



# SHENZHEN LEDWORKER LIGHTING CO., LTD

## CE LVD REPORT

Prepared For:	SHENZHEN LEDWORKER LIGHTING CO., LTD 5TH FLOOR, BUILDING A, BAITONG SCIENCE PARK, NO. 150, SHASONG ROAD, SHAJING, BAOAN, SHENZHEN
Product Name:	COB LED STRIP
Model No. :	LW-COB013, LW-COB001, LW-COB003, LW-COB005, LW-COB006, LW-COB008, LW-COB010, LW-COB012, LW-COB014, LW-COB110, LW-COB122, LW-COB138, LW-COB110 LW-COB122, LW-COB138
Prepared By :	BST Testing (Shenzhen) Co.,Ltd. No.7, New Era Industrial Zone, Guantian, Bao'an District, Shenzhen, Guangdong, China
Test Date:	Dec. 19-29, 2020
Date of Report :	Dec. 29, 2020
Report No.:	BSTXD201215675401SR



<b>TEST REPORT</b> <b>EN 60598-1&amp;EN 60598-2-20</b> <b>Luminaires</b> <b>Part 2: Particular requirements</b> <b>Section Twenty – Lighting chains</b>	
Testing Laboratory Name .....	BST Testing (Shenzhen) Co.,Ltd
Address .....	No.7, New Era Industrial Zone, Guantian, Bao'an District, Shenzhen, Guangdong, China
Testing location .....	BST Testing (Shenzhen) Co.,Ltd
Applicant's Name .....	SHENZHEN LEDWORKER LIGHTING CO., LTD
Address .....	5TH FLOOR, BUILDING A, BAITONG SCIENCE PARK, NO. 150, SHASONG ROAD, SHAJING, BAOAN, SHENZHEN
Manufacturer .....	SHENZHEN LEDWORKER LIGHTING CO., LTD
Address .....	5TH FLOOR, BUILDING A, BAITONG SCIENCE PARK, NO. 150, SHASONG ROAD, SHAJING, BAOAN, SHENZHEN
Test specification	N/A
Standard .....	EN 60598-1:2015+A1:2018 EN 60598-2-20:2015
Procedure deviation .....	N/A
Non-standard test method .....	N/A
Test item description .....	COB LED STRIP
Trade mark .....	N/A
Model and/or type reference .....	LW-COB013, LW-COB001, LW-COB003, LW-COB005, LW-COB006, LW-COB008, LW-COB010, LW-COB012, LW-COB014, LW-COB110, LW-COB122, LW-COB138, LW-COB110 LW-COB122, LW-COB138
Rating(s) .....	DC24V, 0.46A
Test case verdicts	
Test case does not apply to the test object ....:	N/A
Test item does meet the requirement .....	P(ass)
Test item does not meet the requirement .....	F(ail)



General remarks

This report shall not be reproduced except in full without the written approval of the testing laboratory.

The test results presented in this report relate only to the item(s) tested.

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

"(see Annex #)" refers to an annex appended to the report.

Clause numbers between brackets refer to clauses in IEC 60 598-1 (EN 60598-1)

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

Attached with:

A. photo documentation

B. General product information:

The series products have the same circuit diagram, PCB layout and functionality. The differences are the appearance, so, we select 3535-60D-12V/24V to test.

Copy of marking plate and summary of test results:

COB LED STRIP

Model: LW-COB013

Rated: DC24V, 0.46A



SHENZHEN LEDWORKER LIGHTING CO., LTD



Name and address of the testing laboratory : BST Testing (Shenzhen) Co.,Ltd

No.7, New Era Industrial Zone, Guantian, Bao'an District, Shenzhen, Guangdong, China

Test by : Apple Li Dec. 29, 2020  
Signature Date  
Technician  
Title

Review by : Sabon Dec. 29, 2020  
Signature Date  
Project Engineer  
Title

Approved by : Andy Yan Dec. 29, 2020  
Signature Date  
Andy Yan / Manager  
Name and Title





EN 60598-1 & EN 60598-2-20

Cl.	Requirement – Test	Result	Verdict
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1.1 (0)	SCOPE		P
1.1 (0.1)	More sections applicable .....	Yes [ <input checked="" type="checkbox"/> ]      No [ <input type="checkbox"/> ]	—

