



TEST REPORT

EN 60598-2-20

Luminaires

Part 2: Particular requirements

Section 20 – Lighting chains

Report Reference No.....: CTT20160330107S

Tested by (name + signature).....:

File administrators Judy Chan

Judy Chan

Supervised by (name + signature).....:

Test Engineer Andy Liu

Andy Liu

Approved by (name + signature).....:

Manager Tony Wu

Tony Wu

Date of issue.....: April 17, 2017



Testing Laboratory Name.....: **Shenzhen CTT Testing Co., LTD.**

Address.....: 513-515, Xinbaosheng, No.233, Xixiang Street, Bao'an District, Shenzhen, China.

Testing location.....: Same as above

Applicant's name.....: **LEDYI LIGHTING(HK) CO., LIMITED**

Address.....: Yuechang Technology Park, Shiyan Town, Bao'an District, 518108, Shenzhen, China

Test specification:

Standard.....: EN 60598-2-20:2015 used in conjunction with
 EN 60598-1:2015
 EN 62031 :2008+A1 :2013+A2:2015

Test procedure.....: CTT

Non-standard test method.....: N/A

Test Report Form(s) Originator.....: CTT

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Test item description.....: LED Strip

Trade Mark.....: LEDYI

Manufacturer.....: LEDYI LIGHTING(HK) CO., LIMITED
 Yuechang Technology Park, Shiyan Town, Bao'an District, 518108, Shenzhen, China

Model/Type reference.....: LYX1-SX2X3-X4X5-X6(where "X1", "X2", "X5" is any number, "X3", "X4", "X6" is a letter or the combination of a letter and a number)
 "X1" denote LED quantity per meter, can be 18 30, 48, 60, 70, 72, 84, 96, 112, 120, 144, 180, 204, 224, 240, 360, 480
 "S" denote LED strip
 "X2" denote LED type, can be 5050, 3528, 2835, 5630, 3014, 335, 3030, 2016
 "X3" denote LED color, can be WW, W, WWW, R, G, B, RGB,

RGBW

"X4" denote PCB color, can be W, B, Y

"X5" denote voltage, can be 5, 12, 24, 36, 48

"X6" denote waterproof grade, can be IP20, IP65, IP67, IP68

Ratings.....: 24V==, 2.0A, 48W max

Summary of testing:**Testing location:**

Shenzhen CTT Testing Co., LTD.

513-515, Xinbaosheng, No.233, Xixiang Street, Bao'an District, Shenzhen, China..

Tests performed (name of test and test clause):

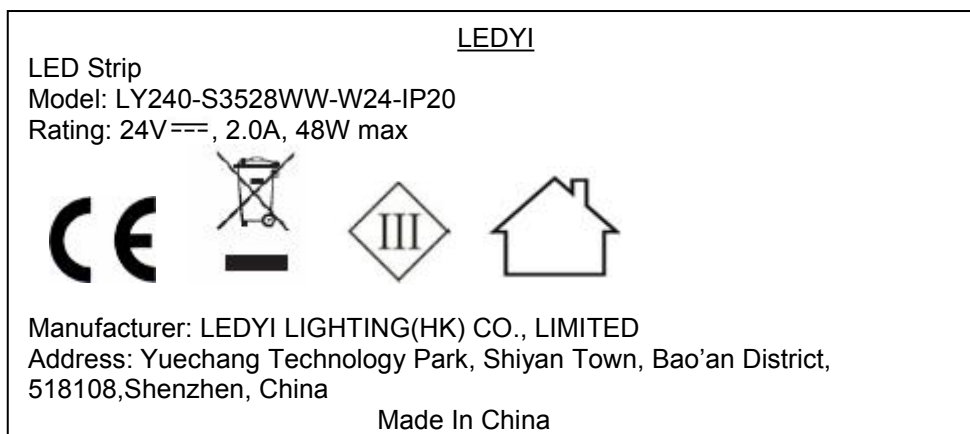
- EN 60598-1:2015
- EN 60598-2-20:2015
- EN 62031 :2008+A1 :2013+A2:2015

The LED was applied to EN 62471: 2008 declared by the client.

The submitted samples were found to comply with the requirements of above test specification.

