APPLICATION REPORT

On Behalf of

Shenzhen Better Technology Limited

High Voltage SMD LED Strip Light

**Model: YH-HRFAB220S-X (A stand for LED quantity as 15, 30, 44, 60, 72, 90.....
B stand for LED type 2835, 3528, 5050, 5630, 3014, 3030 .....
X stand for color: R, G, B, W, WW, Y, P, O, RGB, RGBW, RGBWW.
It means Red, Green, Blue, White, Warm white, Yellow, Purple,
Orange, RGB, RGBW, RGBWW color.)**

Prepared For	:	**Shenzhen Better Technology Limited** **Floor 4th, Building F, Fusen Technology Park, Hangcheng Road, Gushu, Xixiang, Bao'an, Shenzhen, China**
Prepared By	:	**Shenzhen LCS Compliance Testing Laboratory Ltd.** **1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China**
Date of Test	:	**May 08, 2016 - May 26, 2016**
Date of Report	:	**May 26, 2016**
Report Number	:	**LCS1605252314S**

TEST REPORT
EN 60598-2-20
Luminaires
Part 2-20: Particular requirements – Lighting chains

Report reference No.....:	LCS1605252314S
Tested by(name + signature)..... :	Anther Ruan
Approved by(name +signature).....:	Hart Qiu
Date of issue .....:	May 26, 2016
Contents.....:	38 pages
Testing laboratory	
Name.....:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address.....:	1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China
Testing location .....:	As above
Client	
Name .....:	Shenzhen Better Technology Limited
Address.....:	Floor 4th, Building F, Fusen Technology Park, Hangcheng Road, Gushu, Xixiang, Bao'an, Shenzhen, China
Manufacturer	
Name .....:	Shenzhen Better Technology Limited
Address.....:	Floor 4th, Building F, Fusen Technology Park, Hangcheng Road, Gushu, Xixiang, Bao'an, Shenzhen, China
Test specification	
Standard.....:	EN 60598-1: 2015; EN 60598-2-20: 2015; EN 62471: 2008; EN 62493: 2010; EN 62031: 2008+A1: 2013+A2: 2015
Test procedure .....:	Compliance with EN 60598-1: 2015; EN 60598-2-20: 2015; EN 62471: 2008; EN 62493: 2010; EN 62031: 2008+A1: 2013+A2: 2015
Non-standard test method .....:	N/A
Test item Description.....:	High Voltage SMD LED Strip Light
Trademark .....:	BET
Model and/or type reference.....:	YH-HRFAB220S-X (A stand for LED quantity as 15, 30, 44, 60, 72, 90..... B stand for LED type 2835, 3528, 5050, 5630, 3014, 3030 ..... X stand for color: R, G, B, W, WW, Y, P, O, RGB, RGBW, RGBWW. It means Red, Green, Blue, White, Warm white, Yellow, Purple, Orange, RGB, RGBW, RGBWW color.)
Rating(s).....:	200-240V~, 50/60Hz, Max. 20W, IP67

Test item particulars

Classification of installation and use ……..: Class II

Supply Connection ……: Power plug

Test case verdicts

Test case does not apply to the test object .: N(N/A)

Test item does meet the requirement .....: P(Pass)

Test item does not meet the requirement ... : F(Fail)

Testing

Date of receipt of test item.....: May 08, 2016

Date(s) of performance of test.....: May 08, 2016 - May 26, 2016

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 tested.

Clause numbers between brackets refer to clauses in EN 60598-1.

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

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

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

Modified Information

Version	Report No.	Revision Data	Summary
V1.0	LCS1605252314S	/	Original Version

General product information:

1. The maximum ambient temperature is +25 ℃.

2. Models are similar except their models name, power and product length. All tests are conducted on model YH-HRF305050220S-W.

3. The report include: Attachment No. 1: Report of EN 62301.

Attachment No. 2: Report of EN 61347.

Attachment No. 3: 2 pages of product photos.

