

Report No.:18240SC10031801

Test Report

Client Name : HANRON LIGHTING CO., LIMITED
Address : 4/F Building1-2#,Tongfuyu Industrial Park,Aiqun
Road,Shiyan
Town,Baoan district,Shenzhen, Guangdong, 518108,
China.
Product Name : LED Strip Light
Date : Nov. 15, 2021



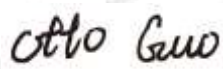

Shenzhen Anbotek Compliance Laboratory Limited

Shenzhen Anbotek Compliance Laboratory Limited

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TEST REPORT IEC60598-2-20 Luminaires Part 2: Particular requirements Section 20: Lighting Chains	
Report Number	18240SC10031801
Date of issue	Nov. 15, 2021
Total number of pages	52(pages)
Name of Testing Laboratory preparing the Report	Shenzhen Anbotek Compliance Laboratory Limited
Applicant's name	HANRON LIGHTING CO., LIMITED
Address	4/F Building1-2#,Tongfuyu Industrial Park,Aiqun Road,Shiyan Town,Baoan district,Shenzhen, Guangdong, 518108, China.
Test specification:	
Standard	IEC 60598-2-20:2014 used in conjunction with IEC 60598-1:2020
Test procedure	safety report
Non-standard test method	N/A

Test item description :	LED Strip Light	
Trade Mark :	Hanron	
Manufacturer	HANRON LIGHTING CO., LIMITED 4/F Building1-2#,Tongfuyu Industrial Park,Aiqun Road,Shiyan Town,Baoan district,Shenzhen, Guangdong, 518108, China.	
Factory	HANRON LIGHTING CO., LIMITED 4/F Building1-2#,Tongfuyu Industrial Park,Aiqun Road,Shiyan Town,Baoan district,Shenzhen, Guangdong, 518108, China.	
Model/Type reference :	HR00-A11, HR00-A06, HR00-A07, HR00-A08, HR00-A9, HR00-A10, HR00-A12, HR00-A13, HR00-A14, HR00-A15, HR00-A16, HR00-A17, HR00-A18, HR00-A19, HR00-A20, HR00-A21, HR00-A22, HR00-A23, HR00-A24, HR00-A25, HR00-A26, HR00-B, HR00-XXXXYYZZZ(XXXX means 3528,2835, 5050, 5630, FCOB, 3014, 2216, 2110, 3838; YYY means voltage, 05V, 12V, 24V, ZZZ means 030, 048, 060, 064, 084, 096, 120, 128, 140, 160, 180, 192, 216, 240, 280, 300, 360, 480, 700)	
Ratings :	DC24V, 4.79A, 115W/Roll, IP20	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
Testing location/ address	1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518128	
Tested by (name, function, signature) :	Otto Guo	
Approved by (name, function, signature) .. :	Jeff Zhu	

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

Attachment 1: Test report of EN IEC 62031:2020
Attachment 2: Photo documentation

Summary of testing:

<p>Tests performed (name of test and test clause):</p> <ul style="list-style-type: none"> - EN IEC 60598-1:2021 - EN 60598-2-20:2015 - EN IEC 62031:2020 <p>The submitted samples were found to comply with the requirement of EN 62493:2015 without testing because they are LED-lightsource technology.</p>	<p>Testing location: Shenzhen Anbotek Compliance Laboratory Limited 1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518128</p>
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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.

LED Strip Light
Model No.:HR00-A11
Rating: DC24V,4.79A,115W/Roll, IP20





Manufacturer: HANRON LIGHTING CO., LIMITED
Address: 4/F Building1-2#,Tongfuyu Industrial Park,Aiqun Road,Shiyan Town,Baoan district,Shenzhen, Guangdong, 518108, China.
Importer: xxxxxx
Address: xxxxxx

Test item particulars	: LED Strip Light
Classification of installation and use	: Fixed
Supply Connection	: Supply cord without plug
Protection class	: III
Degree of protection	: III
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	: Oct, 29, 2021
Date (s) of performance of tests	: Oct. 29, 2021 to Nov. 10, 2021
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	
General product information:	
Note: All the samples are the same except the led type, LED QTY, power and voltage is different, so we prepare "HR00-A11" for test only	

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

20.4	GENERAL TEST REQUIREMENTS		P
20.4 (0.3)	More sections applicable	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Section/s:	—
20.4 (0.5)	Components	(see Annex 1)	—
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		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 <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
20.5 (2.5)	Luminaire for normal use	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	Luminaire for rough service	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
20.5.2 (-)	Class II or Class III	Class III	P
20.5.3 (-)	Chain for outdoor use shall be IP44 or higher		N

20.6 (3)	MARKING		P
20.6 (3.2)	Mandatory markings		P
	Position of the marking		P
	Format of symbols/text		N
20.6 (3.3)	Additional information		P
	Language of instructions	English	P
20.6 (3.3.1)	Combination luminaires		N
20.6 (3.3.2)	Nominal frequency in Hz		N
20.6 (3.3.3)	Operating temperature		N
20.6 (3.3.5)	Wiring diagram		N
20.6 (3.3.6)	Special conditions		N

IEC 60598-2-20			
Clause	Requirement + Test	Result - Remark	Verdict
20.6 (3.3.7)	Wiring diagram		N
20.6 (3.3.8)	Special conditions		N
20.6 (3.3.9)	Power factor and supply current		N
20.6 (3.3.10)	Suitability for use indoors		P
20.6 (3.3.11)	Luminaires with remote control		P
20.6 (3.3.12)	Clip-mounted luminaire – warning		N
20.6 (3.3.13)	Specifications of protective shields		P
20.6 (3.3.14)	Symbol for nature of supply		P
20.6 (3.3.15)	Rated current of socket outlet		P
20.6 (3.3.16)	Rough service luminaire		N
20.6 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments	Type X	P
20.6 (3.3.18)	Non-ordinary luminaires with PVC cable		P
20.6 (3.3.19)	Protective conductor current in instruction if applicable		N
20.6 (3.3.20)	Provided with information if not intended to be mounted within arm's reach		P
20.6 (3.3.21)	Non-replaceable and non-user replaceable light sources information provided	Non replaceable light sources	P
20.6 (3.3.22)	Controllable luminaires, classification of insulation provided		P
20.6 (3.3.23)	Luminaire without controlgear provided with necessary information for selection of appropriate component		N
20.6 (3.3.24)	If not supplied with terminal block, information on the packaging		N
20.6 (3.4)	Test with water	15s	P