Summary of compliance with National Differences:

Compliance with the National requirements of CENELEC common modification.

Copy of marking plate

Location: sticking on the enclosure of Flexible LED Strip.

Test item particulars :	
Equipment mobility..... :	Fixed
Supply Connection..... :	DC wire
Protection class..... :	Class III
Ddegree of protection..... :	IP20
Possible test case verdicts:	
- test case does not apply to the test object..... :	N (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..... :	March 30, 2017
Date(s) of performance of tests..... :	March 30, 2017 to April 17, 2017
Attachment No. 1: Test report for EN 62031 :2008+A1 :2013+A2:2015 (for LED module);	
Attachment No. 2: Photo documentation.	
General remarks:	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(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 comma is used as the decimal separator. Clause numbers between brackets refer to clause in EN 60598-1	
General product information:	
This product consists of two parts, one is LED board, the other is a power supply covered by the enclosure. LED driver powered by mains, and Flexible LED Strip powered by output of LED driver, for indoor use only. All models: LYX1-SX2X3-X4X5-X6(where "X1", "X2", "X5" is any number, "X3", "X4", "X6" is a letter or the combination of a letter and a number) "X1" denote LED quantity per meter, can be 18 30, 48, 60, 70, 72, 84, 96, 112, 120,144, 180, 204, 224, 240, 360, 480 "S" denote LED strip "X2" denote LED type, can be 5050, 3528, 2835, 5630, 3014, 335, 3030, 2016 "X3" denote LED color, can be WW, W, WWW, R, G, B, RGB, RGBW "X4" denote PCB color, can be W, B, Y "X5" denote voltage, can be 5, 12, 24, 36, 48 "X6" denote waterproof grade, can be IP20, IP65, IP67, IP68 All tests were conducted on the representative model LY240-S3528WW-W24-IP20	

EN 60598-2-20			
Clause	Requirement	Remark	Result
20.3 (0)	GENERAL TEST REQUIREMENT		—
20.3 (0.1)	Information for luminaire design considered	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
20.3 (0.3)	More sections applicable	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
20.5(2)	CLASSIFICATION		—
20.5(2.2)	Type of protection..... :	Class III	—
20.5(2.3)	Degree of protection..... :	IP20	—
20.5(2.4)	Portable or handheld luminaire	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
	Fixed luminaire suitable for normally flammable surfaces..... :	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	Fixed luminaire suitable for non-combustible materials only	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 checked="" type="checkbox"/>	—
20.6 (3)	MARKING		P
20.6.1 (-)	Warning notice, if not suitable for insulating ceiling		N
20.6 (3.2)	Mandatory markings		P
	Position of the marking		P
	Format of symbols/text		P
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 temperatures		N
20.6 (3.3.4)	Symbol or warning notice		N
20.6 (3.3.5)	Wiring diagram		P
20.6 (3.3.6)	Special conditions		N
20.6 (3.3.7)	Metal halid lamp luminaire – warning		N
20.6 (3.3.8)	Limitation for semi-luminaires		N
20.6 (3.3.9)	Power factor and supply current	2.0A	P
20.6 (3.3.10)	Suitability for use indoor		P

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Clause	Requirement	Remark	Result
20.6 (3.3.11)	Luminaires with remote control		N
20.6 (3.3.12)	Clip-mounted luminaire-warning		N
20.6 (3.3.13)	Specifications of protective shields		N
20.6 (3.3.14)	Symbol for nature of supply	===	P
20.6 (3.3.15)	Rated current of socket outlet		N
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 Y	P
20.6 (3.3.18)	Non-ordinary luminaires with PVC cable		N
20.6 (3.4)	Test with water		P
	Test with hexane		P
	Legible after test		P
	Label attached		P

20.7(4)	CONSTRUCTION		P
20.7(4.2)	Components replaceable without difficulty		N
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
20.7(4.4.5)	Peak pulse voltage		N
20.7(4.4.6)	Centre contact		N
20.7(4.4.7)	Rough service luminaires		N
20.7(4.4.8)	Lamp connectors		N
20.7(4.5)	Starter holders		N
	Starter holders 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		N
20.7(4.7.1)	Contact to metal parts		N
20.7(4.7.2)	Test 8 mm live conductor		N