Copy of marking plate

All Labels are similar except model name, rating .

Marking testing

Rubbing for 15 s with a piece of cloth soaked with water. And a further 15 s with a piece of cloth soaked with petroleum.

EN 60598-2-20			
Clause	Requirement - Test	Result - Remark	Verdict
20.2 (0)	**General test requirements**		**P**
20.2 (0.1)	Information for luminaires design considered	Yes [√] No [ ]	P
20.2 (0.3)	More sections applicable		P
20.5 (2)	**Classification of luminaires**		**P**
20.5(2.2)	Type of protection .....:	Class II	P
20.5 (2.3)	Degree of protection .....:	IP67	P
20.5 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces ……..:	Yes	P
	Luminaire not suitable for direct mounting on normally flammable surfaces ……:		N
20.5 (2.5)	Luminaire for normal use .....:	Yes	P
	Luminaire for rough service .....:		N
20.5.1 (--)	According to the type of protection against electric shock, lighting chains shall be classified as Class II or Class III.	Class II	P
20.5.2 (--)	Chain for outdoor use shall be Rain-proof, splashproof, jet-proof or watertight	IP67	P
20.6 (3)	**MARKING**		**P**
20.6 (3.2)	Markings on luminaires	See marking label	P
	a)Marking to be observed when replacing lamps or other replaceable components		N
	b)Marking to be observed during installation	The height of symbols more than 5mm, text more than 2mm	P
	c)Marking to be observed after installation		N
	Format of symbols/text	Height of symbols more than 5mm, except for symbols for class II and class III minimum of 3 mm, and symbols of not suitable for direct mounting on normally flammable surfaces minimum 25mm; text more than 2mm	P
20.6 (3.3)	Additional information		P
	Language of instructions	English	P
20.6 (3.3.1)	Combination luminaires	No combination luminaire	N
20.6 (3.3.2)	Nominal frequency in Hz	50/60Hz	P
20.6 (3.3.3)	Operating temperature		P

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Clause	Requirement - Test	Result - Remark	Verdict
20.6 (3.3.4)	Symbol or warning notice		P
20.6 (3.3.5)	Wiring diagram		N
20.6 (3.3.6)	Special conditions	No such 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		N
20.6 (3.3.10)	Suitability for use indoors	IP67	N
20.6 (3.3.11)	Luminaires with remote control		P
20.6 (3.3.12)	Clip-mounted luminaire - warning	Not clip-mounted luminaie	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	No socket outlet	N
20.6 (3.3.16)	Rough service luminaire	Normal 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 (3.3.19)	Protective conductor current in instruction if applicable		N
20.6 (3.3.20)	Provided with information if not intended to be mounted within arms reach		N
20.6 (3.4)	Test with water	15s	P
	Test with hexane	15s	P
	Legible after test	Yes	P
	Label attached	Yes	P
20.6.1(--)	The following information shall be marked on the lighting chains.		P
	a) Lighting chains shall be marked with the type reference or the electrical data of the lamps and with the rated voltage of the complete chain. Where it is impractical to mark this information on the lighting chain, the information shall be marked on a durable non-removable sleeve or label fitted to the cable.	See the label	P
	b) Lighting chains shall be accompanied by the substance of the following warnings:		P
	1) do not remove or insert lamps while the chain is connected to the supply;	See the instruction	P

