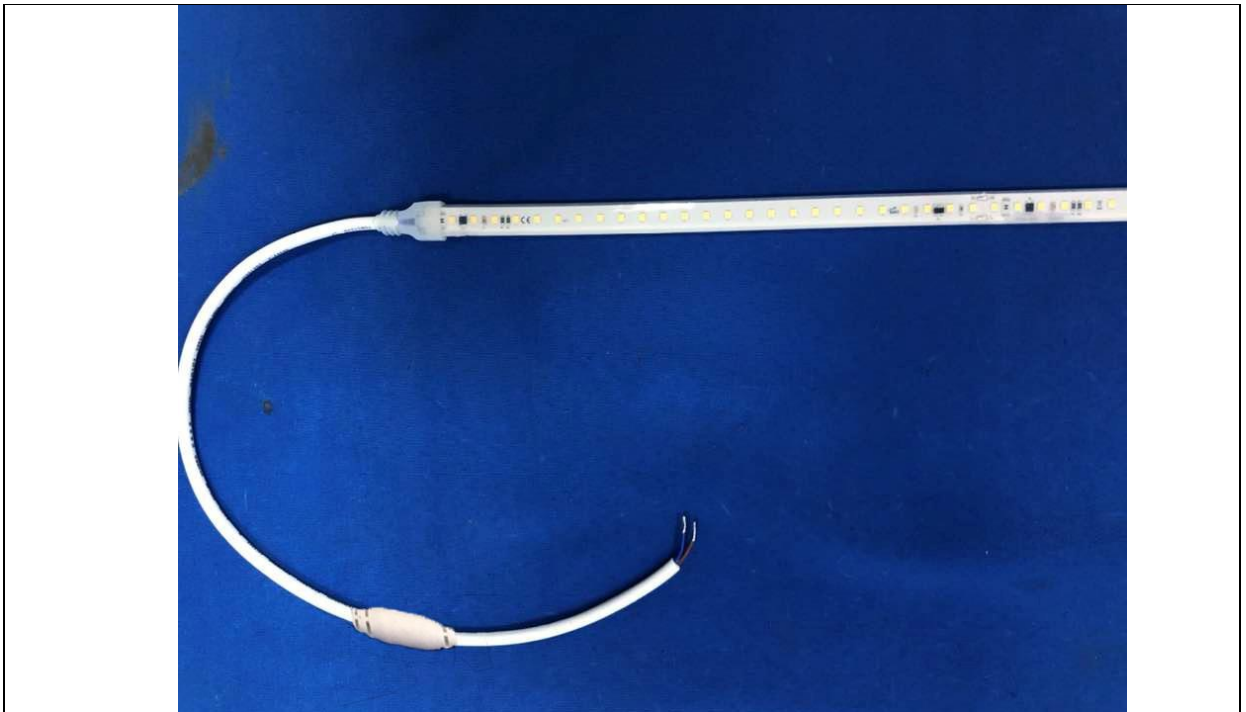
Report No.: 68.140.20.0092.01

Details of: Overall view for all models

Remark: Representative model: H852408EF-8CWNSA050XC1000



Details of: Detail view