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Clause	Requirement	Remark	Result
	Test 8 mm earth conductor		N
20.7(4.7.3)	Terminals for supply conductors		N
20.7(4.7.4)	Terminals other than supply connection		N
20.7(4.7.5)	Heat-resistant wiring/sleeves		N
20.7(4.7.6)	Multi-pole plug		N
20.7(4.8)	Switches:		N
	- adequate rating		N
	- adequate fixing		N
	- polarized supply		N
20.7(4.9)	Insulating lining and sleeves		N
20.7(4.9.1)	Retainment		N
	Method of fixing.....:		N
20.7(4.9.2)	Insulated linings and sleeves		N
	a) & c) Insulation resistance and electric strength		N
	b) Ageing test. Temperature (°C)		N
20.7(4.10)	Insulation of Class II luminaires		N
20.7(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
20.7(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
	- unable to be replaced; luminaire inoperative		N
	- sleeves retained in position		N
	- lining in lampholder		N
20.7(4.11)	Electrical connections		N
20.7(4.11.1)	Contact pressure		N
20.7(4.11.2)	Screws:		N
	- self-tapping screws		N
	- thread- cutting screws		N
	- at least two self-tapping screws		N

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Clause	Requirement	Remark	Result
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		N
20.7(4.11.6)	Electro-mechanical contact systems		N
20.7(4.12)	Mechanical connections 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
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 (N)..... :		N
20.7(4.13)	Mechanical strength		P
20.7(4.13.1)	Impact tests:		N
20.7(4.13.1)	- fragile parts; energy (Nm)..... :		N
	- other parts; energy (Nm)..... :		N
	1) live parts		N
	2) linings		N
	3) protection		N
	4) covers		N
20.7(4.13.3)	Straight test finger		P
20.7(4.13.4)	Rough service luminaires		N
	a) fixed		N
	b) hand-held		N
	c) delivered with a stand		N

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Clause	Requirement	Remark	Result
	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 and adjusting devices		N
20.7(4.14.1)	Mechanical load:		N
	A) four times the weight		N
	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
20.7(4.14.2)	Load to flexible cables		N
	Mass (kg).....:		N
	Stress in conductors (N/mm ²).....:		N
	Semi-luminaires - mass (kg).....:		N
	Semi-luminaires - bending moment (Nm).....:		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		P
	- spacing \geq 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
20.7 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		N
	a) construction		N

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Clause	Requirement	Remark	Result
	b) temperature sensing control		N
	c) surface temperature		N
20.7(4.16)	Luminaires marked with F-symbol		P
	No lamp control gear	(compliance with Section 12)	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)	"F" curve measured	(see 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)	Ignitors compatible with ballast		N
20.7(4.20)	Rough service vibration		N
20.7(4.21)	Protective shield:		N
20.7(4.21.1)	Shield fitted		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		N
20.7(4.22)	Attachments to lamps		N
20.7(4.23)	Semi-luminaires comply class II		N
20.7(4.24)	UV radiation, metal halide lamps		N
20.7(4.25)	No sharp point or edges		P
20.7(4.26)	Short-circuit protection:		N

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Clause	Requirement	Remark	Result
20.7(4.26.1)	Uninsulated accessible SELV parts		N
20.7(4.26.2)	Short-circuit test		N
20.7(4.26.3)	Test chain according to IEC 61032		N

20.8 (11)	CREEPAGE DISTANCES AND CLEARANCES		N
	Working voltage (V)..... :	24VDC	—
	Voltage form	Sinusoidal <input type="checkbox"/> Non-sinusoidal <input type="checkbox"/>	—
	PTI	<600 <input type="checkbox"/> ≥600 <input type="checkbox"/>	—
	Rated pulse voltage (kV)..... :	Category II <input checked="" type="checkbox"/> category III <input type="checkbox"/>	—
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm)..... :		N
	(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)..... :		N