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Clause	Requirement - Test	Result - Remark	Verdict
	2) for series-connected lamps, replace failed lamps immediately by lamps of the same rated voltage and wattage to prevent overheating; this requirement does not apply to sealed chains;	Sealed chains	N
	3) do not connect the chain to the supply while it is in the packing unless the packing has been adapted for display purposes;		P
	4) for series-connected lamps where fused lamps are used to ensure compliance with 20.13.3 hereafter, do not replace a fused lamp with a non-fused lamp [see item e)].		N
	5) ensure all lampholders are fitted with a lamp.	No lampholders	N
	c) Ordinary lighting chains shall additionally be accompanied by the substance of the following information: "FOR INDOOR USE ONLY" Lighting chains which rely on gaskets to provide the specified degree of protection against dust and moisture shall additionally be accompanied by the substance of the following information: "WARNING – THIS LIGHTING CHAIN MUST NOT BE USED WITHOUT ALL GASKETS BEING IN PLACE"		N
	d) Lighting chains not intended for interconnection shall in addition be accompanied by the substance of the following warning: "Do not connect this chain electrically to another chain."		P
	e) Lighting chains fitted with fused lamps to ensure compliance with 20.13.3 shall be accompanied by information indicating the means for identification of fused lamps (see 20.6.3).		N
	f) Lighting chains with non-standardised lamps shall be accompanied by information indicating that replacement lamps must be of the same type as delivered or of a type specified by the manufacturer (see 20.6.2).	Sealed chains	N
	g) Lighting chains provided with non-replaceable lamps shall be accompanied by the information that the lamps are not replaceable.		P
	The information required under items b),3), f) and g) shall be indicated on the packing.		P
20.6.2(--)	The following information shall be marked on the lampholder or on the cable, or on a durable non-removable sleeve or label		P

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Clause	Requirement - Test	Result - Remark	Verdict
	fitted to the cable.		
	a) Mark of origin (this may take the form of a trade mark, the manufacturer's identification mark or the name of the responsible vendor).	See the label	P
	b) Symbol for class II or class III, if applicable.	See the label	P
	c) Marking for degree of protection against dust and moisture, if applicable, or warning that the chain is for indoor use only.	See the label	P
	d) Rated voltage of class III chains.		N
	e) Voltage and wattage of replacement lamps.		P
	f) Use only replacement lamps of the same kind provided with this lighting chain.		P
20.6.3(--)	Fused lamps used to ensure compliance with 20.13.3 shall have a suitable means of identification, such as a special colour.	No such lamp	N
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	Ditto	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)……..:		N
	After test the lampholder comply with relevant standard sheets and show no damage		N
	After test on singal-capped lampholder the lampholder have not moved form its position and show no permanent deformation		N
	- bending test (N)……:		N
	After test the lamholder have not moved from its position and show no permanent deformation		N
20.7 (4.4.5)	Peak pulse voltage	No ignitors	N

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Clause	Requirement - Test	Result - Remark	Verdict
20.7 (4.4.6)	Centre contact	No ignitors	N
20.7 (4.4.7)	Parts in rough service luminaires resistant to tracking	Not for rough service	N
20.7 (4.4.8)	Lamp connectors		N
20.7 (4.4.9)	Caps and bases correctly used	No caps and bases	N
20.7 (4.5)	Starter holders	No starter holders	N
	Starter holder in luminaries other than Class II		N
	Starter holder Class II construction		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)	Location stranded wires		N
	8 mm test live conductor		N
	8 mm test earth conductor		N
20.7 (4.7.3)	Terminals for supply conductors		N
20.7 (4.7.3.1)	Welded connections		N
	- stranded or solider conductor		N
	- spot welding		N
	- welding between wires		N
	- type Z attachment		N
	- mechanical test according to 15.8.2		N
	- electrical test according to 15.9		N
	- hest test according to 15.9.2.3 and 15.9.2.4		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
	- test at 30 N		N
	The method of connection of wiring, external or internal, to components of chains shall give reliable electrical contact over the service life of the component.		
20.7 (4.8)	Switches:		N
	- adequate rating		N
	- adequate fixing		N
	- polarized supply		N

