TEST REPORT

IEC 60598-2-20

Luminaires

Part 2: Particular requirements

Section 20: Lighting Chains

Report reference No. ..... :	61.11.22.0421.01
Date of issue ..... :	2022-11-04
Testing laboratory ..... :	Guangzhou Quality Technology Service Co., Ltd.
Address ..... :	Room 106, R&D Center, No.11, Nanyunwu Road, High-tech Industry Development Zone, Guangzhou, Guangdong, China
Testing location ..... :	As above
Applicant ..... :	V-TAC EXPORTS LIMITED
Address ..... :	ROOM NO 301, KAM ON BUILDING,176A QUEENS ROAD CENTRAL, CENTRAL, HONG KONG
Standard ..... :	IEC 60598-2-20:2014 for use in conjunction with IEC 60598-1:2020
Test Result	The a. m. test item passed
Test procedure ..... :	CE (LVD)
Procedure deviation ..... :	N. A.
Non-standard test method ..... :	N. A.
Test Report Form No. ..... :	IEC60598_2_20G
Test Report Form(s) Originator ..... :	Intertek Semko AB
Master TRF ..... :	Dated 2021-12-17
Number of pages (Report) ..... :	41
Number of pages (Attachments) ..... :	8+1+1+2+2
Tested by ..... : Rain Chen	Approved by ..... : Arvin Hu

Rain Chen

.....

Signature

GUANGZHOU QUALITY TECHNOLOGY SERVICE CO., LTD. AUTHORIZED

.....

Signature

Type of test object ..... :	LED STRIP LIGHT
Trademark ..... :	N/A
Model and/or type reference ..... :	See model list
Manufacturer ..... :	Same as applicant
Rating(s) ..... :	12VDC, Class III, IP20, ta: 25°C, other see the model list.

Copy of marking plate:

LED STRIP LIGHT

Model: 12V-5730-120L-IP20

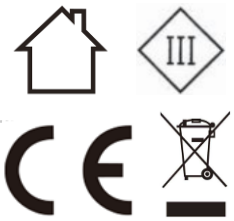
Input: 12VDC

Power: 20W/m

Length: Max.5m

V-TAC EXPORTS LIMITED

ROOM NO 301, KAM ON BUILDING,176A QUEENS ROAD CENTRAL, CENTRAL, HONG KONG



Remarks:

Height of CE mark at least 5 mm, height of WEEE symbol should not less than 7mm, height of other marks at least 5mm, height of letters and numerals at least 2mm.

Test items particulars:

Classification of installation and use ..... :	Class III, Rope lights
Supply Connection ..... ……..:	Lead wire

Possible test case verdicts:

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

Testing:

Date of receipt of test item ..... :	2022-10-20
Date (s) of performance of tests ..... :	2022-10-20 to 2022-11-02

General remarks:

"(see remark #)" refers to a remark appended to the report.

"(see appended table)" refers to a table appended to the report.

Throughout this report a comma is used as the decimal separator.

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 testing laboratory.

List of Attachments (including a total number of pages in each attachment):

Attachment 1: IEC 62013:2018. (8 pages)

Attachment 2: EN IEC 62031:2020+A11:2021. (1 pages)

Attachment 3: EN 62493:2015. (1 page)

Attachment 4: IEC TR 62778:2014. (2 pages)

Attachment 5: Photos. (2 pages)

Summary of testing：

All tests are performed comply with the requirements of EN 60598-2-20:2015+A1:2017 and EN IEC 60598-1:2021+A11:2022.

There is no difference between IEC 60598-2-20:2014 used in conjunction and IEC 60598-1:2020 with EN 60598-2-20:2015+A1:2017 and EN IEC 60598-1:2021+A11:2022.

General product information:

1. The products under test are LED STRIP LIGHT.
2. The lighting chains equipped with non-replaceable lighting source.
3. The lighting chains are class III luminaries, and suitable for direct mounting on normally flammable surfaces.

Factory Name and Location:

GUANGDONG COOPER OPTOELECTRONICS INCORPORATED CO., LTD.

NO.5 BUILDING 7, NO.27 OF HIGH-TECH EAST ROAD, JIANGHAI DISTRICT, JIANGMEN CITY, GUANGDONG CHINA.

Model list

No.	Model	Input	Rated Power	Length
1	12V-2835-60L-IP20-3.2W	12VDC	3.2W/m	Max.5m
2	12V-2835-60L-IP20	12VDC	4.2W/m	Max.5m
3	12V-2835-60L-IP20-5W	12VDC	5W/m	Max.5m
4	12V-2835-120L-IP20	12VDC	8W/m	Max.5m
5	12V-2835-120L-IP20-10W	12VDC	10W/m	Max.5m
6	12V-2835-120L-IP20-12W	12VDC	12W/m	Max.5m
7	12V-2835-120L-IP20-14W	12VDC	14W/m	Max.5m
8	12V-2835-168L-IP20	12VDC	13W/m	Max.5m
9	12V-2835-180L-IP20	12VDC	14W/m	Max.5m
10	12V-2835-192L-IP20	12VDC	16W/m	Max.5m
11	12V-2835-204L-IP20	12VDC	17W/m	Max.5m
12	12V-2835-240L-IP20-17W	12VDC	17W/m	Max.5m
13	12V-2835-240L-IP20	12VDC	20W/m	Max.5m
14	12V-5050-30L-IP20-RGB	12VDC	4W/m	Max.5m
15	12V-5050-30L-IP20	12VDC	6W/m	Max.5m
16	12V-5050-60L-IP20-RGB	12VDC	7W/m	Max.5m
17	12V-5050-60L-IP20-8W	12VDC	8W/m	Max.5m
18	12V-5050-60L-IP20	12VDC	11W/m	Max.5m
19	12V-5050-60L-IP20-15W	12VDC	15W/m	Max.5m
20	12V-5050-72L-IP20	12VDC	12W/m	Max.5m
21	12V-5050-96L-IP20	12VDC	15W/m	Max.5m
22	12V-5050-120L-IP20	12VDC	20W/m	Max.5m
23	12V-4040-60L-IP20	12VDC	8W/m	Max.5m
24	**12V-5730-120L-IP20**	**12VDC**	**20W/m**	**Max.5m**

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
20.4 (0)	**GENERAL TEST REQUIREMENTS**		**P**
20.4 (0.3)	More sections applicable..... :	Yes ☐ No ☐ Section/s:	—
20.4 (0.5)	Components		—
20.4 (0.7)	**Information for luminaire design in light sources standards**		**—**
20.4 (0.7.2)	Light source safety standard .....:		—
	Luminaire design in the light source safety standard		—

20.5 (2)	**CLASSIFICATION OF LUMINAIRES**		**P**
20.5 (2.2)	Type of protection .....:	Class III	P
20.5 (2.3)	Degree of protection .....:	IP20	—
20.5 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces .....:	Yes ☐ No ☐	
20.5 (2.5)	Luminaire for normal use .....:	Yes ☐ No ☐	—
	Luminaire for rough service .....:	Yes ☐ No ☐	—
20.5.1 (-)	Ordinary luminaire classified “for indoor use only”....:	Yes ☐ No ☐	—
	Luminaires other than ordinary classified “for indoor use only” .....:	Yes ☐ No ☐	—
	Luminaires other than ordinary classified for “outdoor use” and “for indoor use” .....:	Yes ☐ No ☐	—
20.5.2 (-)	Lighting chains shall be classified as Class II or Class III		P
20.5.3 (-)	Lighting chains for outdoor use shall have a protective index IP 44 or higher		N/A