20.4 (2)	CLASSIFICATION		P
20.4(2.2)	Type of protection.....	Class III	—
20.4 (2.3)	Degree of protection .....	IP20	—
1.4 (2.4)	Portable or handheld luminaire .....	Yes	—
	Fixed luminaire suitable for normally flammable surfaces .....	No	—
	Fixed luminaire suitable for non-combustible materials only .....	No	—
1.4 (2.5)	Luminaire for normal use .....	Yes	—
	Luminaire for rough service .....	No	—

20.5 (3)	MARKING		P
20.5 (3.2)	Mandatory markings	Near connector	P
	Position of the marking	On the lable	P
	Format of symbols/text	Symbol: minimum 5mm Text: minimum 2mm	P
20.5 (3.3)	Additional information		P
	Language of instructions	English	P
20.5 (3.3.1)	Combination luminaires		N
20.5 (3.3.2)	Nominal frequency in Hz		N
20.5 (3.3.3)	Operating temperature		N
20.5 (3.3.4)	Symbol or warning notice	See the label	P
20.5 (3.3.5)	Wiring diagram		N
20.5 (3.3.6)	Special conditions		N
20.5 (3.3.7)	Metal halid lamp luminaire – warning		N
20.5 (3.3.8)	Limitation for semi-luminaires		N



EN 60598-1 & EN 60598-2-20			
Cl.	Requirement – Test	Result	Verdict
20.5 (3.3.9)	Power factor and supply current		P
20.5 (3.3.10)	Indoor and outdoor use	Indoor permanent use	P
20.5 (3.3.11)	Luminaires with remote control		P
20.5 (3.3.12)	Clip-mounted luminaire – warning		N
20.5 (3.3.13)	Specifications of protective shields		N
20.5 (3.3.14)	Symbol for nature of supply	≡	P
20.5 (3.3.15)	Rated current of socket outlet		N
20.5 (3.3.16)	Rough service luminaire	Ordinary luminaire	N
20.5 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments	type Y	P
20.5 (3.3.18)	Non-ordinary luminaires with PVC cable		N
20.5 (3.4)	Test with water	15s with water	P
	Test with hexane	15s with hexane	P
	Legible after test	The marking is legible	P
	Label attached	The marking not be easily removable and shows no curling	P
20.5.1	b.Lighting chains shall be accompanied by the substance of the following warnings:		P
	1)do not remove or insert lamps		P
	2) replace failed lamps		N
	3)do not connect the chain		P
	4)do not replace a fused lamp with a non-fused lamp	the lamps are not replaceable.	P
	5) ensure all lampholders are fitted with a lamp.	No lampholder	P
	c. in addition,		P
	2) Lighting chains for outdoor use shall be accompanied by the context		N



EN 60598-1 & EN 60598-2-20			
Cl.	Requirement – Test	Result	Verdict
	d. Lighting chains not intended for interconnection	Do not connect this chain electrically to another chain	P
	e. indicating the means for identification of fused lamps	No fused lamps	N
	f. Lighting chains with non-standard lamps		N
	g. the lamps are not replaceable.		P

20.6 (4)	CONSTRUCTION		P
20.6 (4.2)	Components replaceable without difficulty		N
20.6 (4.3)	Wireways smooth and free from sharp edges		P
20.6 (4.4)	Lampholders		N
20.6 (4.4.1)	Integral lampholder		N
	G5 lampholders are assessed for access to live parts during lamp replacements and with the lamp removed.		N
20.6 (4.4.2)	Wiring connection		N
20.6 (4.4.3)	Lampholder for end-to-end mounting		N
20.6 (4.4.4)	Positioning		N
20.6 (4.4.5)	Peak pulse voltage		N
20.6 (4.4.6)	Centre contact		N
20.6 (4.4.7)	Rough service luminaires	Ordinary luminaires	N
20.6 (4.4.8)	Lamp connectors	No lamp connector provided	N
20.6 (4.5)	Starter holders		N
	Starter holder in luminaires other than class II		N
	Starter holder class II construction		N
20.6 (4.6)	Terminal blocks		N
	Tails	Not apply	N
	Unsecured blocks		N
20.6 (4.7)	Terminals and supply connections		N
20.6 (4.7.1)	Contact to metal parts		N