20.9(7)	PROVISION FOR EARTHING		N
20.9 (7.2.1 + 7.2.3)	Accessible metal parts		N
	Metal parts in contact with supporting surface		N
	Resistance < 0,5 Ω		N
	Two self-tapping screws used		N
	Thread-forming screws		N
	Connector earthing first		N
20.9 (7.2.2 + 7.2.3)	Earth continuity in joints etc.		N
20.9 (7.2.4)	Locking of clamping means		N
	Compliance with 4.7.3		N
20.9 (7.2.5)	Earth terminal integral part of connector socket		N

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Clause	Requirement	Remark	Result
20.9 (7.2.6)	Earth terminal adjacent to mains terminals		N
20.9 (7.2.7)	Electrolytic corrosion of the earth terminal		N
20.9 (7.20.9)	Material of earth terminal		N
	Contact surface bare metal		N
20.9 (7.2.10)	Class II luminaire for looping-in		N
20.9 (7.2.11)	Earthing core coloured green-yellow		N
	Length of earth conductor		N

20.11 (5)	EXTERNAL AND INTERNAL WIRING		P
20.11 (5.2)	Supply connection and external wiring		P
20.11 (5.2.1)	Means of connection..... :		P
20.11 (5.2.2)	Type of cable..... :		P
	Nominal cross-sectional area (mm ²)..... :	2*0.5mm ²	P
20.11 (5.2.3)	Type of attachment, X, Y or Z	Type Y	P
20.11 (5.2.5)	Type Z not connected to screws		N
20.11 (5.2.6)	Cable entries:		P
	- suitable for introduction		P
	- adequate degree of protection		P
20.11 (5.2.7)	Cable entries through rigid material have rounded edges		P
20.11 (5.2.8)	Insulating bushings:		N
	- suitably fixed		N
	- material in bushings		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:		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

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Clause	Requirement	Remark	Result
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		P
20.11 (5.2.10.3)	Tests:		P
	- impossible to push cable; unsafe		P
	- pull test: 25 times; pull (N).....: 50 time 30N no damage		P
	- torque test: torque (Nm).....:		N
	- displacement ≤ 2 mm		P
	- no movement of conductors		P
	- no damage of cable or cord		P
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		P
20.11 (5.2.14)	Mains plug same protection		N
	Class III luminaire plug		N
20.11 (5.2.15)	Colour code low voltage		P
20.11 (5.2.16)	Appliance inlets (IEC 60320)		N
	Appliance couplers of class II type		N
20.11 (5.3)	Internal wiring		N
20.11 (5.3.1)	Internal wiring of suitable size and type		N
	Through wiring		N
	- not delivered/ mounting instruction		N
	- factory assembled		N

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Clause	Requirement	Remark	Result
	- 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		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
20.11 (5.3.1.3)	Double or reinforced insulation for class II		N
20.11 (5.3.1.4)	Conductors without insulation		N
20.11 (5.3.1.5)	SELV current-carrying parts		N
20.11 (5.3.1.6)	Insulation thickness other than PVC or rubber		N
20.11 (5.3.2)	Sharp edges etc.		N
	No moving parts of switches etc.		N
	Joints, raising/lowering devices		N
	Telescopic tubes etc.		N
	No twisting over 360°		N
20.11 (5.3.3)	Openings		N
	Bushings not removable		N
	Bushings in sharp openings		N
	Cables with protective sheath		N
20.11 (5.3.4)	Joints and junctions effectively insulated		N
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
20.12 (8)	PROTECTION AGAINST ELECTRIC SHOCK		N
20.12 (8.2.1)	Live parts not accessible		N

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Clause	Requirement	Remark	Result
	Protection in any position		N
	Double-ended tungsten filament lamp		N
	Insulation lacquer not reliable		N
	Double-ended high pressure discharge lamp		N
20.12 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N
20.12 (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		N
	Class I luminaire with BC lampholder		N
20.12 (8.2.4)	Portable luminaire:		N
	- protection independent of supporting surface		N
	- terminal block completely covered		N
20.12 (8.2.6)	Covers reliably secured		N
20.12 (8.2.7)	Discharging of capacitors $\geq 0,5 \mu\text{F}$	$<0,5 \mu\text{F}$	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