20.6 (3)	**MARKING**		**P**
20.6.1 (3.2)	Mandatory markings		P
	Position of the marking		P
	Format of symbols/text		P
20.6.1 (3.3)	Additional information		P
	Language of instructions	English	P
20.6.1 (3.3.1)	Combination luminaires		P
20.6.1 (3.3.2)	Nominal frequency in Hz		N/A
20.6.1 (3.3.3)	Operating temperature		N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
20.6.1 (3.3.5)	Wiring diagram		N/A
20.6.1 (3.3.6)	Special conditions		N/A
20.6.1 (3.3.7)	Metal halide lamp luminaire – warning		N/A
20.6.1 (3.3.8)	Limitation for semi-luminaires		N/A
20.6.1 (3.3.9)	Power factor and supply current		N/A
20.6.1 (3.3.10)	Suitability for use indoors		P
20.6.1 (3.3.11)	Luminaires with remote control		N/A
20.6.1 (3.3.12)	Clip-mounted luminaire – warning		N/A
20.6.1 (3.3.13)	Specifications of protective shields		N/A
20.6.1 (3.3.14)	Symbol for nature of supply	DC	P
20.6.1 (3.3.15)	Rated current of socket outlet		N/A
20.6.1 (3.3.16)	Rough service luminaire		N/A
20.6.1 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments		N/A
20.6.1 (3.3.18)	Non-ordinary luminaires with PVC cable		N/A
20.6.1 (3.3.19)	Protective conductor current in instruction if applicable		N/A
20.6.1 (3.3.20)	Provided with information if not intended to be mounted within arm's reach		N/A
20.6.1 (3.3.21)	Non replaceable and non-user replaceable light sources information provided		N/A
20.6.1 (3.3.22)	Controllable luminaires, classification of insulation provided	Non-replaceable light sources	P
20.6.1 (3.3.23)	Luminaires without controlgear provided with necessary information for selection of appropriate component		N/A
20.6.1 (3.3.24)	If not supplied with terminal block, information on the packaging		N/A
20.6.1 (3.3.25)	Luminaires employing light sources emitting UV on mains wiring, information provided		N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
20.6.1 (3.3.26)	Wall mounted luminaire using external flexible cable or cord longer than 0.3 m, information provided		N/A
20.6.1 (3.4)	Test with water		P
	Test with hexane		P
	Legible after test		P
	Label attached		P
20.6.2 (-)	**Lighting chain marking**		**P**
	The following information shall be marked on the lighting chain:		P
	– rated voltage of the complete chain		P
	– rated wattage of the complete chain		P
	Where the information is on the cable, it shall be marked on a durable non-removable sleeve or label		P
20.6.3 (-)	**Lighting chain and packing marking**		**P**
	The following marking shall be placed on the lighting chain and on the accompanying packing of lighting chains for indoor use only		P
	– “FOR INDOOR USE ONLY”		P
	– As an alternative to the text, the lighting chain can be marked with the symbol  The symbol shall be explained in the instructions.		P
20.6.4 (-)	**Packing or instruction marking**		**P**
	The following or similar marking shall be placed on the accompanying packing or instructions		P
	a) For all lighting chains where the packing has not been adapted for display purposes		N/A
	– “Do not connect the chain to the supply while it is in the packing”.		N/A
	b) For lighting chains with replaceable lamps:		P
	– voltage and wattage or manufacturer's article number of replacement lamps		P
	– “Do not remove or insert lamps while the chain is connected to the supply”		N/A
	– “Ensure that all lampholders are fitted with a lamp”		N/A
	c) Lighting chains designed to be used without a lamp in every lampholder:		N/A
	– adequate information about required blanking plug(s)		N/A
	d) For chains with replaceable series-connected lamps:		N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
	– “Replace failed lamps immediately by lamps of the same type as delivered or of a type specified by the manufacturer”.		N/A
	e) For lighting chains with ‘fuse’ lamp(s):		N/A
	– “Do not replace a ‘fuse’ lamp with a non-’fuse’ lamp”; in order to indicate the difference from ‘ordinary’ lamps, ‘fuse’ lamps shall be partly coloured white		N/A
	– information indicating that the chain is provided with ‘fuse’ lamps and explanation of their function.		N/A
	f) For lighting chains with non-replaceable lamps:		P
	– “The lamps are not replaceable”		P
	g) For class II lighting chains with non-replaceable lamps, the substance of the following:		N/A
	– where breakage or damage to lamps occurs the chain must not be used/energised but disposed of safely		N/A
	h) For lighting chains which rely on gaskets to provide the specified degree of protection against dust, solid objects and moisture		P
	– “WARNING – THIS LIGHTING CHAIN MUST NOT BE USED WITHOUT ALL GASKETS BEING IN PLACE		P
	i) For lighting chains intended for interconnection:		P
	– “Do not interconnect parts of this lighting chain with parts of another manufacturer's lighting chain”		P
	– “Interconnection shall be made only by the use of the supplied connectors. Any open ends must be sealed-off before use”;		P
	– maximum system length that may be interconnected		P
	– maximum number of lamps or max system wattage that may be interconnected		P
	j) For lighting chains incorporating lamp bridging device(s):		N/A
	– information stating that the chain is fitted with a bridging device(s).		N/A
	k) For class III lighting chains delivered without a supply source:		N/A
	– relevant information concerning the required supply source		N/A
	l) For mains voltage lighting chains with series connected lamps:		N/A
	– “WARNING – RISK OF ELECTRIC SHOCK IF LAMPS ARE BROKEN OR MISSING. DO NOT USE”		N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
20.7 (4)	**CONSTRUCTION**		**P**
20.7.1 (4.2)	Components replaceable without difficulty		N/A
20.7.1 (4.3)	Wireways smooth and free from sharp edges		P
20.7.1 (4.4)	**Lampholders**		**N/A**
20.7.1 (4.4.1)	Integral lampholder		N/A
20.7.1 (4.4.2)	Wiring connection		N/A
20.7.1 (4.4.3)	Lampholder for end-to-end mounting		N/A
20.7.1 (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 has not moved from its position and show no permanent deformation		N/A
20.7.1 (4.4.5)	Peak pulse voltage		N/A
20.7.1 (4.4.6)	Centre contact		N/A
20.7.1 (4.4.7)	Parts in rough service luminaires resistant to tracking		N/A
20.7.1 (4.4.8)	Lamp connectors		N/A
20.7.1 (4.4.9)	Caps and bases correctly used		N/A
20.7.1 (4.4.10)	Light source for lampholder or connection according IEC 60061 not connected another way		N/A
20.7.1 (4.5)	**Starter holders**		N/A
	Starter holder in luminaires other than class II		N/A
	Starter holder class II construction		N/A
20.7.1 (4.6)	**Terminal blocks**		N/A
	Tails		N/A
	Unsecured blocks		N/A
20.7.1 (4.7)	**Terminals and supply connections**		**P**