IEC 60598-2-20			
Clause	Requirement + Test	Result - Remark	Verdict
	Test with hexane	15s	P
	Legible after test		P
	Label attached		P
20.6.2 (-)	Lighting chain marking		P
	Rated voltage and wattage marked on the chain		P
	Durable non-removable label if information on the cable		N
20.6.3 (-)	Marking on the packing or instructions		P
	Marking if only for indoor use		N
20.6.4 (-)	Marking on the packing or instructions		P
	Marking a) – l)		P

20.7 (4)	CONSTRUCTION		P
20.7 (4.2)	Components replaceable without difficulty		P
20.7 (4.3)	Wireways smooth and free from sharp edges		P
20.7 (4.4)	Lampholders		N
20.7 (4.4.1)	Integral lampholder		N
20.7 (4.4.2)	Wiring connection		N
20.7 (4.4.3)	Lampholder for end-to-end mounting		N
20.7 (4.4.4)	Positioning		N
	- pressure test (N)		—
	After test the lampholder comply with relevant standard sheets and show no damage		N
	After test on single-capped lampholder the lampholder have not moved from its position and show no permanent deformation		N
	- bending test (N)		—
	After test the lampholder have not moved from its position and show no permanent deformation		N
20.7 (4.4.5)	Peak pulse voltage		N

IEC 60598-2-20			
Clause	Requirement + Test	Result - Remark	Verdict
20.7 (4.4.6)	Centre contact		N
20.7 (4.4.7)	Parts in rough service luminaires resistant to tracking		N
20.7 (4.4.8)	Lamp connectors		N
20.7 (4.4.9)	Caps and bases correctly used		P
20.7 (4.4.10)	Light source for lampholder or connection according IEC 60061 not connected another way		N
20.7 (4.5)	Starter holders		N
	Starter holder in luminaires other than class II		N
	Starter holder class II construction		N
20.7 (4.6)	Terminal blocks		N
	Tails		N
	Unsecured blocks		N
20.7 (4.7)	Terminals and supply connections		P
20.7 (4.7.1)	Contact to metal parts		N
20.7 (4.7.2)	Test 8 mm live conductor		N
	Test 8 mm earth conductor		N
20.7 (4.7.3)	Terminals for supply conductors		P
20.7 (4.7.3.1)	Welded method and material		N
	- stranded or solid conductor		N
	- spot welding		N
	- welding between wires		N
	- Type Z attachment		N
	- mechanical test according to 15.6.2		N
	- electrical test according to 15.6.3		N
	- heat test according to 15.6.3.2.3 and 15.6.3.2.4		N
20.7 (4.7.4)	Terminals other than supply connection		N

IEC 60598-2-20			
Clause	Requirement + Test	Result - Remark	Verdict
20.7 (4.7.5)	Heat-resistant wiring/sleeves		N
20.7 (4.7.6)	Multi-pole plug		N
	- test at 30 N		N
20.7 (4.8)	Switches		N
	- adequate rating		N
	- adequate fixing		N
	- polarized supply		N
	- compliance with IEC 61058-1 for electronic switches		N
20.7 (4.9)	Insulating lining and sleeves		P
20.7 (4.9.1)	Retainment		P
	Method of fixing.....:		P
20.7 (4.9.2)	Insulated linings and sleeves:		N
	Resistant to a temperature > 20 °C to the wire temperature or		N
	a) & c) Insulation resistance and electric strength		N
	b) Ageing test. Temperature (°C).....:		N
20.7 (4.10)	Double or reinforced insulation		P
20.7 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		N
	Safe installation fixed luminaires		P
	Capacitors and switches		N
	Interference suppression capacitors according to IEC 60384-14		N
20.7 (4.10.2)	Assembly gaps:		N
	- not coincidental		N
	- no straight access with test probe		N
20.7 (4.10.3)	Retainment of insulation:		N
	- fixed		N

IEC 60598-2-20			
Clause	Requirement + Test	Result - Remark	Verdict
	- unable to be replaced; luminaire inoperative		N
	- sleeves retained in position		N
	- lining in lampholder		N
20.7 (4.10.4)	Protective impedance device		N
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		N
	Y1 or Y2 capacitors comply with IEC 60384-14		N
	Resistors comply with test (a) in 14.1 of IEC 60065		N
20.7 (4.11)	Electrical connections and current-carrying parts		N
20.7 (4.11.1)	Contact pressure		N
20.7 (4.11.2)	Screws:		N
	- self-tapping screws		N
	- thread-cutting screws		N
20.7 (4.11.3)	Screw locking:		N
	- spring washer		N
	- rivets		N
20.7 (4.11.4)	Material of current-carrying parts		N
20.7 (4.11.5)	No contact to wood or mounting surface		N
20.7 (4.11.6)	Electro-mechanical contact systems		N
20.7 (4.12)	Screws and connections (mechanical) and glands		N
20.7 (4.12.1)	Screws not made of soft metal		N
	Screws of insulating material		N
	Torque test: torque (Nm); part		N
	Torque test: torque (Nm); part		N
	Torque test: torque (Nm); part		N

IEC 60598-2-20			
Clause	Requirement + Test	Result - Remark	Verdict
20.7 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N
20.7 (4.12.4)	Locked connections:		N
	- fixed arms; torque (Nm)		N
	- lampholder; torque (Nm)		N
	- push-button switches; torque 0,8 Nm		N
20.7 (4.12.5)	Screwed glands; force (Nm)		N
20.7 (4.13)	Mechanical strength		P
20.7 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm)	LED PCB: 0.35Nm	P
	- other parts; energy (Nm)		N
	1) live parts		P
	2) linings		N
	3) protection		N
	4) covers		P
20.7 (4.13.2)	Metal parts have adequate mechanical strength		N
20.7 (4.13.3)	Straight test finger		N
20.7 (4.13.4)	Rough service luminaires		N
	- IP54 or higher		N
	a) fixed		N
	b) hand-held		N
	c) delivered with a stand		N
	d) for temporary installations and suitable for mounting on a stand		N
20.7 (4.13.6)	Tumbling barrel		N
20.7 (4.14)	Suspensions, fixings and means of adjusting		--
20.7 (4.14.1)	Mechanical load:		P