EN 60598-1 & EN 60598-2-20			
Cl.	Requirement – Test	Result	Verdict
20.6 (4.7.2)	Test 8 mm live conductor		N
	Test 8 mm earth conductor		N
20.6 (4.7.3)	Terminals for supply conductors		N
20.6 (4.7.4)	Terminals other than supply connection		N
20.6 (4.7.5)	Heat-resistant wiring/sleeves		N
20.6 (4.7.6)	Multi-pole plug		N
20.6 (4.8)	Switches:		N
	- adequate rating		N
	- adequate fixing		N
	- polarized supply		N
20.6 (4.9)	Insulating lining and sleeves		N
20.6 (4.9.1)	Retainment		N
	Method of fixing .....		N
20.6 (4.9.2)	Insulated linings and sleeves		N
	a) & c) Insulation resistance and electric strength		N
	b) Ageing test. Temperature (°C) .....		N
20.6 (4.10)	Insulation of Class II luminaires		N
20.6 (4.10.1)	No contact, mounting surface - accessible metal parts - wiring of basic insulation		N
	Safe installation fixed luminaires		N
	Capacitors		N
	Interference suppression capacitors according to IEC 60384-14		N
20.6 (4.10.2)	Assembly gaps:		N
	- not coincidental	No such gaps	N
	- no straight access with test probe		N
20.6 (4.10.3)	Retainment of insulation:		N
	- fixed	Cannot remove easily	N
	- unable to be replaced; luminaire inoperative		N





EN 60598-1 & EN 60598-2-20			
Cl.	Requirement – Test	Result	Verdict
	- sleeves retained in position		N
	- lining in lampholder		N
20.6 (4.11)	Electrical connections and current-carrying parts		P
20.6 (4.11.1)	Contact pressure	Not transmitted through insulating material	P
20.6 (4.11.2)	Screws:		N
	- self-tapping screws		N
	- thread-cutting screws		N
	- at least two self-tapping screws		N
20.6 (4.11.3)	Screw locking:		N
	- spring washer	No spring washer used	N
	- rivets	No rivet used	N
20.6 (4.11.4)	Material of current-carrying parts	Copper	P
20.6 (4.11.5)	No contact to wood	No wood use	N
20.6 (4.11.6)	Electro-mechanical contact systems	No such systems	N
20.6 (4.12)	Mechanical connections and glands		N
20.6 (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
20.6 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N
20.6 (4.12.4)	Locked connections:		N
	- fixed arms; torque (Nm) .....		N
	- lampholder; torque (Nm) .....		N
	- push-button switches; torque 0,8 Nm .....		N
20.6 (4.12.5)	Screwed glands; force (N).....:	No such part	N
20.6 (4.13)	Mechanical strength		P



EN 60598-1 & EN 60598-2-20			
Cl.	Requirement – Test	Result	Verdict
20.6 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm) .....		N
	- other parts; energy (Nm) .....	Enclosure ,3 times	P
	1) live parts	No live parts accessibly	P
	2) linings	Provide continued protection	P
	3) protection		P
	4) covers	No covers	N
20.6 (4.13.3)	Straight test finger	Can't touch with live part with 30N	P
20.6 (4.13.4)	Rough service luminaires		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
20.6 (4.13.6)	Tumbling barrel		N
20.6 (4.14)	Suspensions and adjusting devices		P
20.6 (4.14.1)	Mechanical load:		P
	A) four times the weight		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
20.6 (4.14.2)	Load to flexible cables		N
	Mass (kg).....		N
	Stress in conductors (N/mm <sup>2</sup> ).....		N
	Semi-luminaires – mass (kg) .....		N
	Semi-luminaires – bending moment (Nm).....		N
20.6 (4.14.3)	Adjusting devices:		N



EN 60598-1 & EN 60598-2-20			
Cl.	Requirement – Test	Result	Verdict
	- flexing test; number of cycles.....:		N
	- strands broken		N
	- electric strength test afterwards		N
20.6 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors	No telescopic tubes	N
20.6 (4.14.5)	Guide pulleys	No guide pulleys	N
20.6 (4.14.6)	Strain on socket-outlets		N
20.6 (4.15)	Flammable materials:		P
	- glow-wire test 650 °C		P
	- spacing $\geq$ 30 mm		N
	- screen withstanding test of 13.3.1		N
	- screen dimensions		N
	- no fiercely burning material		P
	- thermal protection		N
	- electronic circuits exempted		N
20.6 (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
20.6 (4.16)	Luminaires marked with flammable symbol		P
	No lamp control gear		P
20.6 (4.16.1)	Lamp control gear spacing:		N
	- spacing 35 mm		N
	- spacing 10 mm		N
20.6 (4.16.2)	Thermal protection:		N
	- in lamp control gear		N
	- external		N
	- fixed position		N
	- temperature marked lamp control gear		N