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
20.7.1 (4.7.1)	Contact to metal parts		N/A
20.7.1 (4.7.2)	Test 8 mm live conductor		N/A
	Test 8 mm earth conductor		N/A
20.7.1 (4.7.3)	Terminals for supply conductors		N/A
20.7.1 (4.7.3.1)	Welded method and material		P
	- stranded or solid conductor		P
	- spot welding		P
	- welding between wires		P
	- 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 15.6.3.2.3 and 15.6.3.2.4		N/A
20.7.1 (4.7.4)	Terminals other than supply connection		N/A
20.7.1 (4.7.5)	Heat-resistant wiring/sleeves		P
20.7.1 (4.7.6)	Multi-pole plug		N/A
	- test at 30 N		N/A
20.7.1 (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
20.7.1 (4.9)	**Insulating lining and sleeves**		**P**
20.7.1 (4.9.1)	Retainment		P
	Method of fixing .....:		P
20.7.1 (4.9.2)	Insulated linings and sleeves:		P
	Resistant to a temperature > 20 °C to the wire temperature or		P
	a) & c) Insulation resistance and electric strength		N/A
	b) Ageing test. Temperature (°C) .....:		N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
20.7.1 (4.10)	**Double or reinforced insulation**		**N/A**
20.7.1 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		N/A
	Safe installation fixed luminaires		N/A
	Capacitors and switches		N/A
20.7.1 (4.10.2)	Assembly gaps:		N/A
	- not coincidental		N.A
	- no straight access with test probe		N/A
20.7.1 (4.10.3)	Retainment of insulation:		N/A
	- fixed		N/A
	- unable to be replaced; luminaire inoperative		N/A
	- sleeves retained in position		N/A
	- lining in lampholder		N/A
20.7.1 (4.10.4)	Protective impedance device		N/A
	Basic and supplementary insulation bridged by resistor(s) or appropriate capacitor		N/A
	Double or reinforced insulation bridged by at least two separate resistors in series or appropriate capacitor(s)		N/A
	Capacitors comply with IEC 60384-14		N/A
	Resistors comply with test (a) in 14.2 of IEC 60065		N/A
20.7.1 (4.11)	**Electrical connections and current-carrying parts**		**P**
20.7.1 (4.11.1)	Contact pressure		P
20.7.1 (4.11.2)	Screws:		N/A
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
20.7.1 (4.11.3)	Screw locking:		N/A
	- spring washer		N/A
	- rivets		N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
20.7.1 (4.11.4)	Material of current-carrying parts		P
20.7.1 (4.14.7)	No contact to wood or mounting surface		P
20.7.1 (4.14.7)	Electro-mechanical contact systems		N/A
20.7.1 (4.12)	**Screws and connections (mechanical) and glands**		**N/A**
20.7.1 (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
20.7.1 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
20.7.1 (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
20.7.1 (4.12.5)	Screwed glands; force (Nm) .....:		N/A
20.7.1 (4.13)	**Mechanical strength**		**P**
20.7.1 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm).....:		N/A
	- other parts; energy (Nm) .....:	0.5Nm	P
	1) live parts		P
	2) linings		N/A
	3) protection		N/A
	4) covers		N/A
20.7.1 (4.13.2)	Metal parts have adequate mechanical strength		N/A
20.7.1 (4.13.3)	Straight test finger		N/A
20.7.1 (4.13.4)	Rough service luminaires		N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
	- 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
20.7.1 (4.13.6)	Tumbling barrel		N/A
20.7.1 (4.14)	**Suspensions, fixings and means of adjusting**		**N/A**
20.7.1 (4.14.1)	Mechanical load:		N/A
	A) four times the weight		N/A
	B) torque 2,5 Nm		N/A
	C) bracket arm; bending moment (Nm).....:		N/A
	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
20.7.1 (4.14.2)	Load to flexible cables		N/A
	Mass (kg) .....:		—
	Stress in conductors (N/mm²) .....:		N/A
	Mass (kg) of semi-luminaire .....:		N/A
	Bending moment (Nm) of semi-luminaire .....:		N/A
20.7.1 (4.14.3)	Adjusting devices:		N/A
	- flexing test; number of cycles .....:		N/A
	- strands broken.....:		N/A
	- electric strength test afterwards		N/A
20.7.1 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N/A
20.7.1 (4.14.5)	Guide pulleys		N/A
20.7.1 (4.14.6)	Strain on socket-outlets		N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
20.7.1 (4.15)	**Flammable materials**		**P**
	- glow-wire test 650°C.....:	See Test Table 20.16 (13.3.2)	P
	- spacing ≥30 mm		N/A
	- screen withstanding test of 13.3.1		N/A
	- screen dimensions		N/A
	- no fiercely burning material		P
	- thermal protection		N/A
	- electronic circuits exempted		N/A
20.7.1 (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
20.7.1 (4.16)	**Luminaires for mounting on normally flammable surfaces**		**P**
	No lamp control gear .....:	(compliance with Section 12)	P
	Provided with adaptor for a track meet the requirements for direct mounting on normally flammable surfaces		N/A
20.7.1 (4.16.1)	Lamp control gear spacing:		N/A
	- spacing 35 mm		N/A
	- spacing 10 mm		N/A
20.7.1 (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
20.7.1 (4.16.3)	Design to satisfy the test of 12.6	(see clause 12.6)	N/A
20.7.1 (4.17)	**Drain holes**		**N/A**
	Clearance at least 5 mm		N/A
20.7.1 (4.18)	**Resistance to corrosion**		**N/A**
20.7.1 (4.18.1)	- rust-resistance		N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
20.7.1 (4.18.2)	- season cracking in copper		N/A
20.7.1 (4.18.3)	- corrosion of aluminium		N/A
20.7.1 (4.19)	Ignitors compatible with ballast		N/A
20.7.1 (4.20)	Rough service vibration		N/A
20.7.1 (4.21)	**Protective shield**		**N/A**
20.7.1 (4.21.1)	Shield fitted if tungsten halogen lamps or metal halide lamps		N/A
	Shield of glass if tungsten halogen lamps		N/A
20.7.1 (4.21.2)	Particles from a shattering lamp not impair safety		N/A
20.7.1 (4.21.3)	No direct path		N/A
20.7.1 (4.21.4)	Impact test on shield		N/A
	Glow-wire test on lamp compartment .....:	See Test Table 20.16 (13.3.2)	N/A
20.7.1 (4.22)	Attachments to lamps not cause overheating or damage		N/A
20.7.1 (4.23)	Semi-luminaires comply Class II		N/A
20.7.1 (4.24)	**Photobiological hazards**		**P**
20.7.1 (4.24.1)	No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P)		P
20.7.1 (4.24.2)	Retinal blue light hazard		N/A
	Class of risk group assessed according to IEC/TR 62778 .....:		—
	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

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
	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
20.7.1 (4.25)	**Mechanical hazard**		**P**
	No sharp point or edges		P
20.7.1 (4.26)	**Short-circuit protection**		**N/A**
20.7.1 (4.26.1)	Adequate means of uninsulated accessible SELV or PELV parts		N/A
20.7.1 (4.26.2)	Short-circuit test with test chain according 4.26.3		N/A
	Supply source ES1 PSE		N/A
	Test chain not melt through		N/A
	Test sample not exceed values of Table 12.1 and 12.2		N/A
20.7.1 (4.27)	**Terminal blocks with integrated screwless protective earthing contacts**		**N/A**
	Test according Annex V		N/A
	Pull test of terminal fixing (20 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Pull test of mechanical connection (50 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Voltage drop test, resistance < 0,05 Ω		N/A
20.7.1 (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
20.7.1 (4.29)	**Luminaires with non-replaceable light source**		**P**
	Not possible to replace light source		P

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
	Live part not accessible after parts have been opened by hand or tools		P
20.7.1 (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
	At least one fixing means requiring use of tool		N/A
20.7.1 (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
20.7.1 (4.31.1)	SELV or PELV circuits		P
	Used SELV or PELV source		P
	Voltage ≤ ELV		P
	Insulating of SELV or PELV circuits from LV supply		N/A
	Insulating of SELV or PELV circuits from other non SELV or PELV circuits		N/A
	Insulating of SELV or PELV circuits from FELV		N/A
	Insulating of SELV or PELV circuits from other SELV or PELV circuits		N/A
	SELV or PELV circuits insulated from accessible parts according Table X.1		P
	Plugs not able to make any electrical contact with 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
20.7.1 (4.31.2)	FELV circuits		N/A
	Used FELV source		N/A
	Voltage ≤ ELV		N/A
	Insulating of FELV circuits from LV supply		N/A
	FELV circuits insulated from accessible parts according Table X.1		N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
	Plugs not able to make any electrical contact with socket-outlets of other voltage systems		N/A
	Socket outlets does not admit plugs of other voltage systems		N/A
	Socket-outlets have protective conductor contact		N/A
20.7.1 (4.31.3)	Other circuits		N/A
	Other circuits insulated from accessible parts according Table X.1		N/A
	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 does 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
20.7.1 (4.32)	**Overvoltage protective devices**		**N/A**
	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
20.7.1 (4.33)	**Luminaire powered via information technology communication cabling**		**N/A**
	Requirements for Class III luminaire		N/A
	Rated voltage within the range of ES1 and does not exceed maximum voltage of used connector		N/A
	Luminaire does not create any hazard from overvoltage	(see Annex 2)	N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
20.7.1 (4.34)	**Electromagnetic fields (EMF)**		**P**
	No harmful electromagnetic fields		P
20.7.1 (4.35)	**Protection against moving fan blades**		**N/A**
	Test with a standard test finger		N/A
	Test with test probe acc. to Figure 13 (IEC 61032) for portable luminaire		N/A
	Blades rounded with radius ≥ 0.5 mm and:		N/A
	- hardness less than D60 Shore		N/A
	- peripheral speed less than 15 m/s		N/A
	- input power of fan ≤ 2 W at rated voltage		N/A
20.7.1 (4.36)	**Track-mounted luminaires**		**N/A**
	Test in accordance with Annex A of IEC60570:2003/AMD2:2019		N/A
20.7.2 (-)	**Lampholders**		**N/A**
	Tested as part of the lighting chain if non-standardised lampholders		N/A
	E5, E10, E14 and E27 according IEC 60238		N/A
	Bayonet according IEC 61184		N/A
	Insulating piercing terminals only if SELV circuit or permanent non-rewireable connections in class II chain		N/A
	Maximum voltage used for E5, E10 and small lampholders		N/A
	Body of insulating material		N/A
20.7.3 (-)	**Terminal blocks**		**N/A**
	Clause 4.6 of IEC 60598-1 referring to terminal blocks does not apply		—
20.7.4 (-)	**Terminals and supply connections**		**N/A**
	Comply with Annex A		N/A
20.7.5 (-)	**Gaskets**		**N/A**
	Gasket weather resistant if outdoor use		N/A
	Gasket remains in place and fit tightly		N/A
20.7.6 (-)	**Mechanical strength**		**P**
	Mechanical strength requirements of 4.13 of part 1 or 15 of IEC 61184		P
	Accessories comply with 4.13.6 of part 1		P