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Clause	Requirement + Test	Result - Remark	Verdict
	A) four times the weight	0.113*4=0.452kg	P
	B) torque 2,5 Nm		N
	C) bracket arm; bending moment (Nm)		N
	D) load track-mounted luminaires		N
	E) clip-mounted luminaires, glass-shelve. Thickness (mm)		N
	Metal rod. diameter (mm)		N
	Fixed luminaire or independent control gear without fixing devices		N
20.7 (4.14.2)	Load to flexible cables		N
	Mass (kg)		—
	Stress in conductors (N/mm ²)		N
	Mass (kg) of semi-luminaire		N
	Bending moment (Nm) of semi-luminaire		N
20.7 (4.14.3)	Adjusting devices:		N
	- flexing test; number of cycles		N
	- strands broken		N
	- electric strength test afterwards		N
20.7 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N
20.7 (4.14.5)	Guide pulleys		N
20.7 (4.14.6)	Strain on socket-outlets		N
20.7 (4.15)	Flammable materials		P
	- glow-wire test 650°C.....	See Test Table 20.16 (13.3.2)	P
	- spacing ≥30 mm		N
	- screen withstanding test of 13.3.1		N
	- screen dimensions		N
	- no fiercely burning material		N
	- thermal protection		N
	- electronic circuits exempted		N

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Clause	Requirement + Test	Result - Remark	Verdict
20.7 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		N
	a) construction		N
	b) temperature sensing control		N
	c) surface temperature		N
20.7 (4.16)	Luminaires for mounting on normally flammable surfaces		N
	No lamp control gear.....: (compliance with Section 12)		N
	Provided with adaptor for a track meet the requirements for direct mounting on normally flammable surfaces		N
20.7 (4.16.1)	Lamp control gear spacing:		N
	- spacing 35 mm		N
	- spacing 10 mm		N
20.7 (4.16.2)	Thermal protection:		N
	- in lamp control gear		N
	- external		N
	- fixed position		N
	- temperature marked lamp control gear		N
20.7 (4.16.3)	Design to satisfy the test of 12.6	(see clause 12.6)	N
20.7 (4.17)	Drain holes		N
	Clearance at least 5 mm		N
20.7 (4.18)	Resistance to corrosion		N
20.7 (4.18.1)	- rust-resistance		N
20.7 (4.18.2)	- season cracking in copper		N
20.7 (4.18.3)	- corrosion of aluminium		N
20.7 (4.19)	Igniters compatible with ballast		N
20.7 (4.20)	Rough service vibration		N
20.7 (4.21)	Protective shield		

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Clause	Requirement + Test	Result - Remark	Verdict
20.7 (4.21.1)	Shield fitted if tungsten halogen lamps or metal halide lamps		N
	Shield of glass if tungsten halogen lamps		N
20.7 (4.21.2)	Particles from a shattering lamp not impair safety		N
20.7 (4.21.3)	No direct path		N
20.7 (4.21.4)	Impact test on shield		N
	Glow-wire test on lamp compartment	See Test Table 20.16 (13.3.2)	N
20.7 (4.22)	Attachments to lamps not cause overheating or damage		N
20.7 (4.23)	Semi-luminaires comply Class II		N
20.7 (4.24)	Photobiological hazards		N
20.7 (4.24.1)	No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P)		N
20.7 (4.24.2)	Retinal blue light hazard		N
	Class of risk group assessed according to IEC/TR 62778		—
	Luminaires with E_{thr} :		N
	a) Fixed luminaires		N
	- distance x m, borderline between RG1 and RG2....:		N
	- marking and instruction according 3.2.23		N
	b) Portable and handheld luminaires		N
	- marking according 3.2.23 if RG1 exceeded at 200 mm according to IEC/TR 62778		N
	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
20.7 (4.25)	Mechanical hazard		P
	No sharp point or edges		P
20.7 (4.26)	Short-circuit protection		N
20.7 (4.26.1)	Adequate means of uninsulated accessible SELV parts		N

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Clause	Requirement + Test	Result - Remark	Verdict
20.7 (4.26.2)	Short-circuit test with test chain according 4.26.3		N
	Test chain not melt through		N
	Test sample not exceed values of Table 12.1 and 12.2		N
20.7 (4.27)	Terminal blocks with integrated screwless earthing contacts		N
	Test according Annex V		N
	Pull test of terminal fixing (20 N)		N
	After test, resistance < 0,05 Ω		N
	Pull test of mechanical connection (50 N)		N
	After test, resistance < 0,05 Ω		N
	Voltage drop test, resistance < 0,05 Ω		N
20.7 (4.28)	Fixing of thermal sensing control		N
	Not plug-in or easily replaceable type		N
	Reliably kept in position		N
	No adhesive fixing if UV radiations from a lamp can degrade the fixing		N
	Not outside the luminaire enclosure		N
	Test of adhesive fixing:		N
	Max. temperature on adhesive material (°C):		—
	100 cycles between t min and t max		N
	Temperature sensing control still in position		N
20.7 (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
20.7 (4.30)	Luminaires with non-user replaceable light source		N
	If protective cover provide protection against electric shock and marked with “caution, electric shock risk” symbol:		N
	Minimum two fixing means		N
20.7 (4.31)	Insulation between circuits		P
	Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3		P

IEC 60598-2-20			
Clause	Requirement + Test	Result - Remark	Verdict
	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
20.7 (4.31.1)	SELV or PELV circuits		P
	Used SELV/PELV source		P
	Voltage ≤ ELV		P
	Insulating of SELV/PELV circuits from LV supply		N
	Insulating of SELV/PELV circuits from other non SELV/PELV circuits		N
	Insulating of SELV/PELV circuits from FELV		N
	Insulating of SELV/PELV circuits from other SELV/PELV circuits		N
	SELV/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
	Socket outlets does not admit plugs of other voltage systems		N
	Plugs and socket-outlets does not have protective conductor contact		N
20.7 (4.31.2)	FELV circuits		N
	Used FELV source		N
	Voltage ≤ ELV		N
	Insulating of FELV circuits from LV supply		N
	FELV circuits insulated from accessible parts according Table X.1		N
	Plugs not able to enter socket-outlets of other voltage systems		N
	Socket outlets does not admit plugs of other voltage systems		N
	Socket-outlets does not have protective conductor contact		N
20.7 (4.31.3)	Other circuits		N