EN 60598-1 & EN 60598-2-20			
Cl.	Requirement – Test	Result	Verdict
20.6 (4.16.3)	"F" curve measured	--	N
20.6 (4.17)	Drain holes		N
	Clearance at least 5 mm		N
20.6 (4.18)	Resistance to corrosion:		N
20.6 (4.18.1)	- rust-resistance	Not have meat part	N
20.6 (4.18.2)	- season cracking in copper		N
20.6 (4.18.3)	- corrosion of aluminium		N
20.6 (4.19)	Igniters compatible with ballast		N
20.6 (4.20)	Rough service vibration.....:	Ordinary luminaire	N
20.6 (4.21)	Protective shield:		N
20.6 (4.21.1)	Shield fitted		N
20.6 (4.21.2)	Particles from a shattering lamp not impair safety		N
20.6 (4.21.3)	No direct path		N
20.6 (4.21.4)	Impact test on shield		N
	Glow-wire test on lamp compartment		N
20.6 (4.22)	Attachments to lamps	No attachments	N
20.6 (4.23)	Semi-luminaires comply class II		N
20.6 (4.24)	UV radiation		P
20.6 (4.25)	No sharp point or edges	No sharp points or edges	P
20.6 (4.26)	Short-circuit protection:		N
20.6 (4.26.1)	Uninsulated accessible SELV parts		N
20.6 (4.26.2)	Short-circuit test		N
20.6 (4.26.3)	Test chain according to IEC 61032		N
20.6.1	Edison screw lampholders E10, E14 and E27 shall meet the requirements of IEC 60238.		N
20.6.4	Only 4.11.4 and 4.11.5 of clause 4.11 of section 4 of EN 60598.1, referring to electrical connections and current-carrying parts, apply.		N



EN 60598-1 & EN 60598-2-20			
Cl.	Requirement – Test	Result	Verdict
20.6.5	Gaskets used to provide the specified degree of protection	No gaskets	N
20.6.6	mechanical strength requirements of	No lampholder	N
20.6.7	Lampholders maximum rated voltage or wattage		N
20.6.8	For lighting chains fitted with series-connected lamps, resistors		N
20.6.9	Flasher units forming an integral part of the lighting chain		N
20.6.10	Lampholders in festoon lighting		N
20.6.10.1	Lampholders in festoon lighting shall be of a type in which stress is not imposed on the terminals.		N
20.6.10.2	Exposure to weather		N
20.6.11	Lampholders for replaceable push-in lamps shall have a body of insulating material.		N
20.6.12	The lamp (bulb) glass of push-in lamps shall not rotate in relation		N
20.6.13	Replaceable push-in type lamps shall remain in the seated position	No replace	N
20.6.14	mechanical strength.		N
	For rigid sealed lighting chains, 45 times:		N
	a)A pull of 60 N		N
	b)A torque of 0,15 Nm		N
	For flexible sealed lighting chains:60N, 250 mm diameter:		N
	--up to and including 20: 10 times at 25°C ±5°C		N
	--over 20: 0 times at 25°C ±5°C followed by 10 times at -15°C ±5°C no damage affecting the safety		N
20.6.15	mechanical requirements	0.2Nm	P
20.6.16	electronic device		P

20.7 (11)	CREEPAGE DISTANCES AND CLEARANCES		N
	Working voltage (V) .....	DC12V	—
	Voltage form	LED	—
	PTI	< 600V	—
	Rated pulse voltage (kV) .....	--	—
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm) .....		N



EN 60598-1 & EN 60598-2-20			
Cl.	Requirement – Test	Result	Verdict
	(2) Current-carrying parts and accessible parts: cr (mm); cl (mm) .....		N
	(3) Parts becoming live due to breakdown of basic insulation and metal parts: cr (mm); cl (mm) .....		N
	(4) Outer surface of cable where it is clamped and metal parts: cr (mm); cl (mm) .....		N
	(5) Current-carrying parts of switches and metal parts, after removal of insulation: cr (mm); cl (mm) .....		N
	(6) Current-carrying parts and supporting surface: cr (mm); cl (mm) .....		P
20.7	The provisions of section 11 of EN 60598.1 apply except that for Edison screw lampholders and small lampholders of the push-in type, clause 17 of IEC 60238 applies.		N