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
20.7.7 (-)	**Lamp bridging devices**		**N/A**
	Protection against electric shock and fire will not be impaired by bridging lamp filaments		N/A
20.7.8 (-)	**Control units**		N**/A**
	Forming an integral part enclosed in non-flammable insulating material tested according 20.16		N/A
	Securely fixed to the cable		N/A
	Electronic control device complies with IEC 61347-2-11		N/A
	LED driver complies with IEC 61347-2-13		N/A
20.7.9 (-)	**Lamp rotation**		**N/A**
	Bulb and lamp cap of push-in lamps will not rotate with a torque of 0,025 Nm		N/A
20.7.10 (-)	**Lamp insertion/withdrawal force**		**N/A**
	Pull force up to 3 N for push-in lamps		N/A
	Push-in force up to 3 N for push-in lamps		N/A
	Pull out force of between 3 N and 10 N for push-in lamps		N/A
20.7.11 (-)	**Lamp mechanical requirements**		**N/A**
	Impact test of 0,2 Nm on lamps of Class II chain:		N/A
	- non-removable lamps		N/A
	- non-standardized lamps		N/A

20.8 (11)	**CREEPAGE DISTANCES AND CLEARANCES**		**P**
20.8 (11.2.1)	Impulse withstand category (Normal category II)	Category II ☐ Category III ☒	—
	Category III according Annex U		N/A
	Protected against pollution, reduced creepage and clearance according Annex P of IEC 61347-1		N/A
20.8 (11.2.2)	Creepage distances for frequency up to 30 kHz	See Test Table 20.8 (11.2) I	N/A
	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 20.8 (11.2) II	N/A
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 20.8 (11.2) II	N/A
20.8 (11.2.3)	Clearances for frequency up to 30 kHz	See Test Table 20.8 (11.2) I	N/A
	Clearances distances for frequency over 30 kHz:		N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
	- Controlgear marked with U_P		N/A
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347		N/A
20.10 (14)	**SCREW TERMINALS**		**N/A**
	Separately approved; component list.....:	(see Annex 1)	N/A
	Part of the luminaire.....:	(see Annex 3)	N/A
20.10 (15)	**SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS**		**N/A**
	Separately approved; component list.....:	(see Annex 1)	N/A
	Part of the luminaire.....:	(see Annex 4)	N/A
20.11 (5)	**EXTERNAL AND INTERNAL WIRING**		**P**
20.11.1 (5.2)	**Supply connection and external wiring**		P
20.11.1 (5.2.1)	Means of connection.....:	Lead wire	P
	Outdoor luminaire has not PVC insulated external wiring if not Class III or SELV/PELV circuits ≤ 25 V AC/60 V DC/25 V peak interrupted DC voltage with frequency 10Hz -200 Hz or protected from outdoor environment		N/A
20.11.1 (5.2.2)	Type of cable .....:		N/A
	Nominal cross-sectional area (mm²).....:		N/A
	Cables equal to IEC 60227 or IEC 60245		N/A
20.11.1 (5.2.3)	Type of attachment, X, Y or Z		N/A
20.11.1 (5.2.5)	Type Z not connected to screws		N/A
20.11.1 (5.2.6)	Cable entries:		P
	- suitable for introduction		P
	- adequate degree of protection		P
20.11.1 (5.2.7)	Cable entries through rigid material have rounded edges		N/A
20.11.1 (5.2.8)	Insulating bushings:		N/A
	- suitably fixed		N/A
	- material in bushings		N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
	- material not likely to deteriorate		N/A
	- tubes or guards made of insulating material		N/A
20.11.1 (5.2.9)	Locking of screwed bushings		N/A
20.11.1 (5.2.10)	Cord anchorage:		N/A
	- covering protected from abrasion		N/A
	- clear how to be effective		N/A
	- no mechanical or thermal stress		N/A
	- no tying of cables into knots etc.		N/A
	- insulating material or lining		N/A
20.11.1 (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
20.11.1 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment		N/A
20.11.1 (5.2.10.3)	Tests:		N/A
	- impossible to push cable; unsafe		N/A
	- pull test: 25 times; pull (N) .....:		N/A
	- torque test: torque (Nm) .....:		N/A
	- displacement ≤ 2 mm		N/A
	- no movement of conductors		N/A
	- no damage of cable or cord		N/A
	- function independent of electrical connection		N/A
20.11.1 (5.2.10.4)	Luminaire with/designed for use with supply cord with maximum current of 2A:		N/A
	- Ordinary Class III luminaire supplied with SELV ≤ 25V RMS/60V DC		N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
	- Ordinary Class III luminaire supplied with PELV ≤ 12V RMS/30V DC		N/A
	- Other than ordinary Class III luminaire supplied with voltage ≤ 12V RMS/30V DC		N/A
	Pull test of 30 N		N/A
20.11.1 (5.2.11)	External wiring passing into luminaire		N/A
20.11.1 (5.2.12)	Looping-in terminals		N/A
20.11.1 (5.2.13)	Wire ends not tinned		N/A
	Wire ends tinned: no cold flow		N/A
20.11.1 (5.2.14)	Mains plug same protection		N/A
	Class III luminaire plug		N/A
	No unsafe compatibility		N/A
20.11.1 (5.2.15)	Connectors for Class III luminaires (IEC 60603 or IEC 62680)		N/A
20.11.1 (5.2.16)	Appliance inlets (IEC 60320)		N/A
	Installation couplers (IEC 61535)		N/A
	Appliance inlet or connector systems (IEC 61984)		N/A
20.11.1 (5.2.17)	No standardized interconnecting cables properly assembled		N/A
20.11.1 (5.2.18)	Used plug in accordance with		N/A
	- IEC 60083		N/A
	- other standard		N/A
20.11.1 (5.3)	**Internal wiring**		**P**
20.11.1 (5.3.1)	Internal wiring of suitable size and type		P
	Through wiring		N/A
	- not delivered/ mounting instruction		N/A
	- factory assembled		N/A
	- socket outlet loaded (A).....:		N/A
	- temperatures .....:		N/A
	Green-yellow for protective earth only		N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
20.11.1 (5.3.1.1)	Internal wiring connected directly to fixed wiring		P
	Cross-sectional area (mm²).....:		P
	Insulation thickness (mm) .....:		P
	Extra insulation added where necessary		N/A
20.11.1 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		N/A
	Cross-sectional area (mm²).....:		N/A
20.11.1 (5.3.1.3)	Double or reinforced insulation for class II		N/A
20.11.1 (5.3.1.4)	Conductors without insulation		N/A
20.11.1 (5.3.1.5)	SELV or PELV current-carrying parts		P
20.11.1 (5.3.1.6)	Insulation thickness other than PVC or rubber		N/A
20.11.1 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		P
	Joints, raising/lowering devices		N/A
	Telescopic tubes etc.		N/A
	No twisting over 360°		P
20.11.1 (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
20.11.1 (5.3.4)	Joints and junctions effectively insulated		N/A
20.11.1 (5.3.5)	Strain on internal wiring		N/A
20.11.1 (5.3.6)	Wire carriers		N/A
20.11.1 (5.3.7)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		P
20.11.1 (5.4)	**Test to determine suitability of conductors having a reduced cross-sectional area**		**N/A**