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Clause	Requirement + Test	Result - Remark	Verdict
	Other circuits insulated from accessible parts according Table X.1		N
	Class II construction with equipotential bonding for protection against indirect contacts with live parts:		N
	- conductive parts are connected together		N
	- test according 7.2.3		N
	- conductive part not cause an electric shock in case of an insulation fault		N
	- equipotential bonding in master/slave applications		N
	- master luminaire provided with terminal for accessible conductive parts of slave luminaires		N
	- slave luminaire constructed as class I		N
20.7 (4.32)	Overvoltage protective devices		P
	Comply with IEC 61643-11		N
	External to controlgear and connected to earth:		N
	- only in fixed luminaires		N
	- only connected to protective earth		N
20.7 (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
20.7 (4.34)	Electromagnetic fields (EMF)		P
	No harmful electromagnetic fields	The submitted samples were LED-light-source technology, they were found to comply with the requirement of IEC 62493:2015 without test.	P
20.7 (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

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Clause	Requirement + Test	Result - Remark	Verdict
	-peripheral speed less than 15 m/s		N/A
	-input power of fan \leq 2 W at rated voltage		N/A
20.7 (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
	Tested as part of the lighting chain if non-standardised lampholders		N
	E5, E10, E14 and E27 according IEC 60238		N
	Bayonet according IEC 61184		N
	Insulating piercing terminals only if SELV circuit or permanent non-rewireable connections in class II chain		N
	Maximum voltage used for E5, E10 and small lampholders		N
	Body of insulating material		N
20.7.3 (-)	Terminal blocks		N
	Clause 4.6 of IEC 60598-1 referring to terminal blocks does not apply		—
20.7.4 (-)	Terminals and supply connections		P
	Comply with Annex A		N
20.7.5 (-)	Gaskets		N
	Gasket weather resistant if outdoor use		N
	Gasket remains in place and fit tightly		N
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		N
20.7.7 (-)	Lamp bridging devices		N
	Protection against electric shock and fire will not be impaired by bridging lamp filaments		N
20.7.8 (-)	Control units		P
	Forming an integral part enclosed in non-flammable insulating material tested according 20.16		P
	Securely fixed to the cable		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Electronic control device complies with IEC 61347-2-11		P
	LED driver complies with IEC 61347-2-13		P
20.7.9 (-)	Lamp rotation		N
	Bulb and lamp cap of push-in lamps will not rotate with a torque of 0,025 Nm		N
20.7.10 (-)	Lamp insertion/withdrawal force		P
	Pull force up to 3 N for push-in lamps		P
	Push-in force up to 3 N for push-in lamps		P
	Pull out force of between 3 N and 10 N for push-in lamps		P
20.7.11 (-)	Lamp mechanical requirements		P
	Impact test of 0,2 Nm on lamps of Class II chain:		P
	- non-removable lamps		P
	- non-standardized lamps		P

20.8 (11)	CREEPAGE DISTANCES AND CLEARANCES		P
20.8 (11.2.1)	Impulse withstand category (Normal category II)	Category II <input checked="" type="checkbox"/> Category III <input type="checkbox"/>	—
	Category III according Annex U		N
	Protected against pollution, reduced creepage and clearance according Annex P of IEC 61347-1		P
20.8 (11.2.2)	Creepage distances for frequency up to 30 kHz	See Test Table 20.8 (11.2) I	P
	Creepage distances for frequency over 30 kHz:		N
	- 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
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 20.8 (11.2) II	N
20.8 (11.2.3)	Clearances for frequency up to 30 kHz	See Test Table 20.8 (11.2) I	P
	Clearances distances for frequency over 30 kHz:		N
	- Controlgear marked with U_P	See Test Table 20.8 (11.2) II	N
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 20.8 (11.2) II	N

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Clause	Requirement + Test	Result - Remark	Verdict

20.10 (14)	SCREW TERMINALS		N
	Separately approved; component list	(see Annex 1)	N
	Part of the luminaire	(see Annex 3)	N

20.10 (15)	SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS		N
	Separately approved; component list	(see Annex 1)	N
	Part of the luminaire.....	(see Annex 4)	N

20.11 (5)	EXTERNAL AND INTERNAL WIRING		--
20.11 (5.2)	Supply connection and external wiring		N
20.11 (5.2.1)	Means of connection.....		N
	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
20.11 (5.2.2)	Type of cable		N
	Nominal cross-sectional area (mm ²).....		N
	Cables equal to IEC 60227 or IEC 60245		N
20.11 (5.2.3)	Type of attachment, X, Y or Z		N
20.11 (5.2.5)	Type Z not connected to screws		N
20.11 (5.2.6)	Cable entries:		N
	- suitable for introduction		N
	- adequate degree of protection		N
20.11 (5.2.7)	Cable entries through rigid material have rounded edges		N
20.11 (5.2.8)	Insulating bushings:		N
	- suitably fixed		N
	- material in bushings		N

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Clause	Requirement + Test	Result - Remark	Verdict
	- material not likely to deteriorate		N
	- tubes or guards made of insulating material		N
20.11 (5.2.9)	Locking of screwed bushings		N
20.11 (5.2.10)	Cord anchorage:		N
	- covering protected from abrasion		N
	- clear how to be effective		N
	- no mechanical or thermal stress		N
	- no tying of cables into knots etc.		N
	- insulating material or lining		N
20.11 (5.2.10.1)	Cord anchorage for type X attachment:		N
	a) at least one part fixed		N
	b) types of cable		N
	c) no damaging of the cable		N
	d) whole cable can be mounted		N
	e) no touching of clamping screws		N
	f) metal screw not directly on cable		N
	g) replacement without special tool		N
	Glands not used as anchorage		N
	Labyrinth type anchorages		N
20.11 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment		N
20.11 (5.2.10.3)	Tests:		N
	- impossible to push cable; unsafe		N
	- pull test: 25 times; pull (N)		N
	- torque test: torque (Nm).....		N
	- displacement ≤ 2 mm		N
	- no movement of conductors		N
	- no damage of cable or cord		N
	- function independent of electrical connection		N

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Clause	Requirement + Test	Result - Remark	Verdict
(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
	- 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 30N		N/A
20.11 (5.2.11)	External wiring passing into luminaire		N
20.11 (5.2.12)	Looping-in terminals		N
20.11 (5.2.13)	Wire ends not tinned		N
	Wire ends tinned: no cold flow		N
20.11 (5.2.14)	Mains plug same protection		N
	Class III luminaire plug		N
	No unsafe compatibility		N
20.11 (5.2.16)	Appliance inlets (IEC 60320)		N
	Installation couplers (IEC 61535)		N
	Other appliance inlet or connector according relevant IEC standard		N
20.11 (5.2.17)	No standardized interconnecting cables properly assembled		N
20.11 (5.2.18)	Used plug in accordance with		N
	- IEC 60083		N
	- other standard		N
20.11 (5.3)	Internal wiring		P
20.11 (5.3.1)	Internal wiring of suitable size and type		P
	Through wiring		N
	- not delivered/ mounting instruction		N
	- factory assembled		N