20.9 (15)	TERMINALS		N
	Separately approved; component list		N
	Part of the luminaire		N

20.10 (5)	EXTERNAL AND INTERNAL WIRING		P
20.10 (5.2)	Supply connection and external wiring		N
20.10 (5.2.1)	Means of connection .....		P
20.10 (5.2.2)	Type of cable .....		P
	Nominal cross-sectional area (mm <sup>2</sup> ) .....		P
20.10 (5.2.3)	Type of attachment, X, Y or Z	Type Y	P
20.10 (5.2.5)	Type Z not connected to screws		N
20.10 (5.2.6)	Cable entries:		N
	- suitable for introduction		N
	- adequate degree of protection		N
20.10 (5.2.7)	Cable entries through rigid material have rounded edges		N



EN 60598-1 & EN 60598-2-20			
Cl.	Requirement – Test	Result	Verdict
20.10 (5.2.8)	Insulating bushings:		N
	- suitably fixed		N
	- material in bushings		N
	- tubes or guards made of insulating material		N
20.10 (5.2.9)	Locking of screwed bushings		N
20.10 (5.2.10)	Cord anchorage:		P
	- covering protected from abrasion		P
	- clear how to be effective		P
	- no mechanical or thermal stress		P
	- no tying of cables into knots etc.		P
	- insulating material or lining		P
20.10 (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
20.10 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment		P
20.10 (5.2.10.3)	Tests:		P
	- impossible to push cable; unsafe		P
	- pull test: 25 times; pull (N).....:		P
	- torque test: torque (Nm) .....		P
	- displacement $\leq$ 2 mm		P
	- no movement of conductors		P
	- no damage of cable or cord		P



EN 60598-1 & EN 60598-2-20			
Cl.	Requirement – Test	Result	Verdict
20.10 (5.2.11)	External wiring passing into luminaire		N
20.10 (5.2.12)	Looping-in terminals		N
20.10 (5.2.13)	Wire ends not tinned		N
	Wire ends tinned: no cold flow		N
20.10 (5.2.14)	Mains plug same protection		N
	Class III luminaire plug		N
20.10 (5.2.16)	Appliance inlets (IEC 60320)		N
	Appliance couplers of class II type		N
20.10 (5.3)	Internal wiring		N
20.10 (5.3.1)	Internal wiring of suitable size and type		N
	Through wiring		N
	- not delivered/ mounting instruction		N
	- factory assembled		N
	- socket outlet loaded (A) .....		N
	- temperatures .....		N
	Green-yellow for earth only		N
20.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		N
	Cross-sectional area (mm <sup>2</sup> ) .....		N
	Insulation thickness		N
	Extra insulation added where necessary		N
20.10 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		N
	Adequate cross-sectional area and insulation thickness		N
20.10 (5.3.1.3)	Double or reinforced insulation for class II		N
20.10 (5.3.1.4)	Conductors without insulation		N
20.10 (5.3.1.5)	SELV current-carrying parts		P





EN 60598-1 & EN 60598-2-20			
Cl.	Requirement – Test	Result	Verdict
20.10 (5.3.1.6)	Insulation thickness other than PVC or rubber		N
20.10 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		N
	Joints, raising/lowering devices		N
	Telescopic tubes etc.		N
	No twisting over 360°		N
20.10 (5.3.3)	Openings		N
	Bushings not removable		N
	Bushings in sharp openings		N
	Cables with protective sheath		N
20.10 (5.3.4)	Joints and junctions effectively insulated		N
20.10 (5.3.5)	Strain on internal wiring		N
20.10 (5.3.6)	Wire carriers		N
20.10 (5.3.7)	Wire ends not tinned		N
	Wire ends tinned: no cold flow		N
20.10.1	Internal and external cables		--
20.10.2	a single-core cable is subjected 50 times to a pull of 30 N.	1mm	P
20.10.3	Plugs of lighting chains shall meet the requirements of IEC 60083.		N
20.10.4	Cables in festoon lighting		N
20.10.4.1	Type of cable		N

20.11 (8)	PROTECTION AGAINST ELECTRIC SHOCK		P
20.11 (8.2.1)	Live parts not accessible		P
	Protection in any position		P
	Double-ended tungsten filament lamp		N
	Insulation lacquer not reliable	No insulation lacquer	P
	Double-ended high pressure discharge lamp		N