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
	Under test the temperature of the luminaire wiring insulation does not exceed the limits stated in Table 12.2	(see Annex 2)	N/A
	No damage to luminaire wiring after test		P
20.11.2 (-)	**Cables for lighting chains**		**P**
	Type of cable :		P
	Cables not lighter than IEC 60227 or IEC 60245 for class II chain		P
	Cables not lighter than insulation according to 5.3.1 of part 1 for class III chain		N/A
	Nominal cross-sectional area (mm²).....:		P
	Mechanical properties according 4.14.1 and 4.14.2 of part 1		P
20.11.3 (-)	**Cord anchorage test**		**N/A**
	Pull test 30 N 25 times on single-core cable		N/A
20.11.4 (-)	**Plugs and cable length**		**N/A**
	Splash-proof plug or permanent connection if for outdoor use		N/A
	Length of the cable between the plug and first lamp or lampholder not less than 1,5 m		N/A
20.11.5 (-)	**Maximum length of extendable class II lighting chains**		**N/A**
	Maximum length 100 m for 0,5 mm² cable		N/A
	Maximum length 150 m for 0,75 mm² cable		N/A

20.12 (8)	**PROTECTION AGAINST ELECTRIC SHOCK**		**P**
20.12.1 (8.2.1)	Live parts not accessible		P
	Basic insulated parts not used on the outer surface without appropriate protection		N/A
	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		N/A
	Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N/A
	Basic insulation only accessible under lamp or starter replacement		N/A
	Protection in any position		N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
	Double-ended tungsten filament lamp		N/A
	Insulation lacquer not reliable		N/A
	Double-ended high-pressure discharge lamp		N/A
	Relevant warning according to 3.2.18 fitted to the luminaire		N/A
20.12.1 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N/A
20.12.1 (8.2.3.a)	Class II luminaire:		N/A
	- basic insulated metal parts not accessible		N/A
	- required insulation from live parts in compliance with Table X.1		N/A
	- glass protective shields not used as supplementary insulation		N/A
20.12.1 (8.2.3.b)	Metal BC lampholder in class I luminaires connected to protective earth		N/A
20.12.1 (8.2.3.c)	SELV circuits with exposed current carrying parts:		P
	Ordinary luminaire:		P
	- voltage under load/ no-load AC (V) .....:	12VDC	P
	- voltage under load/ no-load DC (V) .....:	12VDC	P
	- interrupted DC voltage (V).....:		P
	- touch current if applicable (mA) .....:		P
	One conductive part insulated		P
	Other than ordinary luminaire:		N/A
	- voltage under load/ no-load AC (V) .....:		N/A
	- voltage under load/ no-load DC (V) .....:		N/A
	- interrupted DC voltage (V).....:		N/A
20.12.1 (8.2.3.d)	PELV circuits with exposed current carrying parts:		N/A
	Ordinary luminaire:		N/A
	- voltage under load/ no-load AC (V) .....:		N/A
	- voltage under load/ no-load DC (V) .....:		N/A
	Other than ordinary luminaire:		N/A
	- voltage under load/ no-load AC (V) .....:		N/A
	- voltage under load/ no-load DC (V) .....:		N/A
	Pole not connected to earth insulated		N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
	Class III luminaire only for connection to SELV or PELV		N/A
20.12.1 (8.2.4)	Portable luminaire has protection independent of supporting surface		N/A
20.12.1 (8.2.5)	Compliance with the standard test finger or relevant probe		N/A
20.12.1 (8.2.6)	Covers reliably secured		N/A
20.12.1 (8.2.7)	Luminaire other than below with capacitor > 0,5 μF not exceed 50 V 1 min after disconnection		N/A
	Portable luminaire with capacitor > 0,1 μF (0,25) not exceed 34 V 1 s after disconnection		N/A
	Other luminaires with capacitor > 0,1 μF (0,25) with plug and track adaptors not exceed 60 V 5 s after disconnection		N/A
20.12.2 (-)	**Divisible plug**		N/A
	Divisible plug in compliance with Figure 1		N/A
	Parts of the connector do not separate with a pull force of 10 N		N/A
20.12.3 (-)	**Electrification of decorations**		N/A
	Test with flat probe		N/A
20.12.4 (-)	**Contact of push-in lampholders**		N/A
	Lampholder contacts in push-in lampholders is reliably secured		N/A
	Contacts move maximum 0,8 mm during the endurance test		N/A
20.12.5 (-)	**Blanking plugs**		N/A
	Blanking plugs provided if chain designed to be used without lamp in every lampholder		N/A

20.13 (12)	**ENDURANCE TEST AND THERMAL TEST**		P
20.13.1 (-)	If IP > IP 20 relevant test of (12.4), (12.5), (12.6) and (12.7) after (9.2) but before (9.3) specified in 20.14		—
20.13.1 (12.2)	**Selection of lamps and ballasts**		**—**
	Lamp used according Annex B	(Lamp used see Annex 2)	—
	Controlgear if separate and not supplied	(Controlgear used see Annex 2)	—
20.13.1 (12.3)	**Endurance test**		**P**
	a) mounting-position .....:	As in normal operation	—

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
	b) test temperature (°C) ..... :	35°C	—
	c) total duration (h) ..... :	240h	—
	d) supply voltage (V) ..... :	13.2VDC	—
	d) if not equipped with controlgear, constant voltage/current (V) or (A) ..... :		—
20.13.1 (12.3.1d)	d) Class III luminaires powered via information technology communication cable:		—
	- voltage under normal operation (V) ..... :		—
	- voltage under abnormal operation (V) ..... :		
	e) luminaire ceases to operate		—
	f) luminaire with a constant light output function		N/A
20.13.1 (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
20.13.1 (12.4)	**Thermal test (normal operation)**	(see Annex 2)	P
20.13.1 (12.5)	**Thermal test (abnormal operation)**	(see Annex 2)	P
20.13.1 (12.6)	**Thermal test (failed lamp control gear condition):**		N/A
20.13.1 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A) ..... :		—
	- case of abnormal conditions ..... :		—
	- electronic lamp control gear		N/A
	- measured winding temperature (°C): at 1,1 Un ..... :		—
	- measured mounting surface temperature (°C) at 1,1 Un ..... :		N/A
	- calculated mounting surface temperature (°C) ..... :		N/A
	- track-mounted luminaires		N/A
20.13.1 (12.6.2)	Temperature sensing control		N/A
	- case of abnormal conditions ..... :		—
	- thermal link		N/A
	- manual reset cut-out		N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
	- auto reset cut-out		N/A
	- measured mounting surface temperature (°C) .....:		N/A
	- track-mounted luminaires		N/A
20.13.1 (12.7)	**Thermal test (failed lamp control gear in plastic luminaires):**		N/A
20.13.1 (12.7.1)	Luminaire without temperature sensing control		N/A
20.13.1 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		N/A
	Test method 12.7.1.1 or Annex W .....:		—
	Test according to 12.7.1.1:		N/A
	- case of abnormal conditions.....:		—
	- Ballast failure at supply voltage (V) .....:		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
	Test according to Annex W:		N/A
	- case of abnormal conditions.....:		—
	- measured winding temperature (°C): at 1,1 Un.....:		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un.....:		—
	- calculated temperature of fixing point/exposed part (°C) .....:		—
	Ball-pressure test..... :	See Test Table 20.16 (13.2.1)	N/A
20.13.1 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		N/A
	- case of abnormal conditions.....:		—
	- measured winding temperature (°C): at 1,1 Un.....:		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un.....:		—
	- calculated temperature of fixing point/exposed part (°C) .....:		—
	Ball-pressure test.....:	See Test Table 20.16 (13.2.1)	N/A
20.13.1 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N/A
	- case of abnormal conditions.....:		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
20.13.1 (12.7.2)	Luminaire with temperature sensing control		N/A
	- thermal link .....:	Yes ☐ No ☐	—
	- manual reset cut-out.....:	Yes ☐ No ☐	—
	- auto reset cut-out.....:	Yes ☐ No ☐	—
	- case of abnormal conditions.....:		—
	- highest measured temperature of fixing point/ exposed part (°C):.....:		—
	Ball-pressure test: .....:	See Test Table 20.16 (13.2.1)	N/A
20.13.2 (-)	**Test voltage**		N/A
	Provision of 12.3.1 d) of part 1 and if class III chain 1,1 x rated voltage of transformer/convertor		—
	Provision of 12.4.1 d) of part 1 and if class III chain 1,06 x rated voltage of transformer/convertor		—
20.13.3 (-)	**Lamp bridging devices**		N/A
	Lamp bridging not cause temperature which impair safety		N/A
	Temperature of lampholders and cables not exceed values in Table 12.1 when bridging device operate successively on each lamp		N/A
20.13.4 (-)	**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