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Clause	Requirement + Test	Result - Remark	Verdict
	- socket outlet loaded (A)		N
	- temperatures.....	(see Annex 2)	N
	Green-yellow for earth only		N
20.11 (5.3.1.1)	Internal wiring connected directly to fixed wiring		N
	Cross-sectional area (mm ²)		N
	Insulation thickness (mm)		N
	Extra insulation added where necessary		N
20.11 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		N
	Adequate cross-sectional area and insulation thickness		N
	Current limit rating according proven characteristics		N
20.11 (5.3.1.3)	Double or reinforced insulation for class II		P
20.11 (5.3.1.4)	Conductors without insulation		N
20.11 (5.3.1.5)	SELV current-carrying parts		P
20.11 (5.3.1.6)	Insulation thickness other than PVC or rubber		P
20.11 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		P
	Joints, raising/lowering devices		N
	Telescopic tubes etc.		N
	No twisting over 360°		N
20.11 (5.3.3)	Insulating bushings:		N
	- suitable fixed		N
	- material in bushings		N
	- material not likely to deteriorate		N
	- cables with protective sheath		N
20.11 (5.3.4)	Joints and junctions effectively insulated		N

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Clause	Requirement + Test	Result - Remark	Verdict
20.11 (5.3.5)	Strain on internal wiring		N
20.11 (5.3.6)	Wire carriers		N
20.11 (5.3.7)	Wire ends not tinned		N
	Wire ends tinned: no cold flow		N
20.11 (5.4)	Test to determine suitability of conductors having a reduced cross-sectional area		N
	Under test the temperature of the luminaire wiring insulation not exceed the limits stated in Table 12.2	(see Annex 2)	N
	No damage to luminaire wiring after test		N
20.11.2 (-)	Cables for lighting chains		N
	Type of cable		N
	Cables not lighter than IEC 60227 or IEC 60245 for class II chain		N
	Cables not lighter than insulation according to 5.3.1 of part 1 for class III chain		N
	Nominal cross-sectional area (mm ²)		N
	Mechanical properties according 4.14.1 and 4.14.2 of part 1		N
20.11.3 (-)	Cord anchorage test		P
	Pull test 30 N 25 times on single-core cable		P
20.11.4 (-)	Plugs and cable length		P
	Splash-proof plug or permanent connection if for outdoor use		P
	Length of the cable between the plug and first lamp or lampholder not less than 1,5 m		P
20.11.5 (-)	Maximum length of extendable class II lighting chains		P
	Maximum length 100 m for 0,5 mm ² cable		N
	Maximum length 150 m for 0,75 mm ² cable		N

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Clause	Requirement + Test	Result - Remark	Verdict

20.12 (8)	PROTECTION AGAINST ELECTRIC SHOCK		--
20.12 (8.2.1)	Live parts not accessible		N
	Basic insulated parts not used on the outer surface without appropriate protection		N
	Basic insulated parts not accessible with standard test finger on portable, settable and adjustable luminaires		N
	Basic insulated parts not accessible with Ø 50 mm probe from outside, other types of luminaires		N
	Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N
	Basic insulation only accessible under lamp or starter replacement		N
	Protection in any position		N
	Double-ended tungsten filament lamp		N
	Insulation lacquer not reliable		N
	Double-ended high-pressure discharge lamp		N
	Relevant warning according to 3.2.18 fitted to the luminaire		N
20.12 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N
20.12 (8.2.3.a)	Class II luminaire:		N
	- basic insulated metal parts not accessible during starter or lamp replacement		N
	- basic insulation not accessible other than during starter or lamp replacement		N
	- glass protective shields not used as supplementary insulation		N
20.12 (8.2.3.b)	BC lampholder of metal in class I luminaires shall be earthed		N
20.12 (8.2.3.c)	SELV circuits with exposed current carrying parts:		N
	Ordinary luminaire:		N

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Clause	Requirement + Test	Result - Remark	Verdict
	- voltage under load (V)..... :		N
	- no-load voltage (V)..... :		N
	- touch current if applicable (mA) :		N
	One conductive part insulated if required		N
	Other than ordinary luminaire:		N
	- nominal voltage (V) :		N
	Class III luminaire only for connection to SELV		N
	Class III luminaire not provided with means for protective earthing		N
20.12 (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
	One pole insulated if required		N/A
20.12 (8.2.4)	Portable luminaire has protection independent of supporting surface		N
20.12 (8.2.5)	Compliance with the standard test finger or relevant probe		P
20.12 (8.2.6)	Covers reliably secured		P
20.12 (8.2.7)	Luminaire other than below with capacitor > 0,5 µF not exceed 50 V 1 min after disconnection		N
	Portable luminaire with capacitor > 0,1 µF (0.25) not exceed 34 V 1 s after disconnection		N
	Other luminaires with capacitor > 0,1 µF (0.25) with plug and track adaptors not exceed 60 V 5 s after disconnection		N
20.12.2 (-)	Divisible plug		P
	Divisible plug in compliance with Figure 1		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Parts of the connector do not separate with a pull force of 10 N		P
20.12.3 (-)	Electrification of decorations		P
	Test with flat probe		P
20.12.4 (-)	Contact of push-in lampholders		N
	Lampholder contacts in push-in lampholders is reliably secured		N
	Contacts move maximum 0,8 mm during the endurance test		N
20.12.5 (-)	Blanking plugs		N
	Blanking plugs provided if chain designed to be used without lamp in every lampholder		N