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Clause	Requirement - Test	Result - Remark	Verdict
	- Compliance with 61058-1 for electronic switches		N
20.7 (4.9)	Insulating lining and sleeves	No 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
	Resistant to temperature >20℃ to the wire temperature or		N
	a) & c) Insulation resistance and electric strength		N
	b) Ageing test. Temperature (℃)..... :		N
20.7 (4.10)	Insulation of Class II luminaires		P
20.7 (4.10.1)	No contact, mounting surface - accessible metal parts - wiring of basic insulation		N
	Safe installation fixed luminaires		N
	Capacitors and switches		N
	Interference suppression capacitors according to IEC 60384-14		N
20.7 (4.10.2)	Assembly gaps:	Comply with requirements	N
	- not coincidental	No such gaps	N
	- no straight access with test probe		N
20.7 (4.10.3)	Retainment of insulation:		P
	- fixed		P
	- unable to be replaced; luminaire inoperative		P
	- sleeves retained in position		N
	- lining in lampholder		N
20.7 (4.11)	Electrical connections		P
20.7 (4.11.4)	Material of current-carrying parts	> 50% copper	P
20.7 (4.11.5)	No contact to wood or mounting surface	No wood	P
20.7 (4.12)	Mechanical connections and glands		P
20.7 (4.12.1)	Screw not made of soft metal	No screw	N
	Screws of insulating material		N
	Torque test: torque (Nm); part ……..		N
	Torque test: torque (Nm); part ……..		N

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Clause	Requirement - Test	Result - Remark	Verdict
	Torque test: torque (Nm); part ……..		N
20.7 (4.12.2)	Screw with diameter < 3 mm screw into metal		N
20.7 (4.12.4)	Locked connections:		N
	- fixed arms; torque (Nm) .....:	No fixed arms	N
	- lampholder; torque (Nm) ..... :	No lampholder	N
	- push-button switches; torque (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:		P
	- fragile parts; energy (Nm) .....:	No fragile parts	N
	- other parts; energy (Nm) ..... :	0.35Nm for enclosure	P
	1) live parts		N
	2) linings		N
	3) protection		N
	4) covers	No such covers	N
20.7 (4.13.2)	Metal parts enclosing live parts shall have adequate mechanical strength		N
20.7 (4.13.3)	Straight test finger	30N	N
20.7 (4.13.4)	Rough service luminaires	Normal service luminaires	N
	IP 54 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 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; force (N) .....:		N
	D) load track-mounted luminaires		N
	E) clip-mounted luminaires, glass-shelve; thickness (mm) ..... :		N

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Clause	Requirement - Test	Result - Remark	Verdict
	metal rod; diameter (mm) ..... :		N
20.7 (4.14.2)	Load to flexible cables:		N
	mass (kg) .....:		N
	stress in conductors (N/mm²) ..... :		N
	Mass (kg) of semi-luminaires ..... :		N
	Bending moment (Nm) of semi-luminaires :		N
20.7 (4.14.3)	Adjusting devices:	No 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	No such tubes	N
20.7 (4.14.5)	Guide pulleys	No such construction	N
20.7 (4.14.6)	Strain on socket-outlets	Not such unit	N
20.7 (4.15)	Flammable materials:	No such material	P
	- glow-wire test 650℃		P
	- spacing ≥ 30 mm		P
	- screen withstanding test of 13.3.1		N
	- screen dimensions		N
	- no fiercely burning material		P
	- thermal protection		N
	- electronic circuits exempted		N
20.7 (4.15.2)	Luminaires made of thermoplastic material		N
	a) construction		N
	b) temperature sensing control		N
	c) surface temperature		N
20.7 (4.16)	Luminaires for mounting on normally flammable surfaces		P
	No lamp control gear		N
20.7 (4.16.1)	Lamp control gear shall spacing:		N
	- spacing 10 mm		N
	- spacing 35 mm		N
20.7 (4.16.2)	Thermal protection:	No such component	N
	- in lamp control gear		N