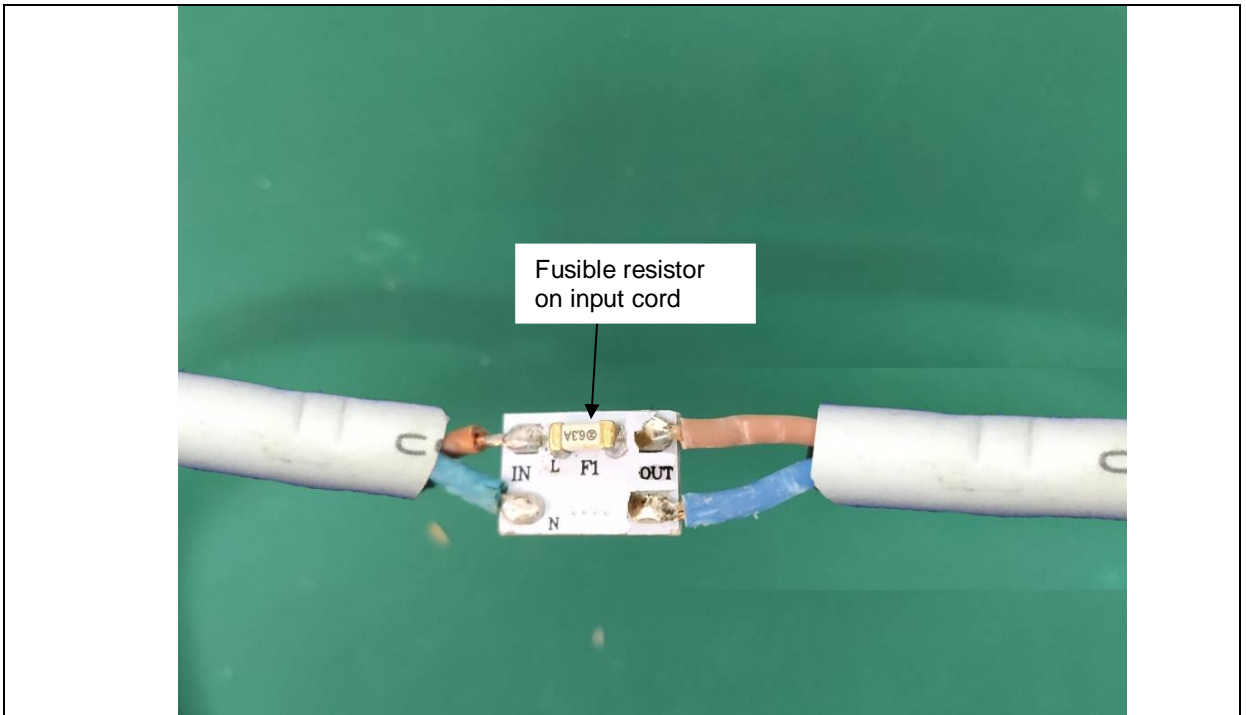


Attachment No. 5

Details of: Detail view

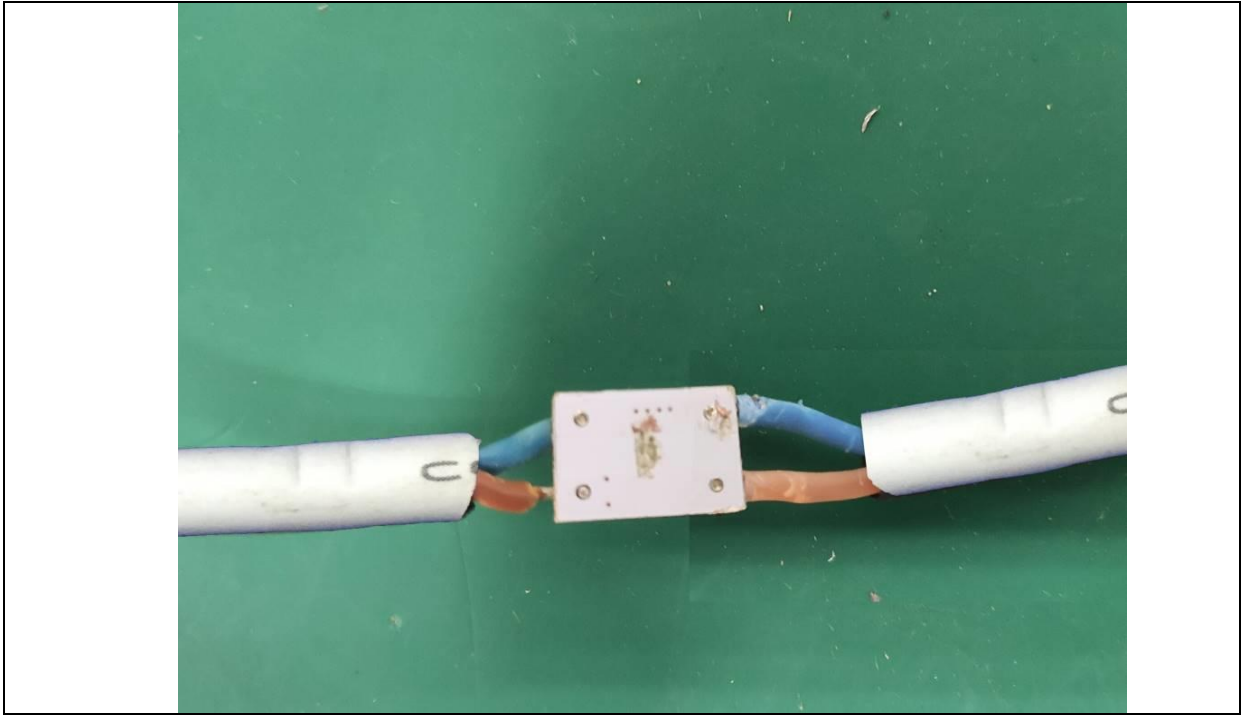


Details of: Detail view



Attachment No. 5

Details of: Detail view