EN 60598-1 & EN 60598-2-20			
Cl.	Requirement – Test	Result	Verdict
20.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N
20.11 (8.2.3)	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	No glass	N
	Class I luminaire with BC lampholder		N
20.11 (8.2.4)	Portable luminaire:		N
	- protection independent of supporting surface		N
	- terminal block completely covered		N
20.11 (8.2.6)	Covers reliably secured		P
20.11 (8.2.7)	Discharging of capacitors $\geq 0,5 \mu\text{F}$		N
	Portable plug connected luminaire with capacitor		N
	Other plug connected luminaire with capacitor		N
	Discharge device on or within capacitor		N
	Discharge device mounted separately		N
20.11.1	other than E10 or larger lampholders shall be at least equivalent to that required for lighting chains provided with E10 lampholders.		N
20.11.2	Lighting chains shall not electrify tinsel or other metallic decorations with which they are used.	No metal part	N
20.11.3	Lampholder contact shall be reliably secured in the lampholder body		N

20.12 (12)	ENDURANCE TEST AND THERMAL TEST		P
20.12 (12.3)	Endurance test:		P
	- mounting-position .....	Normal position	—
	- test temperature (°C).....	35°C	—
	- total duration (h) .....	240h	—
	- supply voltage: Un factor; calculated voltage (V) .....	1.1x24V=26.4V	—



EN 60598-1 & EN 60598-2-20			
Cl.	Requirement – Test	Result	Verdict
	- lamp used.....:	LED	—
	Luminaires with an IP classification greater than IP20 shall be subjected to the relevant tests of Clauses 12.4, 12.5 and 12.6 of Section Twelve of Publication 598-1 after the test(s) of Clause 9.2 but before the test(s) of Clause 9.3 of Section Nine of Publication 598-1 specified in Clause 1.13 of this Section of Publication 598-2.	IP20	—
20.12 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N
	- marking legible	Marking still legible and shows no curling	P
	- no cracks, deformation etc.		P
20.12 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
20.12 (12.5)	Thermal test (abnormal operation)	(see Annex 2)	N
20.12 (12.6)	Thermal test (failed lamp control gear condition):		N
20.12 (12.6.1)	- 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
20.12 (12.6.2)	Temperature sensing control		--
	- 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



EN 60598-1 & EN 60598-2-20			
Cl.	Requirement – Test	Result	Verdict
20.12 (12.7)	Thermal test (failed lamp control gear in plastic luminaires):		N
	- case of abnormal conditions .....		—
20.12 (12.7.1)	- measured winding temperature (°C) at 1,1 Un .:		—
	- measured temperature of fixing point/ exposed part (°C) at 1,1 Un .....		N
	- calculated temperature of fixing point/ exposed part (°C) .....		N
20.12 (12.7.2)	Temperature sensing control		--
	- thermal link		N
	- manual reset cut-out		N
	- auto reset cut-out		N
	- measured temperature of fixing point/ exposed part (°C) .....		N
20.12.1	1.05 times the wattage		N
20.12.3	The operation of devices for bridging the lamp filament		N

20.13 (9)	RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE		P
20.13 (9.2)	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP .....		—
	- mounting position during test .....		—
	- fixing screws tightened; torque (Nm) .....		—
	- tests according to clauses .....		—
	- electric strength test afterwards		P
	a) no deposit in dust-proof luminaire		P
	b) no talcum in dust-tight luminaire		N
	c) no trace of water on current-carrying parts or where it could become a hazard		N
	d) i) For luminaires without drain holes – no water entry		N
	d) ii) For luminaires with drain holes – no hazardous water entry		N
	e) no water in watertight luminaire		N
	f) no contact with live parts (IP 2X)		P



EN 60598-1 & EN 60598-2-20			
Cl.	Requirement – Test	Result	Verdict
	f) no entry into enclosure (IP 3X and IP 4X)		N
20.13 (9.3)	Humidity test 48 h	R.H.:93% T:28°C	P
.20.13	positioned at random		P