20.14 (9)	**RESISTANCE TO DUST AND MOISTURE**		P
20.14 (-)	If IP > IP 20 the order of tests as specified in clause 20.13		P
20.14 (9.2)	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP .....:	IP20	—
	- mounting position during test.....:	Normal	—
	- fixing screws tightened; torque (Nm) .....:		—
	- tests according to clauses .....:	9.2.0	—
	- electric strength test afterwards		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

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
	c.1) For luminaires without drain holes – no water entry		N/A
	c.2) For luminaires with drain holes – no hazardous water entry		N/A
	d) no water in watertight, pressure watertight, high pressure and temperature water jet-proof or high pressure and cold-water jet-proof luminaire		N/A
	e) no contact with live parts (IP 2X)		P
	e) no entry into enclosure (IP 3X and IP 4X)		N/A
	e) no contact with live parts through drain holes and ventilation slots (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
20.14 (9.3)	Humidity test 48 h	25°C, 93%RH	P

20.15 (10)	**INSULATION RESISTANCE AND ELECTRIC STRENGTH**		P
20.15 (10.2.1)	Insulation resistance test		P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø :		—
	Insulation resistance (MΩ):		—
	SELV or PELV:		P
	- between current-carrying parts of different polarity:		N/A
	- between current-carrying parts and mounting surface .....:	100MΩ	P
	- 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 .....:	100MΩ	P
	Other than SELV or PELV:		N/A
	- between live parts of different polarity .....:		N/A
	- between live parts and mounting surface .....:		N/A
	- between live parts and metal parts.....:		N/A
	- between live parts of different polarity through action of a switch.....:		N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
	- 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
20.15 (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
	Luminaires with ignitors provided with ballasts conforming to IEC 61347-2-9		N/A
	SELV or PELV:		P
	- between current-carrying parts of different polarity:		N/A
	- between current-carrying parts and mounting surface .....:	500V	P
	- 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 .....:	500V	P
	Other than SELV/PELV:		N/A
	- between live parts of different polarity .....:		N/A
	- between live parts and mounting surface .....:		N/A
	- between live parts and metal parts .....:		N/A
	- 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
20.15 (10.3)	Touch current (mA).....:		N/A
	Protective conductor current (mA).....:		N/A

20.16 (13)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		P
20.16 (13.2.1)	Ball-pressure test.....:	See Test Table 20.16 (13.2.1)	P
20.16 (13.3.1)	Needle-flame test (10 s) .....:	See Test Table 20.16 (13.3.1)	P

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
20.16 (13.3.2)	Glow-wire test (650°C).....:	See Test Table 20.16 (13.3.2)	P
20.16 (13.4)	Proof tracking test (IEC 60112) .....:	See Test Table 20.16 (13.4)	N/A

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict

20.8 (11.2)	**TABLE I: Creepage distances and clearances**							**N/A**
	Minimum distances (mm) for a.c. up to 30 kHz sinusoidal voltages							
	Applicable part of IEC 60598-1 Table 11.1.A*, 11.1.B* and 11.2* and Table U.1*							
Distances	**Insulation type ****	**Measured clearance**	**Required**		**Measured creepage**	**Required**		
			clearance	***Table**		**creepage**	***Table**	
Distance 1:								
Working voltage (V) ..... :								—
PTI..... :					< 600 ☐		≥ 600 ☐	—
Pulse voltage or U_P if applicable (kV) ..... :								—
Supplementary information:								
Distance 2:								
Working voltage (V) ..... :								—
PTI..... :					< 600 ☐		≥ 600 ☐	—
Pulse voltage or U_P if applicable (kV) ..... :								—
Supplementary information:								
Distance 3:								
Working voltage (V) ..... :								—
PTI..... :					< 600 ☐		≥ 600 ☐	—
Pulse voltage or U_P if applicable (kV) ..... :								—
Supplementary information:								
** Insulation type: B – Basic; S – Supplementary; R – Reinforced. See also IEC 60598-1 Annex M.								

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict

20.8 (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) ..... :								—
Frequency if applicable (kHz)..... :								—
PTI..... :					< 600 ☐	≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) ..... :								—
Supplementary information:								
Distance 2:								
Working voltage (V) ..... :								—
Frequency if applicable (kHz)..... :								—
PTI..... :					< 600 ☐	≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) ..... :								—
Supplementary information:								
Distance 3:								
Working voltage (V) ..... :								—
Frequency if applicable (kHz)..... :								—
PTI..... :					< 600 ☐	≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) ..... :								—
Supplementary information:								
** Insulation type: B – Basic; S – Supplementary; R – Reinforced.								

20.16 (13.2.1)	**TABLE: Ball Pressure Test of Thermoplastics**			**P**
Allowed impression diameter (mm) ..... :		**2**		—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)	
PCB of LED module	See annex 1	125	0.7	
Supplementary information:				

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict

20.16 (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
PCB of LED module	See annex 1	10	No	0	P
Supplementary information:					

20.16 (13.3.2)	**TABLE: Glow-wire test (IEC 60695-2-11)**			
Glow wire temperature .....:	650°C			—
Object/ Part No./ Material	Manufacturer/ trademark	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Heat-shrinkable tube	See annex 1	No	0	PASS
Supplementary information:				

20.16 (13.4)	**TABLE: Proof tracking test (IEC 60112)**				**N/A**
Test voltage PTI .....:	175 V				—
Object/ Part No./ Material	Manufacturer/ trademark	Withstand 50 drops without failure on three places or on three specimens			Verdict
--	--	--	--	--	--
Supplementary information:					

ANNEX 1	**TABLE: Critical components information**				--
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity 1)**
Lead wire	Kenic Electric Mfg Co Ltd	H03VVH2-F	2x0.75mm²	--	UL
Heat-shrinkable tube	CHANGYUAN ELECTRONICS GROUP CO LTD	CB-HFT, CB-HFT(XY), CYG-MT	600VAC; 125°C	--	UL
LED PCB	KINGBOARD LAMINATES HOLDINGS LTD	KB-6160C	V-0; Al	--	UL
LED module	Guangzhou Hongli Opto-Electronic Co., Ltd.	HL-A-2835H9VW-2C-S1-08-HR3	IF=30mA; VF=18-24V; 6500K	IEC TR 62778	Tested with appliance

Supplementary information:

1) Provided evidence ensures the agreed level of compliance. See OD-CB2039. The codes above have the following meaning

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict

ANNEX 2	**TABLE: Thermal tests of Section 12**		
	Type reference.....:	12V-5730-120L-IP20	—
	Lamp used.....:	LED module	—
	Lamp control gear used.....:	--	—
	Mounting position of luminaire.....:	As in normal use	—
	Supply wattage (W).....:	19.8W	—
	Supply current (A).....:	1.833A	—
	Table: measured temperatures corrected for ta = 25 °C		—
	- abnormal operating mode.....:	S/C or O/C one LED	—
1.12 (12.4)	- test 1: rated voltage .....:	--	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current .....:	12.72VDC	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage.....:	--	—
	Through wiring or looping-in wiring loaded by a current of A during the test .....:	--	—
1.12 (12.5)	- test 4: 1,1 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current.....:	13.2VDC	—

Temperature measurements (°C)

Part	Ambient	**Cl. 12.4 – normal**				**Cl. 12.5 – abnormal**	
		test 1	test 2	test 3	limit	test 4	limit
Lead wire	25	--	47.2	--	80	--	--
LED module	25	--	73.3	--	Ref	--	--
PCB near LED module	25	--	65.4	--	90	--	--
Mounting surface	25	--	59.6	--	90	--	--
Lighting object (0.1m)	25	--	55.7	--	90	--	--

Supplementary information:

The Max. value was record. The input wattage of abnormal operating mode was less than normal condition, the test data can refer to normal condition.