2.12 (12)	ENDURANCE TEST AND THERMAL TEST		—
20.13 (12.3)	Endurance test:		P
	- mounting-position.....:	As in normal use	—
	- test temperature (°C).....:	35°C	—
	- total duration (h).....:	240	—
	- supply voltage: Un factor; calculated voltage (V).....:	26.4VDC	—
	- lamp used.....:	LED modules delivered by the manufacturer	—
20.13 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N

EN 60598-2-20			
Clause	Requirement	Remark	Result
	- 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)	N
20.13 (12.6)	Thermal test (failed lamp control gear condition):		N
20.13 (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
20.13 (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
	- case of abnormal conditions..... :		—
	- 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
20.13 (12.7.2)	Temperature sensing control		N
	- thermal link		N
	- manual reset cut-out		N
	- auto reset cut-out		N
	- measured temperature of fixing point/ exposed part (°C) :		N
20.14 (9)	RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE		—
20.14 (9.2)	Tests for ingress of dust, solid objects and moisture:		P

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Clause	Requirement	Remark	Result
	- classification according to IP.....:	IP20	—
	- mounting position during test.....:	As in normal use	—
	- fixing screws tightened; torque (Nm).....:		—
	- tests according to clauses.....:	Clause 9.2.0	—
	- electric strength test afterwards		N
	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 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)	IP20	N
	f) no entry into enclosure (IP 3X and IP 4X)		P
20.14 (9.3)	Humidity test 48 h	25°C, 95%R.H.	P

20.15 (10)	INSULATION RESISTANCE AND ELECTRIC STRENGTH		—
20.15 (10.2.1)	Insulation resistance test		P
	Insulation resistance (MΩ):		P
	SELV:		N
	- between current-carrying parts of different polarity.....:		
	- between current-carrying parts and mounting surface.....:		
	- between current-carrying parts and metal parts of the luminaire.....:		
	Other than SELV:		P
	- between live parts of different polarity.....:	500 MΩ (required 2 MΩ)	P
	- between live parts and mounting surface.....:	500 MΩ (required 2 MΩ)	P
	- between live parts and metal parts.....:	500 MΩ (required 2 MΩ)	P
	- between live parts of different polarity through action of a switch.....:		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):		P
	SELV:		N

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Clause	Requirement	Remark	Result
	- between current-carrying parts of different polarity.....:		N
	- between current-carrying parts and mounting surface.....:		N
	- between current-carrying parts and metal parts of the luminaire.....:		N
	Other than SELV:		P
	- between live parts of different polarity.....:	500VAC	P
	- between live parts and mounting surface.....:	500VAC	P
	- between live parts and metal parts.....:	500VAC	P
	- between live parts of different polarity through action of a switch.....:		N
20.15 (10.3.1)	Leakage current (mA).....:		N
20.16 (13)	RESISTANCE TO HEAT, FIRE AND TRACKING		—
20.16 (13.2.1)	Ball-pressure test:		N
	- part tested; temperature (°C).....:		N
	- part tested; temperature (°C).....:		
	- part tested; temperature (°C).....:		N
20.16 (13.3.1)	Needle flame test (10 s):		N
	- part tested.....:		N
	- part tested.....:		N
20.16 (13.3.2)	Glow- wire test (650°C):		N
	- part tested.....:		N
	- part tested.....:		N
20.16 (13.4.1)	Tracking test: part tested.....:		N
	COMMON MODIFICATIONS		—
(3.3.101 + 5.2.1)	For luminaires connected by tails, information about terminal block		N
(5.2.2)	Cables equal to HD 21 S2 or HD 22 S2		N
(5.2.15)	Colour code low voltage		N

EN 60598-2-20			
Clause	Requirement	Remark	Result

ANNEX 1: components					
Component	Manufacturer/ trademark	Type/model	Value / rating	Stan-dard	Approval/ Reference
LED	HUANG TAI	1W	5050 VF:2.8-3.5V	EN 62471	CE
Internal wire	SHENZHEN ZELONGKANG ELECTRIC LTD	15CM	20AWM 80°C 300V	UL	E30488
Heat-shrinkable tube	SHENZHEN WOLIDA TRADING CO LTD	RSFR-H	Ø8mm RSFR-H 600V 125°C	UL	E329530