EN 60598-2-20			
Clause	Requirement - Test	Result - Remark	Verdict
	- external		N
	- fixed position		N
	- temperature marked lamp control gear		N
20.7 (4.16.3)	Design to satisfy the test of 12.6		N
20.7 (4.17)	Drain holes	No drain holes	N
	Clearance at least 5 mm		N
20.7 (4.18)	Resistance to corrosion:		P
20.7 (4.18.1)	- rust- resistance		P
20.7 (4.18.2)	- season cracking in copper		N
20.7 (4.18.3)	- corrosion of aluminium	No aluminium used	N
20.7 (4.19)	Ignitors compatible with ballast		N
20.7 (4.20)	Rough service vibration ..... :	No such appliance	N
20.7 (4.21)	Protective shield		N
20.7 (4.21.1)	Shield fitted		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		N
20.7 (4.22)	Attachments to lamps	No such attachments	N
20.7 (4.23)	Semi-luminaires comply with Class II	No such appliance	N
20.7 (4.24)	Photobiological hazards	No such appliance	N
20.7 (4.24.1)	No excessive UV radiation if tungsten halogen lamps and metal halide lamps		N
20.7 (4.24.2)	Retinal blue light hazard		N
	Luminaires with Ethr:		N
	a)Fixed luminaires	RG1	N
	-distance x m, borderline between RG1 and RG2		N
	-marking and instruction according 3.2.23		N
	b)Protable and handheld luminaires		N
	-marking according 3.2.23 if RG1 exceeded at 200mm according to IEC/TR 62778		N
	Protable luminaires for children IEC 60598-2-20 and Mains socket outlet nightlights		N

EN 60598-2-20			
Clause	Requirement - Test	Result - Remark	Verdict
	IEC 60598-2-12 not exceed RG1 at 200mm according to IEC/TR 62778		
20.7 (4.25)	No sharp point edges	No sharp points or edges	P
20.7 (4.26)	Short-circuit protection		N
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 figure 29		N
20.7 (4.27)	Terminal blocks with integrated screwless earthing contacts		N
	Test according Annex V		N
	Pull test of terminal fixing (20N)		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 controls		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)		N
	100 cycles between t min and t max		N
	Temperature sensing control still in position		N
20.7 (4.29)	Luminaire with non replaceable light source		N
	Not possible to replace light source		N
	Live part not accessible after parts have been opened by hand or tools		N
20.7 (4.30)	Luminaires with non-user replaceable light sources		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		N
	Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3		N

EN 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 circuits		N
	Used SELV source		N
	Voltage ≤ ELV		N
	Insulating of SELV circuits from LV supply		N
	nsulating of SELV circuits from other non SELV circuits		N
	Insulating of SELV circuits from FELV		N
	Insulating of SELV circuits from other SELV circuits		N
	SELV 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
	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
	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

EN 60598-2-20			
Clause	Requirement - Test	Result - Remark	Verdict
	- test according 7.2.3 of above		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		N
	Comply with IEC 61643-11		N
	External to control gear and connected to earth:		N
	- only in fixed luminaires		N
	- only connected to protective earth		N
20.7.1(--)	Edison screw lampholders E10, E14 and E27 shall meet the requirements of IEC 60238.		N
	Bayonet lampholders shall meet the requirements of IEC 61184.		N
	In lighting chains where non-standardised lamps (e.g. lamps of the push-in type) are used, the lamps are regarded as parts of the lighting chain and tested accordingly.		N
	E5 and similar small lampholders of the push-in type shall meet the requirements of the appropriate clauses of IEC 60238.		N
	In lighting chains fitted with parallel-connected lamps, E27 and B22 lampholders with insulation piercing contacts shall meet the requirements listed in this part of IEC 60598.		N
20.7.5(--)	Gaskets used to provide the specified degree of protection against dust and moisture of lighting chains for outdoor use shall be weather resistant. Such gaskets shall remain in place on the chain when the lamp is removed and shall fit tightly round the inserted lamp.	Sealed chains	N
20.7.6(--)	Compliance with the mechanical strength requirements of Clause 4.13 of section 4 of EN 60598-1 for Edison screw lampholders, and small lampholders of the push-in type shall be checked by the tests given in		N