20.14 (10)	INSULATION RESISTANCE AND ELECTRIC STRENGTH		P
20.14 (10.2.1)	Insulation resistance test		P
	Insulation resistance (MΩ):		P
	SELV:		P
	- between current-carrying parts of different polarity .....	> 4MΩ	P
	- between current-carrying parts and mounting surface .....	> 4MΩ	P
	- between current-carrying parts and metal parts of the luminaire .....		N
	Other than SELV:		N
	- between live parts of different polarity .....		N
	- between live parts and mounting surface .....		N
	- between live parts and enclosure .....		N
	- between live parts of different polarity through action of a switch .....		N
20.14 (10.2.2)	Electric strength test		P
	Dummy lamp		P
	Luminaires with ignitors after 24 h test		P
	Luminaires with manual ignitors		P
	Test voltage (V):		P
	SELV:		P
	- between current-carrying parts of different polarity .....	DC500V	P
	- between current-carrying parts and mounting surface .....	DC500V	P
	- between current-carrying parts and metal parts of the luminaire .....	DC500V	P
	Other than SELV:		N
	- between live parts of different polarity .....		N



EN 60598-1 & EN 60598-2-20			
Cl.	Requirement – Test	Result	Verdict
	- between live parts and mounting surface .....		N
	- between live parts and enclosure .....		N
	- between live parts of different polarity through action of a switch .....		N
20.14 (10.3.1)	Leakage current (mA).....	0.02mA	N

20.15 (13)	RESISTANCE TO HEAT, FIRE AND TRACKING		P
20.15 (13.2.1)	Ball-pressure test:		P
	- part tested; temperature (°C) .....	Plastic enclosure:75°C	P
	- part tested; temperature (°C) .....		N
	For luminaires with an IP classification greater than IP20 the order of the tests specified in Section Nine of Publication EN 60598-1 shall be as specified in Clause 20.12 of this Section of Publication EN 60598-2.		N
20.15 (13.3.2)	Glow wire test (650°C):		P
	- part tested .....	Plastic enclosure	P
	- part tested .....		N
20.15	glow-wire		N
20.15 (13.4.1)	Tracking test: part tested .....		N

ANNEX 1: components					P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity
Power cord	Various	Various	2x0.75mm <sup>2</sup>	--	VDE

ANNEX 2: temperature measurements, thermal tests of Section 12			P
Type reference .....			—
Lamp used.....	LED		—
Lamp control gear used.....	No use		—
Mounting position of luminaire.....	Portable luminaires		—
Supply Voltage (V) .....	DC24V		—
Supply wattage (W) .....	14W		—



EN 60598-1 & EN 60598-2-20						
Cl.	Requirement – Test	Result			Verdict	
	Supply current (A) .....	0.58A			—	
	Calculated power factor.....	--			—	
	Table: measured temperatures corrected for ta = 25 °C:				P	
	- abnormal operating mode .....	--			—	
	- test 1: rated voltage.....				—	
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....	25.44V			—	
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage.....	--			—	
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....	--			—	
	temperature (°C) of part	clause 12.4 – normal			clause 12.5 – abnormal	
		test 1	test 2	test 3	limits	test 4
	Power cord	--	31.5	--	90	--
	Mounting surface	--	34.0	--	90	--
	Ambient	--	25.0	--	--	--
	ANNEX 3: screw terminals (part of the luminaire)					N
(14)	SCREW TERMINALS					--
(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 <sup>2</sup> ).....				N	
(14.3.3)	Conductor space (mm).....				N	
(14.4)	Mechanical tests					--
(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	



EN 60598-1 & EN 60598-2-20			
Cl.	Requirement – Test	Result	Verdict
(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
	ANNEX 4: SCREWLESS TERMINALS (PART OF THE LUMINAIRE)		N
(15)	SCREWLESS TERMINALS		--
(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
(15.5.1)	Terminals internal wiring		N
(15.5.1.1)	Pull test spring-type terminals (4 N, 4 samples)		N
(15.5.1.2)	Pull test pin or tab terminals (4 N, 4 samples)		N
	Insertion force not exceeding 50 N		N
(15.5.2)	Permanent connections: pull-off test (20 N)		N
(15.6)	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 10 <sup>th</sup> alt. 25th cycle (4 samples) .....		N