ANNEX 3	**Screw terminals (part of the luminaire)**		**N/A**
(14)	**SCREW TERMINALS**		**N/A**
(14.2)	Type of terminal .....:		—
	Rated current (A) .....:		—
(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 (mm²) .....:		—
(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

ANNEX 4	**Screwless terminals (part of the luminaire)**		**N/A**
(15)	**SCREWLESS TERMINALS**		N/A
(15.2)	Type of terminal .....:		—
	Rated current (A) .....:		—
(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)	Terminals and connections for internal wiring		N/A
(15.5.1)	Mechanical tests		N/A
(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)		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:		—
	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

IEC 60598-2-20			
Clause	Requirement – Test	Result - Remark	Verdict
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									—
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).....:									—
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).....:									—
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).....:									—
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).....:									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
Supplementary information:										

Attachment 1

IEC 62031			
Clause	Requirement – Test	Result - Remark	Verdict
4	**GENERAL REQUIREMENTS**		**P**
4.2	Classification		
	Built-in module ..... :	Yes ☐ No ☒	– –
	Independent module ..... :	Yes ☐ No ☒	– –
	Integral module ..... :	Yes ☒ No ☐	– –
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)	P

6	**MARKING**		**N/A**
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 tc and place on the module		N/A
	g) Ethr if required		N/A
	h) symbol for built-in modules		N/A
	i) heat transfer temperature td		N/A
	j) power for heat-conduction Pd		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**
	- 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**

Attachment 1

IEC 62031			
Clause	Requirement – Test	Result - Remark	Verdict
	- marking on the LED module legible after test with water		N/A
	- marking not on the LED module legible		N/A
7	**TERMINALS**		**N/A**
	Requirements not applicable to the evaluated product.		N/A
8 (9)	**EARTHING**		**N/A**
	Requirements not applicable to the evaluated product.		N/A
9 (10)	**PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS**		N/A
	Requirements not applicable to the evaluated product.		N/A
10 (11)	**MOISTURE RESISTANCE AND INSULATION**		**P**
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (MΩ):		P
	For basic insulation 2 MΩ..... :	>500 MΩ	P
	For double or reinforced insulation 4 MΩ..... :		N/A
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		N/A
11 (12)	**ELECTRIC STRENGTH**		**P**
	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V		P
	Working voltage ≤ 50 V, test voltage 500 V		N/A
	Working voltage > 50 V ≤ 1000 V, test voltage (V):		N/A
	Basic insulation, 2U + 1000 V		N/A
	Supplementary insulation, 2U + 1000 V		N/A
	Double or reinforced insulation, 4U + 2000 V		N/A
	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**		**P**
- (14.1)	When operated under fault conditions the controlgear:		P

Attachment 1

IEC 62031			
Clause	Requirement – Test	Result - Remark	Verdict
	- 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)	N/A
- (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)	P
- (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)	N/A
	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 ≥ 1 MΩ :		P
	No flammable gases		P
	No accessible parts have become live		P
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
- (14.7)	Relevant fault condition tests with high-power a.c. supply and in turn to a d.c. supply		
12.2	**Overpower condition**		**P**
	Module withstands overpower condition >15 min.		P
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		N/A
	No fire, smoke or flammable gas is produced		P
	Molten material does not ignite tissue paper, spread below the module		P

14 (15)	**CONSTRUCTION**		**P**
- (15.1)	**Wood, cotton, silk, paper and similar fibrous material**		**P**
	Wood, cotton, silk, paper and similar fibrous material not used as insulation		P
- (15.2)	**Printed circuits**		**N/A**
	Printed circuits used as internal connections complies with clause 14		N/A

Attachment 1

IEC 62031			
Clause	Requirement – Test	Result - Remark	Verdict
15 (16)	**CREEPAGE DISTANCES AND CLEARANCES**		**N/A**
	Requirements not applicable to the evaluated product.		N/A

16 (17)	**SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS**		**P**
	Screws, current-carrying parts and connections in compliance with IEC 60598-1 (clause numbers between parentheses refer to IEC 60598-1)		
(4.11)	**Electrical connections**		**P**
(4.11.1)	Contact pressure		P
(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**		**P**
- (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 main test report	P
- (18.5)	Proof tracking test .....:	See Test Table 17 (18.5)	N/A

Attachment 1

IEC 62031			
Clause	Requirement – Test	Result - Remark	Verdict
18	**RESISTANCE TO CORROSION**		**N/A**
	Comply with requirements according 4.18 of IEC 60598-1		N/A
20	**HEAT MANAGEMENT**		**N/A**
20.1	Requirements not applicable to the evaluated product.		**N/A**
22	**PHOTOBIOLOGICAL SAFETY**		P
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	RG0	P
22.3	**Infrared radiation**		N/A
	Requirements for infrared radiation when required		N/A
A	**ANNEX A - TESTS**		N/A
	All tests performed in accordance with the advice given in Annex H of IEC 61347-1, if applicable		N/A
(A)	**ANNEX A - TEST TO ESTABLISH WHETHER A CONDUCTIVE PART IS A LIVE PART WHICH MAY CAUSE AN ELECTRIC SHOCK**		**N/A**
	Requirements not applicable to the evaluated product.		N/A
ANNEX 1	**LED MODULES WITH INTEGRAL CONTROLGEAR PROVIDING SELV**		N/A
	Requirements not applicable to the evaluated product.		N/A
12 (14)	**TABLE: tests of fault conditions**		**P**
Part	**Simulated fault**		**Hazard**
S/C LED module	Working as normal		~~YES/~~NO
O/C LED module	Working as normal		~~YES/~~NO
15 (16)	**TABLE: clearance and creepage distance measurements (mm)** **(See main report)**		**N/A**

Attachment 1

IEC 62031			
Clause	Requirement – Test	Result - Remark	Verdict

Applicable part of IEC 61347-1 Table 7 – 11*							
Distances	**Insulation type ****	**Measured clearance**	**Required**		**Measured creepage**	**Required**	
			clearance	***Table**		**creepage**	***Table**
Distance 1:							
Working voltage (V) .....:							—
Frequency if applicable (kHz) .....:							—
PTI .....:					< 600 ☐	≥ 600 ☐	—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) .....:							—
Pulse voltage if applicable (kV) .....:							—
Supplementary information:							
Distance 2:							
Working voltage (V) .....:							—
Frequency if applicable (kHz) .....:							—
PTI .....:					< 600 ☐	≥ 600 ☐	—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) .....:							—
Pulse voltage if applicable (kV) .....:							—
Supplementary information:							
Distance 3:							
Working voltage (V) .....:							—
Frequency if applicable (kHz) .....:							—
PTI .....:					< 600 ☐	≥ 600 ☐	—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) .....:							—
Pulse voltage if applicable (kV) .....:							—
Supplementary information:							

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

17 (18.1)	**TABLE: Ball Pressure Test of Thermoplastics**	**N/A**
Allowed impression diameter (mm) .....:	2	—

Attachment 1

IEC 62031			
Clause	Requirement – Test	Result - Remark	Verdict

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			—
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 ..... :		—

Attachment 1

IEC 62031			
Clause	Requirement – Test	Result - Remark	Verdict

Object/ Part No./ Material	Manufacturer/ trademark	Withstand 50 drops without failure on three places or on three specimens			Verdict
Supplementary information:					

Attachment 2

IEC62031F - ATTACHMENT			
Clause	Requirement – Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT

IEC 62031:2018

EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES

(LED modules for general lighting - Safety specifications)

Differences according to ..... :	EN IEC 62031: 2020 + A11: 2021
TRF template used ..... :	IECEE OD-2020-F2:2022, Ed. 1.2
Attachment Form No..... :	EU_GD_IEC62031F
Attachment Originator ..... :	UL Solutions (Demko)
Master Attachment..... :	Dated 2022-09-30

	CENELEC COMMON MODIFICATIONS (EN)	
	No Common modifications	**P**
ZA	**ANNEX ZA, NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS**	**P**
ZZ	**ANNEX ZZ, RELATIONSHIP BETWEEN THIS EUROPEAN STANDARD AND THE SAFETY OBJECTIVES OF DIRECTIVE 2014/35/EU [2014 OJ L96] AIMED TO BE COVERED**	**N/A**

Attachment 3

EN 62493			
Clause	Requirement – Test	Result - Remark	Verdict

EN 62493:2015

Assessment of lighting equipment related to human exposure to electromagnetic field

Procedure	Products are applications with	If No	If yes
a)	Non-electronic control gear?	☒ see Procedure b)	☐ Pass
b)	Incandescent-lamp technology or halogen?	☒ see Procedure c)	☐ see Procedure h)
c)	LED light-source technology?	☐ see Procedure d)	☒ see Procedure h)
d)	OLED light-source technology?	☐ see Procedure e)	☐ see Procedure h)
e)	High-pressure discharge lamp technology?	☐ see Procedure f)	☐ see Procedure h)
f)	Low-pressure discharge lamp technologies with a measurement distance >= 50cm (Distance for Hand lights, table lightings and Self-ballasted lamps is less than 50cm)	☐ see Procedure g)	☐ see Procedure h)
g)	Independent auxiliary?	☐ see Procedure i)	☐ see Procedure h)
h)	Non-wireless technology (exclude infra-red)?	☐ see Procedure i)	☒ Pass
i)	Additional test is performed and result is Pass Test Report with No.:	---	☐ Pass