EN 60598-2-20			
Clause	Requirement - Test	Result - Remark	Verdict
	Clause 15 of IEC 60238.		
	The tests are made on three samples of the lampholder without the lamp inserted. After the test, the relevant compliance requirements of Clause 4.13 of section 4 of EN 60598-1 shall be met.		N
20.7.7(--)	E5 and E10 lampholders and similar small lampholders of the push-in type shall be used only if the rated voltage of each lamp does not exceed: - for E5 and similar small lampholders 25 V; - – for series connected E10 and similar small lampholders 60 V; - – for parallel connected E10 lampholders 250 V.		N
20.7.8(--)	For lighting chains fitted with series-connected lamps, resistors, if any, for bridging the lamp filaments shall be contained within the lamps. The protection against electric shock and fire shall not be impaired when these resistors are functioning.	No such construction	N
20.7.9(--)	Flasher units forming an integral part of the lighting chain, shall be enclosed in non-flammable insulating material; they shall be securely fixed to the cable of the chain.		P
20.7.11(--)	Lampholders for replaceable push-in lamps shall have a body of insulating material.		N
20.7.12(--)	The lamp (bulb) glass of push-in lamps shall not rotate in relation to the lamp cap and the lamp cap shall not rotate in relation to the lampholder.		N
20.7.13(--)	Replaceable push-in type lamps shall remain in the seated position when the lamp is subjected to a pull force of up to 3 N. Replaceable push-in type lamps shall make electrical contact with the lampholder contacts by applying a push-in force of between 3 N and 10 N (under consideration). Withdrawal of the lamp from the holder shall be effected when subjected to a pull force of between 3 N and 10 N (under consideration).		N
	Non-replaceable lamps shall withstand a pull force of 10 N ± 1 N during which the		N

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Clause	Requirement - Test	Result - Remark	Verdict
	lamp shall remain seated and shall not have become unsafe.		
	During each application of the specified forces, no damage shall occur impairing safety and in particular no breakage or separation of the lamp glass envelope from the lamp cap shall take place.		N
	The sample is then placed in an oven at a temperature of 120 °C ± 5 °C for 2 h (under consideration) following which it is allowed to cool down to room temperature.		N
	The sample is then re-submitted to the same tests, requirements and compliance criteria as those specified for the sample before the heating treatment.		N
20.7.14(--)	Sealed lighting chains shall have adequate mechanical strength.		P
	For rigid sealed lighting chains		N
	For flexible sealed lighting chains,	After the test, the pipe does not damage affecting the safety of the chain and comply with the electric strength test of Clause 20.15 applied between live parts and the body.	P
20.7.15(--)	The lamp bulbs in lighting chains shall meet the mechanical requirements of Subclause 4.13.1 of EN 60598-1 using an impact energy of 0,2 Nm when: a) the lamps are non-removable; or b) the lamps are non-standardized and parallel connected.	LED lamp	P
20.7.16(--)	Any electronic control device (e.g. flasher units) shall, in addition to the requirements of this standard, comply with the requirements of IEC 61347-2-11.		P

20.8 (11)	**CREEPAGE DISTANCES AND CLEARANCES**		**P**
	Working voltage (V) .....:	200-240V~	P
	Voltage form	Sinusoidal [√] Non-sinusoidal [ ]	P
	PTI	< 600 [√] ≥ 600 [ ]	P
	Impusle withstand category (normal	Category II	P