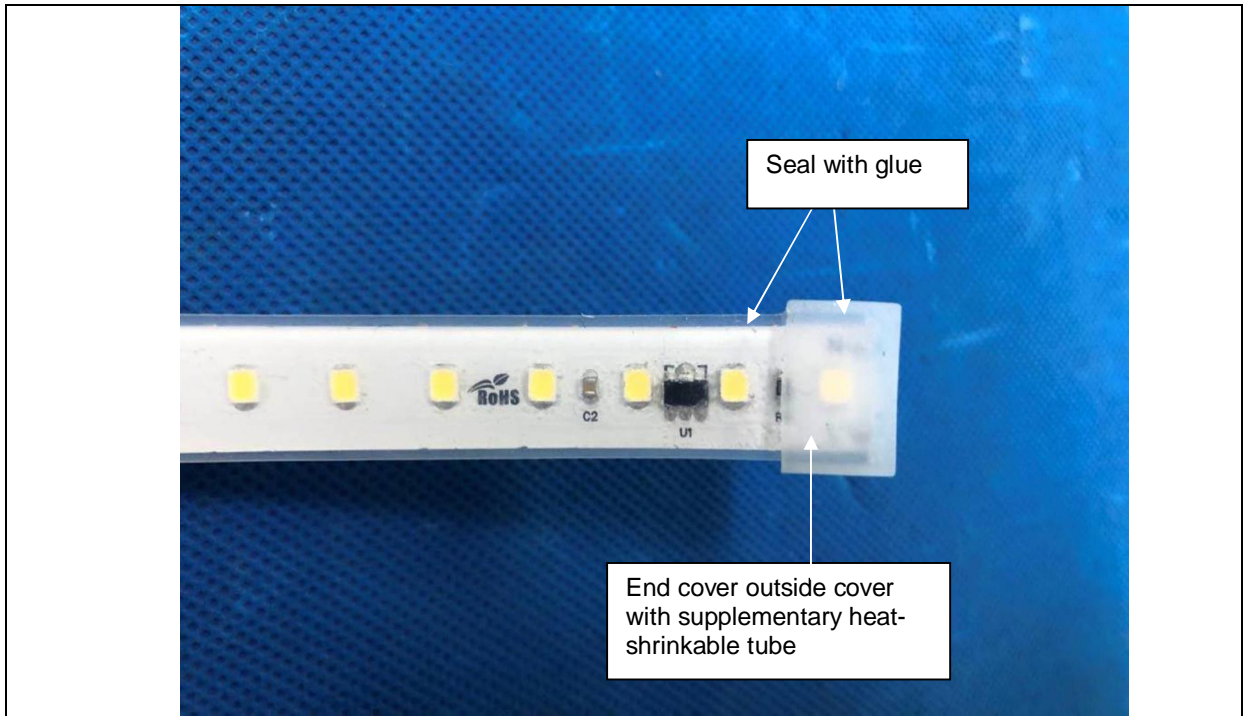


Details of: Input cover view for all models

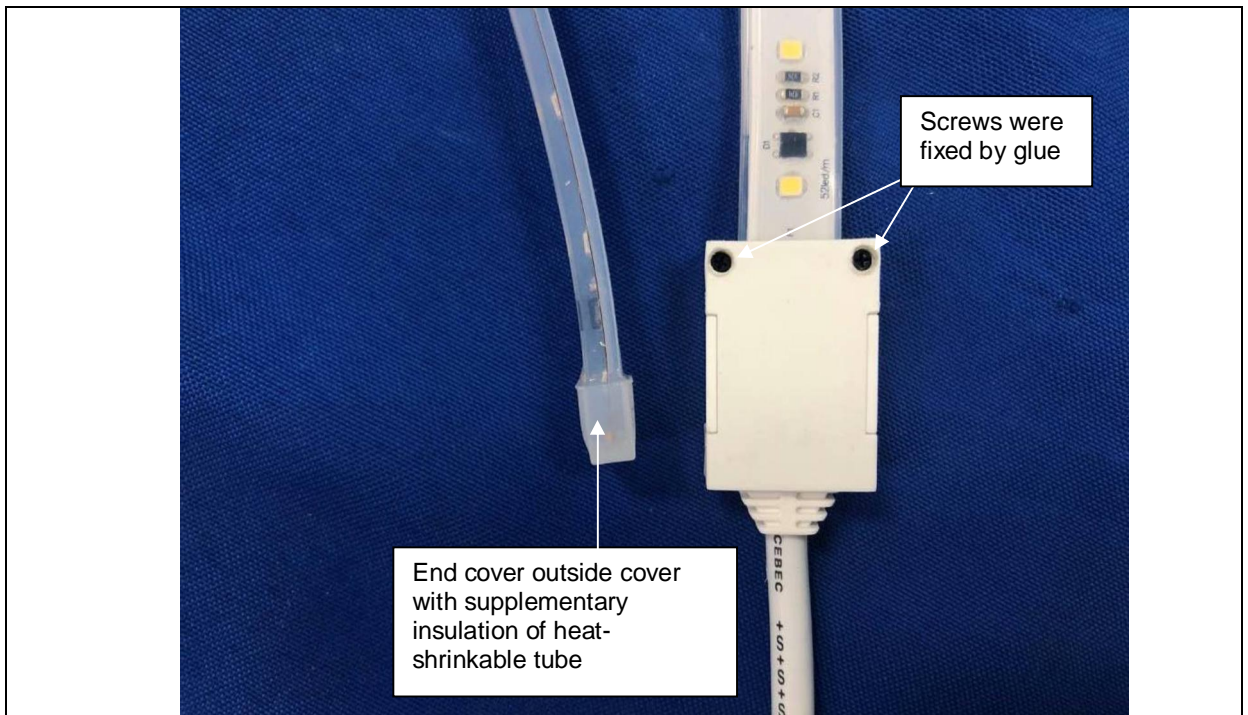


Attachment No. 5

Details of: End cover view for all models