Attachment 4

IEC 62778			
Clause	Requirement – Test	Result - Remark	Verdict

7	**MEASUREMENT INFORMATION FLOW**		**P**
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 .....:	☐ RG0 unlimited ☐ RG1 unlimited	N/A
	E_{thr} of LED package applies to array		N/A
8	**RISK GROUP CLASSIFICATION**		**P**
	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

	TABLE: Spectroradiometric measurement		**P**
	Measurement performed on:	☐ **LED package** ☐ **LED module** ☐ **Lamp** ☒ **Luminaire**	
	Model	12V-5730-120L-IP20	
	Test voltage (V)	12VDC	—

Attachment 4

IEC 62778			
Clause	Requirement – Test	Result - Remark	Verdict

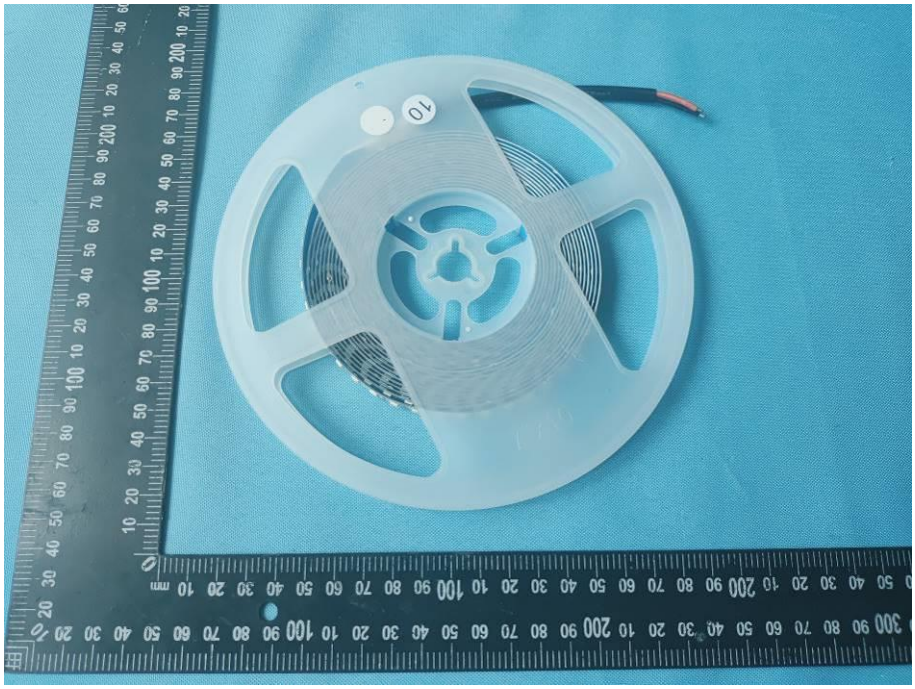
	Test current (mA)	1833	—
	Test frequency (Hz).....	--	—
	Ambient, t (°C).....	25	—
	Measurement distance	☒ 20 cm ☐ ... cm	—
	Source size	☒ Non-small ☐ Small : .... mm	—
	Field of view	☐ 100 mrad ☒ 11 mrad ☐ 1,7 mrad (for small sources)	—

Item	Symbol	Units	Result	Remark
Correlated colour temperature	CCT	K	6500	
x/y colour coordinates			/	
Blue light hazard radiance	L_B	$W/(m^2 \cdot sr^1)$	356.2	
Blue light hazard irradiance	E_B	W/m^2	/	
Luminance	L	cd/m^2	/	
Illuminance	E	lx	/	
Supplementary information:				

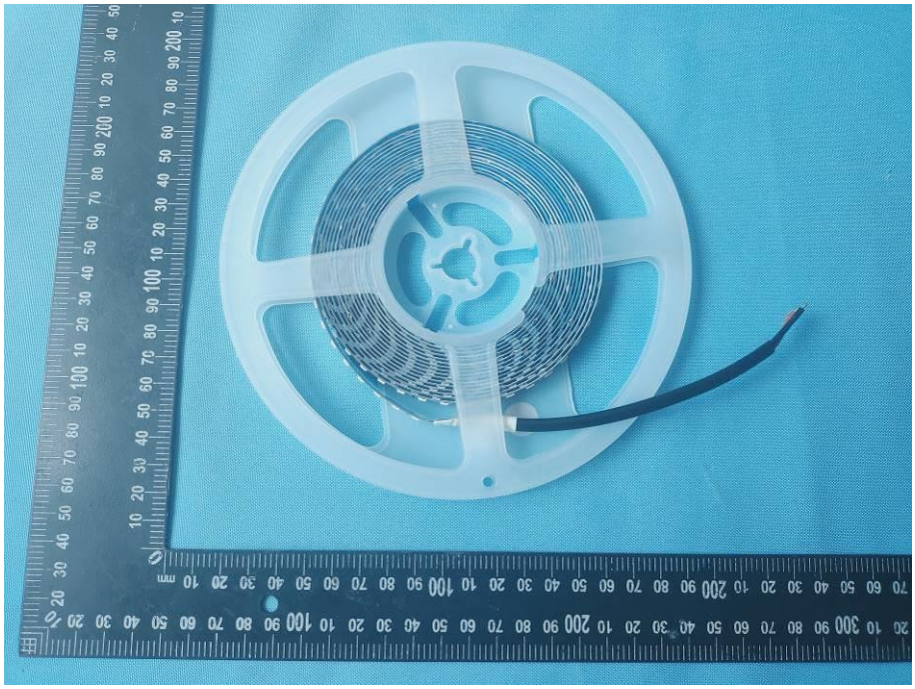
Attachment 5

Photos

Details of: General view of 12V-5730-120L-IP20



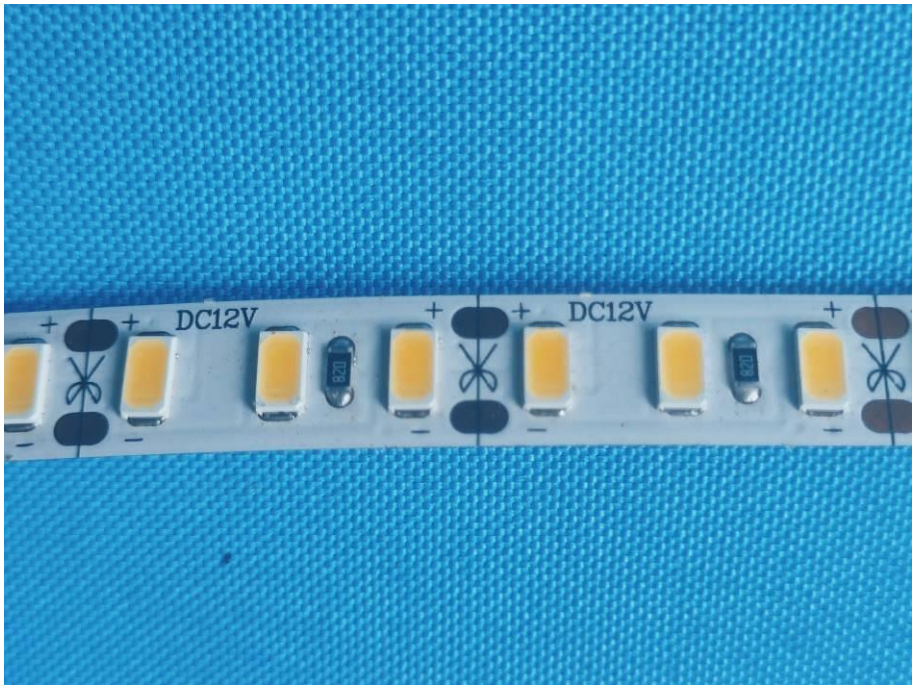
Details of: General view of 12V-5730-120L-IP20



Attachment 5

Details of: Inside view of 12V-5730-120L-IP20

Details of: LED module of 12V-5730-120L-IP20



--- End of the report ----