20.13 (12)	ENDURANCE TEST AND THERMAL TEST		P
20.13 (-)	If IP > IP 20 relevant test of (12.4), (12.5) and (12.6) after (9.2) before (9.3) specified in 20.14		—
20.13 (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 (12.3)	Endurance test		P
	a) mounting-position		—
	b) test temperature (°C)	25	—
	c) total duration (h)	240	—
	d) supply voltage (V)	26.4VDC	—
	d) if not equipped with controlgear, constant voltage/current (V) or (A)		—
	e) luminaire ceases to operate		—
20.13 (12.3.2)	After endurance test:		P
	- no part unserviceable		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- luminaire not unsafe		P
	- no damage to track system		P
	- marking legible		P
	- no cracks, deformation etc.		P
20.13 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
20.13 (12.5)	Thermal test (abnormal operation)	(see Annex 2)	P
20.13 (12.6)	Thermal test (failed lamp control gear condition):		N
20.13 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A)		—
	- case of abnormal conditions		—
	- electronic lamp control gear		N
	- measured winding temperature (°C): at 1,1 Un		—
	- measured mounting surface temperature (°C) at 1,1 Un		N
	- calculated mounting surface temperature (°C)		N
	- track-mounted luminaires		N
20.13 (12.6.2)	Temperature sensing control		N
	- case of abnormal conditions		—
	- thermal link		N
	- manual reset cut-out		N
	- auto reset cut-out		N
	- measured mounting surface temperature (°C)		N
	- track-mounted luminaires		N
20.13 (12.7)	Thermal test (failed lamp control gear in plastic luminaires):		N
20.13 (12.7.1)	Luminaire without temperature sensing control		N
20.13 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		N
	Test method 12.7.1.1 or Annex W		—

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Clause	Requirement + Test	Result - Remark	Verdict
	Test according to 12.7.1.1:		N
	- case of abnormal conditions		—
	- Ballast failure at supply voltage (V)		—
	- Components retained in place after the test		N
	- Test with standard test finger after the test		N
	Test according to Annex W:		N
	- 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
20.13 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		N
	- 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
20.13 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N
	- case of abnormal conditions		—
	- Components retained in place after the test		N
	- Test with standard test finger after the test		N
20.13 (12.7.2)	Luminaire with temperature sensing control		N
	- thermal link.....	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- manual reset cut-out	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- auto reset cut-out	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- case of abnormal conditions		—

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Clause	Requirement + Test	Result - Remark	Verdict
	- highest measured temperature of fixing point/ exposed part (°C):		—
	Ball-pressure test:	See Test Table 20.16 (13.2.1)	N
20.13.2 (-)	Test voltage		N
	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
	Lamp bridging not cause temperature which impair safety		N
	Temperature of lampholders and cables not exceed values in Table 12.1 when bridging device operate successively on each lamp		N
20.13.4 (-)	Short-circuit test of rectifier		N
	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

20.14 (9)	RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE		P
20.14.1 (-)	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 mounting	—
	- fixing screws tightened; torque (Nm)		—
	- tests according to clauses.....	clauses 9.2.0	—
	- electric strength test afterwards		P
	a) no deposit in dust-proof luminaire		N
	b) no talcum in dust-tight luminaire		N
	c) no trace of water on current-carrying parts or on insulation where it could become a hazard		N

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Clause	Requirement + Test	Result - Remark	Verdict
	c.1) For luminaires without drain holes – no water entry		N
	c.2) For luminaires with drain holes – no hazardous water entry		N
	d) no water in watertight or pressure watertight luminaire		N
	e) no contact with live parts (IP 2X)		P
	e) no entry into enclosure (IP 3X and IP 4X)		N
	e) no contact with live parts through drain holes and ventilation slots (IP3X and IP4X)		N
	f) no trace of water on part of lamp requiring protection from splashing water		N
	g) no damage of protective shield or glass envelope		N
20.14 (9.3)	Humidity test 48 h	25°C, 93%	P

20.15 (10)	INSULATION RESISTANCE AND ELECTRIC STRENGTH		P
20.15 (-)	Metal foil procedure		—
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		P
	- between current-carrying parts of different polarity :		N
	- between current-carrying parts and mounting surface	100 MΩ	P
	- between current-carrying parts and metal parts of the luminaire		N
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts		N
	- Insulation bushings as described in Section 5		N
	Other than SELV		N
	- between live parts of different polarity		N

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Clause	Requirement + Test	Result - Remark	Verdict
	- between live parts and mounting surface		N
	- between live parts and metal parts		N
	- between live parts of different polarity through action of a switch		N
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts.....		N
	- Insulation bushings as described in Section 5		N
20.15 (10.2.2)	Electric strength test		P
	Dummy lamp		N
	Luminaires with ignitors after 24 h test		N
	Luminaires with manual ignitors		N
	Test voltage (V)		N
	SELV		P
	- between current-carrying parts of different polarity :		N
	- between current-carrying parts and mounting surface	500V	P
	- between current-carrying parts and metal parts of the luminaire.....		N
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts.....		N
	- Insulation bushings as described in Section 5		N
	Other than SELV		N
	- between live parts of different polarity		N
	- between live parts and mounting surface		N
	- between live parts and metal parts		N
	- between live parts of different polarity through action of a switch		N
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts.....		N
	- Insulation bushings as described in Section 5		N
20.15 (10.3)	Touch current or protective conductor current (mA):		N

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Clause	Requirement + Test	Result - Remark	Verdict

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)	N
20.16 (13.3.1)	Needle-flame test (10 s).....	See Test Table 20.16 (13.3.1)	N
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
20.16 (-)	Edison lampholders according cl. 20 of IEC 60238		N
20.16 (-)	Bayonet lampholders according cl. 19 of IEC 61184		N

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Clause	Requirement + Test	Result - Remark	Verdict

20.8 (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:	SELV	>1.0	>2.6	7	>1.0	>2.6	11
Working voltage (V).....:					24VDC		—
PTI.....:					< 600 <input checked="" type="checkbox"/> ≥ 600 <input type="checkbox"/>		—
Pulse voltage or U_P if applicable (kV)							—
Supplementary information:							
Distance 2:							
Working voltage (V).....:							—
PTI.....:					< 600 <input type="checkbox"/> ≥ 600 <input type="checkbox"/>		—
Pulse voltage or U_P if applicable (kV)							—
Supplementary information:							
Distance 3:							
Working voltage (V).....:							—
PTI.....:					< 600 <input type="checkbox"/> ≥ 600 <input type="checkbox"/>		—
Pulse voltage or U_P if applicable (kV)							—
Supplementary information:							
Distance 1: LED + to LED -							

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

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Clause	Requirement + Test	Result - Remark	Verdict

20.8 (11.2)	TABLE II: Creepage distances and clearances						N
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.....:							—
Peak value of the working voltage \hat{U}_{out} if applicable (kV)							—
Supplementary information:							
Distance 2:							
Working voltage (V).....:							—
Frequency if applicable (kHz).....:							—
PTI.....:							—
Peak value of the working voltage \hat{U}_{out} if applicable (kV)							—
Supplementary information:							
Distance 3:							
Working voltage (V).....:							—
Frequency if applicable (kHz).....:							—
PTI.....:							—
Peak value of the working voltage \hat{U}_{out} if applicable (kV)							—
Supplementary information:							