EN 60598-2-20			
Clause	Requirement	Remark	Result

ANNEX 2: temperature measurements, thermal tests of Section 12			P			
Type reference.....	LY240-S3528WW-W24-IP20		—			
Lamp used.....	LED		—			
Lamp control gear used.....	No use		—			
Mounting position of luminaire.....	As in normal use		—			
Supply wattage (W).....	48.37W		—			
Supply current (A).....	2.0A		—			
Calculated power factor.....	--		—			
Table: measured temperatures corrected for $t_a = 25\text{ }^\circ\text{C}$:						
- abnormal operating mode.....	--		—			
- test 1: rated voltage.....	--		—			
- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....	(2)1.06x24=25.4		—			
- 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.....	--		—			
Through wiring or looping-in wiring loaded by a current of A during the test	--		—			
temperature ($^\circ\text{C}$) of part	Clause 12.4 – normal				Clause 12.5 – abnor-mal	
	test 1	test 2	test 3	limit	test 4	limit
Ambient	--	25.0	--	--	--	--
LED	--	57.9	--	Reference	--	--
Input wire	--	38.5	--	105	--	--

EN 60598-2-20			
Clause	Requirement	Remark	Result

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		
(14.3.2.2)	Special preparation		N
(14.3.2.3)	Terminal size		N
	Cross-sectional area (mm ²).....		N
(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).....	M	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

EN 60598-2-20			
Clause	Requirement	Remark	Result
	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 10 th alt. 25 th cycle (4 samples).....		N
	Voltage drop (mV) after 50 th alt. 100 th cycle (4 samples).....		N
	After ageing, voltage drop (mV) after 10 th alt. 25 th cycle (4 samples).....		N
	After ageing, voltage drop (mV) after 50 th alt. 100 th cycle (4 samples).....		N
(15.7)	Terminals external wiring		N
	Terminal size and rating		N
(15.8.1)	Pull test spring-type terminals or welded connections (4 samples); pull (N)		N
	Pull test pin or tab terminals (4 samples); pull (N)		N

EN 60598-2-20			
Clause	Requirement	Remark	Result

ZB	ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)		—
(3.3)	DK: power supply cord with label		N
	IT: warning label on Class 0 luminaire		N
(4.5.1)	DK: socket- outlets		N
(5.2.1)	CY, DK, FI, SE, GB: type of plug		N

ZC	ANNEX ZC, NATIONAL DEVIATIONS (EN)		—
(4 & 5)	FR: Shuttered socket-outlets 10/16A		N
(13.3)	FR: Glow-wire test 850°C alt. 750°C for luminaires in premises open to public or 960°C for luminaires in emergency exits		N
(13.3)	GB: Requirements according to United Kingdom Building Regulation		N

Attachment No. 1

IEC 62031			
Clause	Requirement	Remark	Result
4	GENERAL REQUIREMENTS		—
4.4	Integral modules treated as part of luminaires defined in clause 0.5 of EN 60598-1	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
4.5	Independent modules complies with requirements in EN 60598-1	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
5	GENERAL TEST REQUIREMENTS		—
5.5	SELV-operated LED modules comply with Annex I of EN 61347-2-13	(see Annex B)	—
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 checked="" type="checkbox"/> No <input type="checkbox"/>	—
	For Integral module; Note to 1.2.1 in EN 60598-1 applies.		—
7	MARKING		N
	Requirements not applicable to the evaluated product.		—
8	SCREW TERMINALS		—
	Compliance with section 14 of EN 60598-1		N
	SCREWLESS TERMINALS		—
	Compliance with section 15 of EN 60598-1		P
	CONNECTORS		—
	Compliance with EN 60838-2-2		N
9	PROVISION FOR PROTECTIVE EARTHING		N
	Requirements not applicable to the evaluated product.		—
8 (10)	PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS		N
	Requirements not applicable to the evaluated product.		—
11	MOISTURE RESISTANCE AND INSULATION		—
	Protection against moisture and insulation in compliance with Clause 11, EN 61347-1		P