Details of: Input connector (alternative) and end cover view

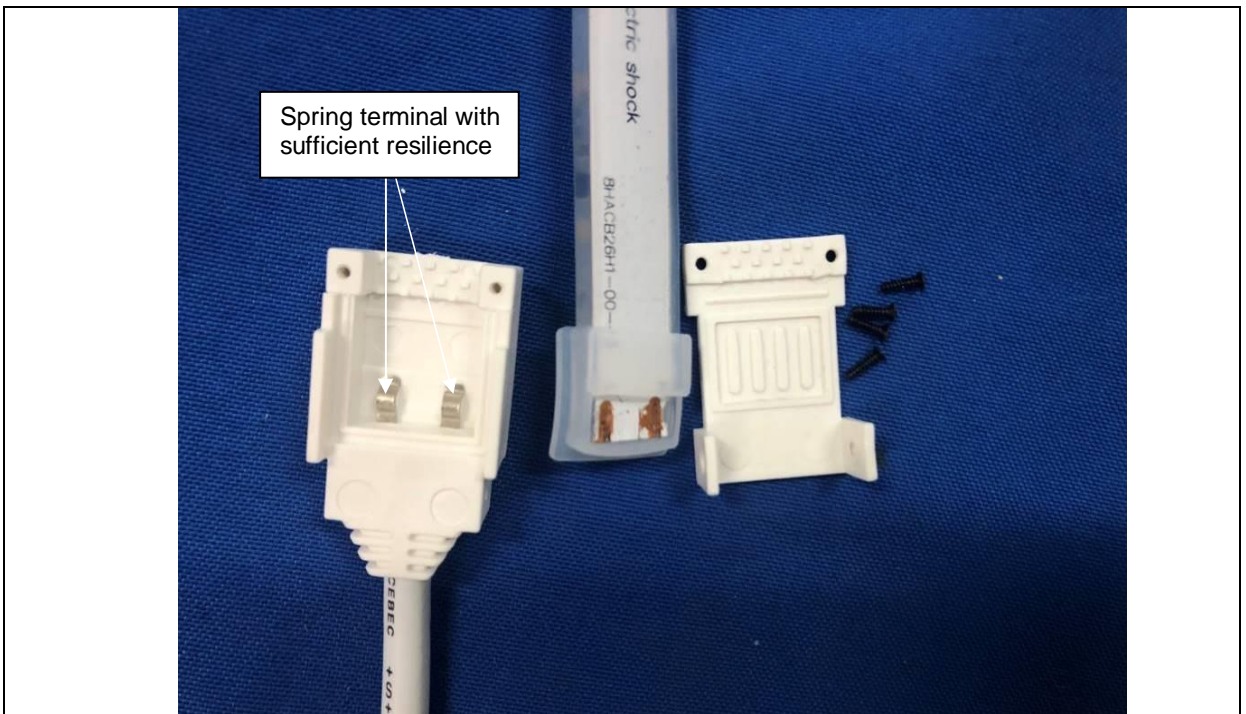


Attachment No. 5

Details of: Internal view for input connector



Details of: Input connector internal view



Attachment No. 5