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

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Clause	Requirement + Test	Result - Remark	Verdict

20.16 (13.2.1)	TABLE: Ball Pressure Test of Thermoplastics			N
Allowed impression diameter (mm)		2		—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)	
Supplementary information:				

20.16 (13.3.1)	TABLE: Needle-flame test (IEC 60695-11-5)				N
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:					

20.16 (13.3.2)	TABLE: Glow-wire test (IEC 60695-2-11)				P
Glow wire temperature		650°C			—
Object/ Part No./ Material	Manufacturer/ trademark	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict	
LED PCB	--	NO	0	P	
Supplementary information:					

IEC 60598-2-20					
Clause	Requirement + Test	Result - Remark			Verdict
20.16 (13.4)	TABLE: Proof tracking test (IEC 60112)				N
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:					

IEC 60598-2-20			
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⁾	
Internal wire	B	SHANGHAI RISHUN ELECTRONIC EQUIPMENTS CO LTD	2651	22AWG, 105°C	UL 758	UL	
PCB for LED	B	SHENZHEN MANKUN ELECTRONICS CO LTD	MK-D	V-0,130C	UL 796	UL	
LED	B	DONGGUAN KITWELL ELECTRIC FURNITURE CO.LTD.	Various	VF:2.8-6.4V, IF:0.12A, CCT:2800K-6500K	EN 60598-2-20	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

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

ANNEX 2	TABLE: Thermal tests of Section 12	P
	Type reference : HR00-A11	—
	Lamp used : LED	—
	Lamp control gear used : --	—
	Mounting position of luminaire : Normally mounted	—
	Supply wattage (W) : 100.6W	—
	Supply current (A) : 3.96A	—
	Temperatures in test 1 - 4 below are corrected for ta (°C) : 25	—
	- abnormal operating mode : --	—
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 : 24*1.06=25.4VDC	—
	- 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 :	—

Temperature measurements (°C)

Part	Ambient	Cl. 12.4 – normal				Cl. 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Inter wire	25	--	43.1	--	105	--	--
Connect	25	--	49.9	--	105	--	--
LED PCB	25	--	58.9	--	Ref.	--	--
LED	25	--	70.9	--	90	--	--

Supplementary information:

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

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

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

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

IEC 60598-2-20			
Clause	Requirement + Test	Result - Remark	Verdict
(15.6)	Terminals and connections for external wiring		N
(15.6.1)	Conductors		N
	Terminal size and rating		N
15.6.2	Mechanical tests		N
(15.6.2.1)	Pull test spring-type terminals or welded connections (4 samples); pull (N)		N
(15.6.2.2)	Pull test pin or tab terminals (4 samples); pull (N)		N
(15.6.3)	Electrical tests		N
	Tests according 15.6.3.1 + 15.6.3.2 in IEC 60598-1		N

(15.6.3.1)	TABLE: Contact resistance test / Heating tests										N
(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										
	Voltage drop after 10th alt. 25th cycle										
	Max. allowed voltage drop (mV)										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Voltage drop after 50th alt. 100th cycle										
	Max. allowed voltage drop (mV)										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Continued ageing: voltage drop after 10th alt. 25th cycle										
	Max. allowed voltage drop (mV)										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											
	Continued ageing: voltage drop after 50th alt. 100th cycle										
	Max. allowed voltage drop (mV)										—
terminal	1	2	3	4	5	6	7	8	9	10	
voltage drop (mV)											

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IEC 60598-2-20										
Clause	Requirement + Test					Result - Remark				Verdict
Supplementary information:										

Attachment 1: 62031: EN IEC 62031:2020

4	GENERAL REQUIREMENTS		—
4.4	Integral modules tested assembled in the luminaire		P
4.5	Independent modules complies with requirements in IEC 60598-1		N

5	GENERAL TEST REQUIREMENTS		—
5.5	SELV-operated LED modules comply with Annex I of IEC 61347-2-13	(see Annex 1)	N
	General conditions for tests in Annex A	(see Annex A)	N

6	CLASSIFICATION		—
	Built-in module	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	Independent module	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	Integral module	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	For Integral module; Note to 1.2.1 in IEC 60598-1 applies.		—

7	MARKING		—
	Requirements not applicable to the evaluated product.		N

8	TERMINALS		—
	Screw terminals according section 14 of IEC 60598-1:		N
	Separately approved; component list	(see Annex 2)	N
	Part of the luminaire	(see Annex 3)	N
	Screwless terminals according section 15 of IEC 60598-1:		N
	Separately approved; component list	(see Annex 2)	N
	Part of the luminaire	(see Annex 4)	N
	Connectors according IEC 60838-2-2:		N
	Separately approved; component list	(see Annex 2)	N

9 (9)	PROVISION FOR PROTECTIVE EARTHING		—
	Requirements not applicable to the evaluated product.		N

10 (10)	PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS		—
	Requirements not applicable to the evaluated product.		N

11 (11)	MOISTURE RESISTANCE AND INSULATION		—
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (MΩ):		P
	For basic insulation $\geq 2 \text{ M}\Omega$	100MΩ	P
	For double or reinforced insulation $\geq 4 \text{ M}\Omega$		N
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		N

12 (12)	ELECTRIC STRENGTH		—
	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V	500V	P
	Working voltage $\leq 50 \text{ V}$, test voltage 500 V		N
	Working voltage $> 50 \text{ V} \leq 1000 \text{ V}$, test voltage (V):		N
	Basic insulation, 2U + 1000 V		N
	Supplementary insulation, 2U + 1000 V		N
	Double or reinforced insulation, 4U + 2000 V		N
	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

13 (14)	FAULT CONDITIONS		—
- (14)	When operated under fault conditions the controlgear:		N
	- does not emit flames or molten material		N
	- does not produce flammable gases		N
	- protection against accidental contact not impaired		N
	Thermally protected controlgear does not exceed the marked temperature value		N
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected	(see appended table)	N
- (14.1)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (except between live parts and accessible metal parts)	(see appended table)	N
	Creepage distances on printed boards less than specified in clause 16 in Part 1 provided with coating according to IEC 60664-3		N