Attachment No. 1

IEC 62031			
Clause	Requirement	Remark	Result
12	ELECTRIC STRENGTH		—
	Electric strength in compliance with Clause 12 of EN 61347-1		P
13	FAULT CONDITIONS		—
13.1	In compliance with EN 61347-1 (clause numbers between parentheses refer to EN 61347-1)		P
13.2	Module withstands overpower condition >15 min.		P
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		N
	During the tests, tissue paper, spread below module, does not ignite.		P
15	CONSTRUCTION		—
	Wood, cotton, silk, paper and similar fibrous material not used as insulation		P
16	CREEPAGE DISTANCES AND CLEARANCES		—
	Creepage and distances and clearances in compliance with EN 60598-1		P
17 (17)	SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS		—
	Screws, current-carrying parts and connections in compliance with EN 60598-1		P
18 (18)	RESISTANCE TO HEAT, FIRE AND TRACKING		—
	Resistance to Heat, Fire and Tracking in compliance with EN 61347-1 (clause numbers between parentheses refer to EN 61347-1)		P
19	RESISTANCE TO CORROSION		—
	Resistance to corrosion in compliance with EN 61347-1		N
A	ANNEX A - TESTS		—
	All tests performed in accordance with the advise given in Annex H of EN 61347-1, if applicable		P
B	ANNEX B - SELV-operated LED modules		—
	SLVE-operated LED modules in compliance with Annex I of EN 61347-2-13		N