Photo documentation

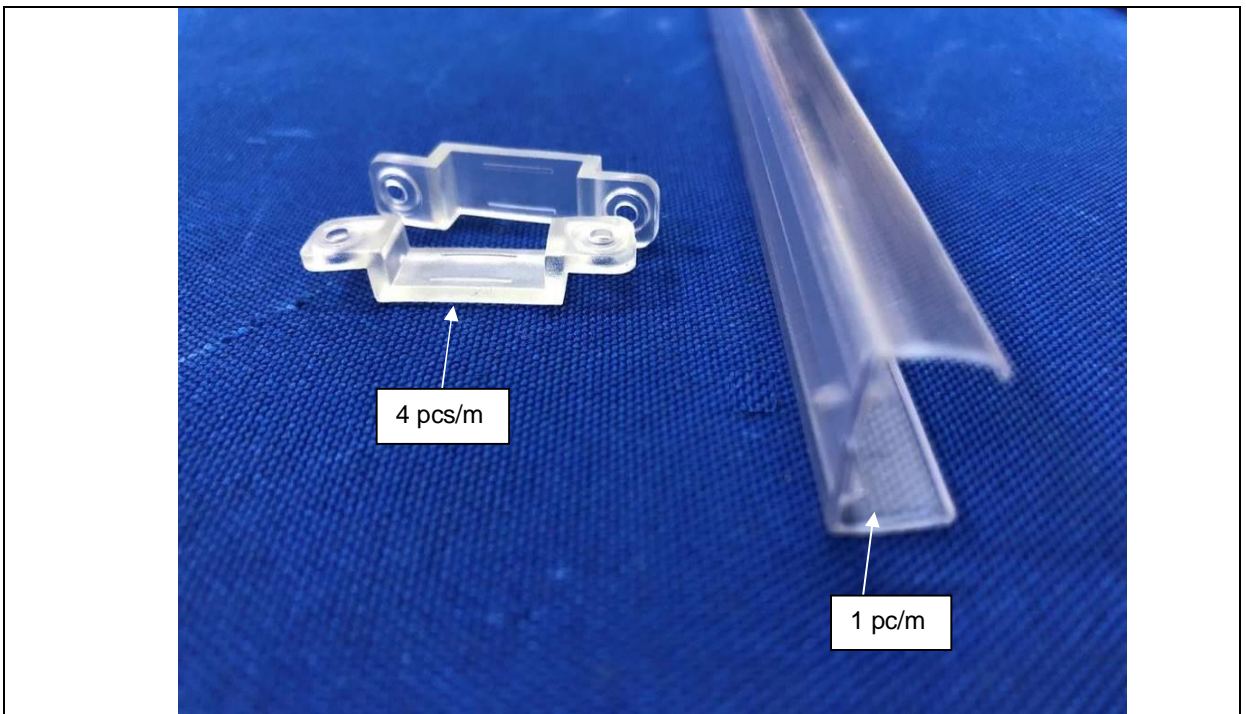
Page 6 of 6

Report No.: 68.140.20.0092.01

Details of: Input connector internal view



Details of: Installation device view



End of Report