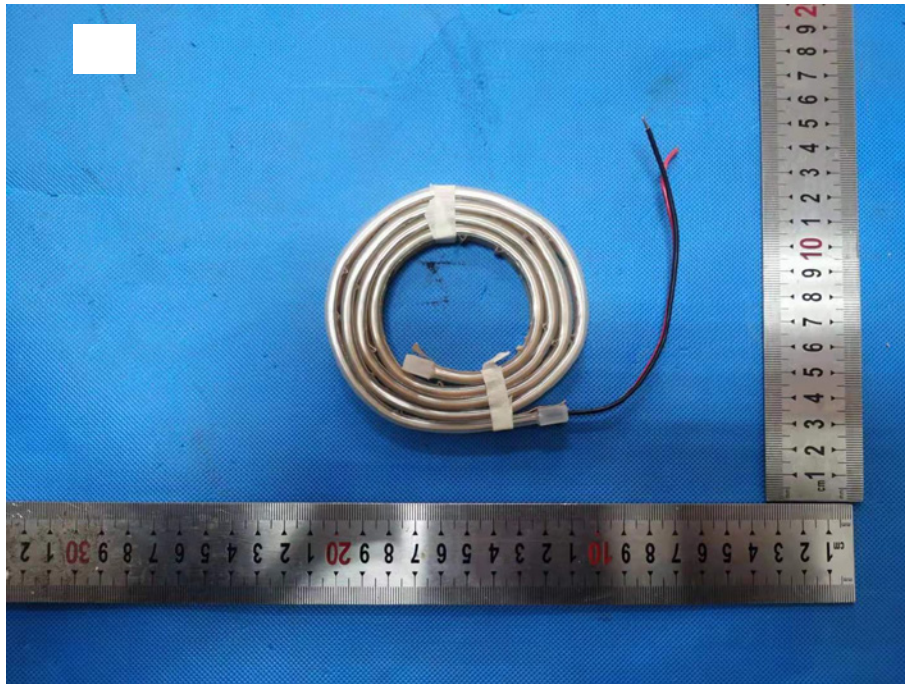
EN 60598-1 & EN 60598-2-20												
Cl.	Requirement – Test										Result	Verdict
	After ageing, voltage drop (mV) after 50 <sup>th</sup> alt. 100th cycle (4 samples) .....											N
(15.7)	Terminals external wiring											N
	Terminal size and rating											N
(15.8.1)	Pull test spring-type terminals (4 samples); pull (N)											N
	Pull test pin or tab terminals (4 samples); pull (N)											N
(15.9)	Contact resistance test											N
	Voltage drop (mV) after 1 h											N
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)												



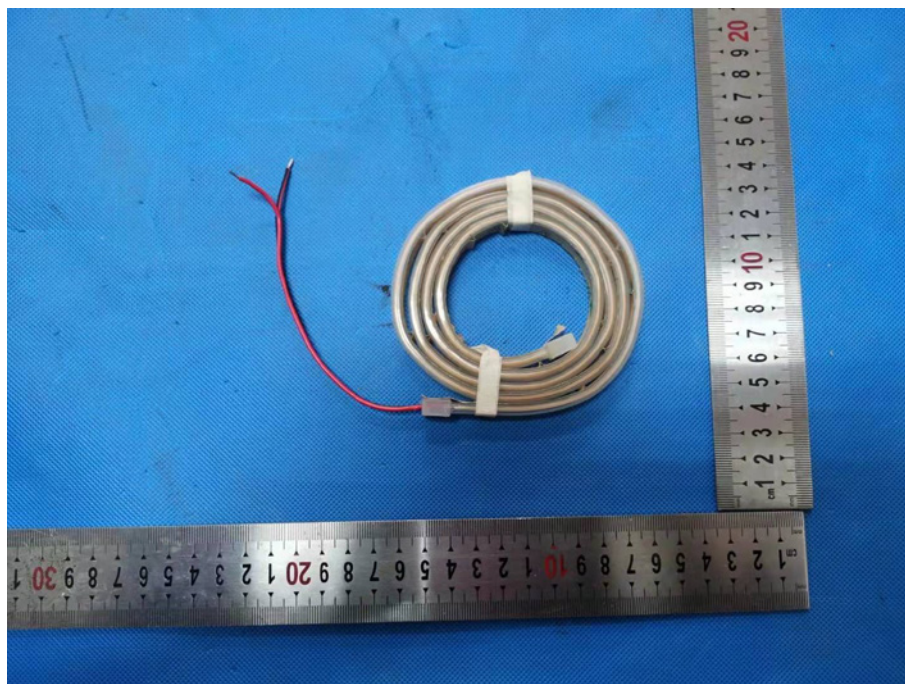
## **ANNEX A**

### **Photo-documentation**

**Photo 1 General Appearance of the EUT**



**Photo 2 General Appearance of the EUT**



**Photo 3 General Appearance of the EUT**



**Photo 4 General Appearance of the EUT**