Attachment No. 2

ANNEX I Photos of Product

Photo documentation

Photo 1 Overall view

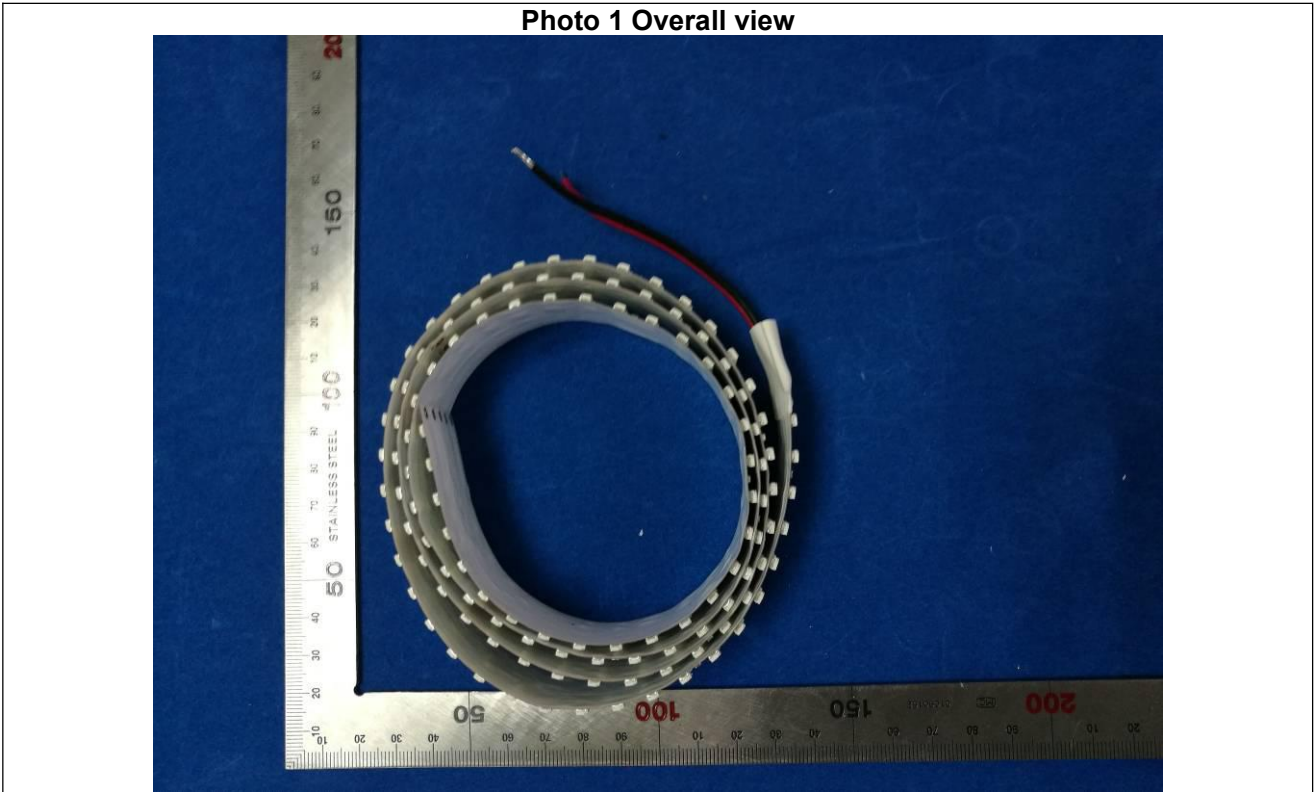
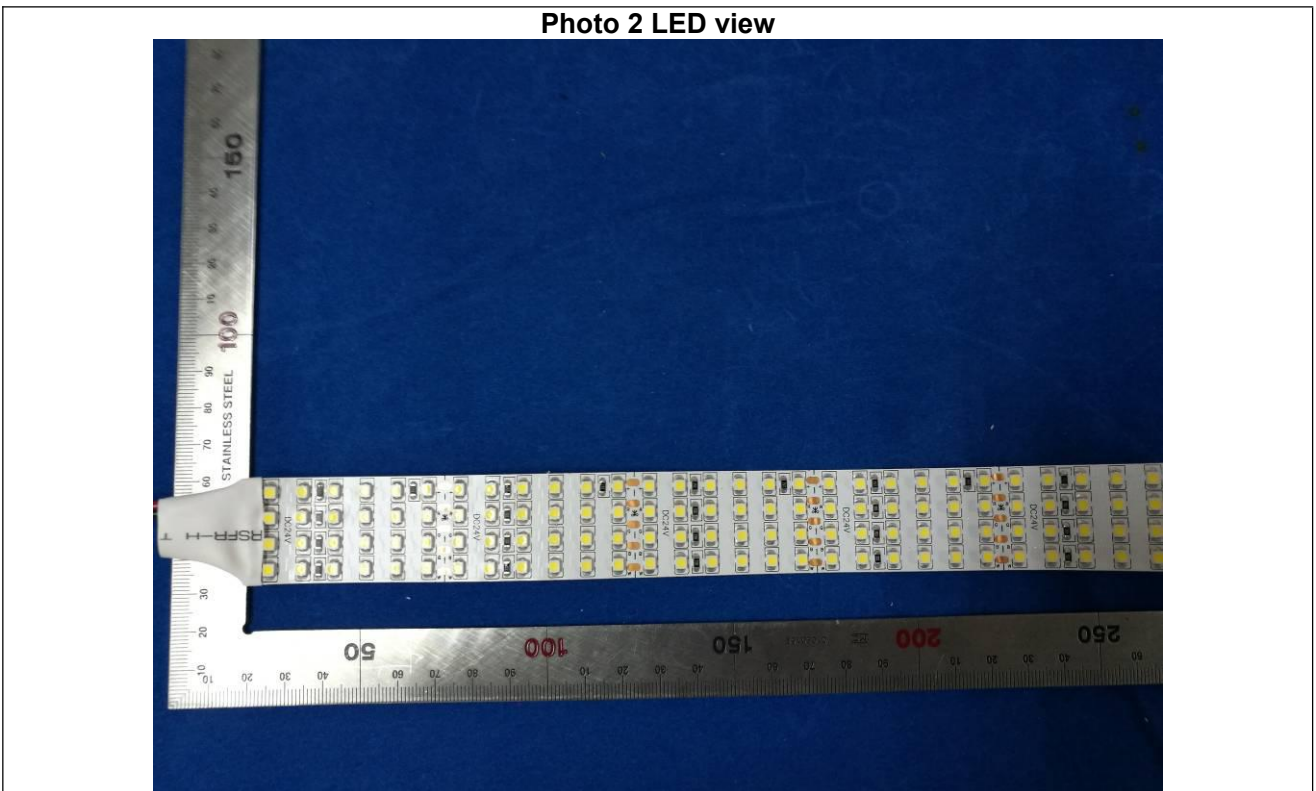


Photo 2 LED view



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