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- (14.2)	Short-circuit or interruption of semiconductor devices	(see appended table)	N
- (14.3)	Short-circuit across insulation consisting of lacquer, enamel or textile	(see appended table)	N
- (14.4)	Short-circuit across electrolytic capacitors	(see appended table)	N
- (14.5)	After the tests has been carried out on three samples:		N
	The insulation resistance $\geq 1 \text{ M}\Omega$		N
	No flammable gases		N
	No accessible parts have become live		N
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		N
- (14.6)	Relevant fault condition tests with high-power supply		N
13.2	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
	No fire, smoke or flammable gas is produced		P
	Molten material does not ignite tissue paper, spread below the module		P

15	CONSTRUCTION		—
	Wood, cotton, silk, paper and similar fibrous material not used as insulation		P

16 (16)	CREEPAGE DISTANCES AND CLEARANCES		—
- (16)	Creepage and distances and clearances in compliance with IEC 61347-1		N
	Insulating lining of metallic enclosures		N
	Basic insulation on printed boards tested according to clause 14		N
	Distances subjected to both sinusoidal voltage as non-sinusoidal pulses not less than value in Table 16		N
	Creepage distances not less than minimum clearance		N
16 (-)	Conductive accessible parts in compliance with applicable parts of IEC 60598-1		N
17 (17)	SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS		—
	Screws, current-carrying parts and connections in compliance with IEC 60598-1 (clause numbers between parentheses refer to IEC 60598-1)		P

18 (18)	RESISTANCE TO HEAT, FIRE AND TRACKING		—
- (18.1)	Ball-pressure test	See Test Table 18 (18.1)	N
- (18.3)	Glow-wire test (650°C)	See Test Table 18 (18.3)	N
- (18.4)	Needle-flame test (10 s)	See Test Table 18 (18.4)	N
- (18.5)	Proof tracking test	See Test Table 18 (18.5)	N

19 (19)	RESISTANCE TO CORROSION		—
	- test according 4.18.1 of IEC 60598-1		N
	- adequate varnish on the outer surface		N

20	INFORMATION FOR LUMINAIRE DESIGN		—
	Information in Annex D (informative)		—

21	HEAT MANAGEMENT		—
21.1	General		N
	Exchangeability is safeguarded by cap or base		N
21.2	Heat-conducting foil and paste		N
	Heat-conducting foil delivered with the module if necessary		N

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

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

	ANNEX 1 - SELV-operated LED modules		—
	SELV-operated LED modules in compliance with Annex I of IEC 61347-2-13		N

	GENELEC COMMON MODIFICATIONS (EN)	—
5.5 (3)	MARKING	—
5.5 (3.3.101)	For luminaires not supplied with terminal block: Adequate warning on the package	P
5.6 (4)	CONSTRUCTION	—
5.6 (4.11.6)	Electro-mechanical contact systems	N
5.10 (5)	EXTERNAL AND INTERNAL WIRING	—
5.10 (5.2.1)	Connecting leads	N
	- without a means for connection to the supply	N
	- terminal block specified	N
	- relevant information provided	N
	- compliance with 4.6, 4.7.1, 4.7.2, 4.10.1, 11.2, 12 and 13.2 of Part 1	P
5.10 (5.2.2)	Cables equal to EN 50525	P
	Replace table 5.1 – Supply cord	P
5.12 (12)	ENDURANCE TESTS AND THERMAL TESTS	—
5.12 (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)	—
(3.3)	DK: power supply cords of class I luminaires with label	N
(4.5.1)	DK: socket-outlets	N
(5.2.1)	CY, DK, FI, GB: type of plug	N
ZC	ANNEX ZC, NATIONAL DEVIATIONS (EN)	—
(4 & 5)	FR: Shuttered socket-outlets 10/16A	N

	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
	- 850°C for luminaires in stairways and horizontal travel paths		N
	- 650°C for indoor luminaires		N
	GB: Requirements according to United Kingdom Building Regulation		N

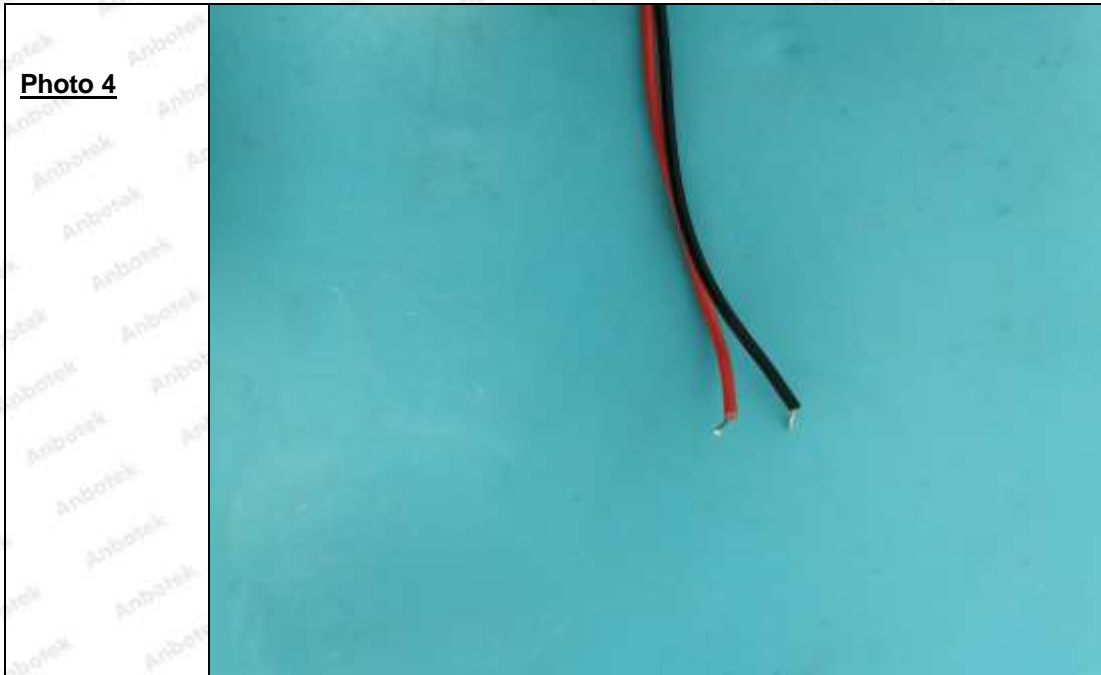
Attachment 1: Photo Documentation



Photo 3



Photo 4



---End of report---