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Clause	Requirement - Test	Result - Remark	Verdict
	category II) (category III annex U)		
	Rated pulse voltage (kV) ..... :	<2.0KV	P
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm) .....:	Cr>3.2mm, limit:2.5mm Cl>3.0mm, limit:1.5mm	P
	(2) Current-carrying parts and accessible parts: cr (mm); cl (mm) ..... :	Cr>6.2mm, limit:5.0mm Cl>6.2mm, limit:3.0mm	P
	(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 clamp and metal parts: cr (mm); cl (mm) .....:		N
	(5)not used		N
	(6) Current-carrying parts and supporting surface: cr (mm); cl (mm) ..... :	Cr>6.2mm, limit:5.0mm Cl>6.2mm, limit:3.0mm	P
	- for Edison screw lampholders E10, E14 and E27, Clause 17 of EN 60238:2004 applies		N
	- for Edison screw lampholders E5 and similar small lampholders of push-in type		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
	Self-tapping screws used		N
	Thread-forming screws		N
	Thread-forming screws used in a grove		N
	Earth marks contact 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
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N
20.9 (7.2.5)	Earth terminal integral part of Connector socket		N
20.9 (7.2.6)	Earth terminal adjacent to mains terminals		N

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Clause	Requirement - Test	Result - Remark	Verdict
20.9 (7.2.7)	Electrolytic corrosion of the earth terminal		N
20.9 (7.2.8)	Material of earth terminal		N
	Contact surface bare metal		N
20.9 (7.2.10)	Class II luminaire for looping-in		N
	Double or reinforced insulation to functional earth		N
20.9 (7.2.11)	Earthing core coloured green-yellow		N
	Length of earth conductor		N
20.10 (14)	**SCREW TERMINALS**		**N**
	Separately approved: component list	No such terminal	N
	Part of the luminaire		N
20.10 (15)	**SCREWLESS TERMINALS and electrical connections**		**N**
	Separately approved: component list	No such terminal	N
	Part of the luminaire		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.....:	Power plug	P
20.11 (5.2.2)	Internal and external cables of lighting chains shall not be lighter than the following (see Table 1):		P
	The nominal cross-sectional area of the conductors shall not be less than the following values:		N
	a) 0,5 mm2 for class II lighting chains with E5 or E10 lampholders or other small lampholders;		N
	b) 0,75 mm2 for class II lighting chains with E14, E27, B15 or B22 lampholders and fitted with series connected lamps;		P
	c) 1,5 mm2 for class II lighting chains with E14, E27, B15 or B22 lampholders and fitted with parallel connected lamps;		N
	d) 0,5 mm2 for class III chains and parts of chains supplied by SELV and with a maximum rated wattage exceeding 50 W;		N
	e) 0,4 mm2 for class III chains and parts of chains supplied by SELV and with a maximum rated wattage not exceeding 50		N

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Clause	Requirement - Test	Result - Remark	Verdict
	W;		
	f) 1 mm2 for the cable between the plug and a sealed chain without joints;		P
	g) 1,5 mm2 for the cable between the plug and a sealed chain with joints.		N
20.11 (5.2.3)	Type of attachment, X ,Y or Z		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	No rigid material	N
20.11 (5.2.8)	Insulating bushings:	No such parts	N
	- suitably fixed		N
	- material in bushings		N
	- material not likely to deteriorate		N
	- tubes or guard made of insulating material		N
20.11 (5.2.9)	Locking of screw bushings	No such component	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 cord	type Y 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 anchorage		N

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Clause	Requirement - Test	Result - Remark	Verdict
20.11 (5.2.10.2)	Adequate cord anchorages for type Y and type Z attachments	Not such construction	P
20.11 (5.2.10.3)	Tests:		P
	- impossible to push cable; unsafe		P
	- pull test: 25 times; pull (N)	60N	P
	- torque test: torque (Nm)	0.15Nm	P
	- displacement ≤ 2 mm	0.08mm	P
	- no movement of conductors		P
	- no damage of cable or cord		P
20.11 (5.2.11)	External wiring passing into luminaire		P
20.11 (5.2.12)	Looping-in terminals	Not looping-in appliance	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		P
	Class III luminaire plug		N
20.11 (5.2.16)	Appliance inlets (IEC 60320)	No appliance inlet	N
	Appliance couplers of class II type		N
20.11 (5.2.17)	No standardized in interconnecting cables assembled		N
20.11 (5.2.18)	Used plug in accordance with		P
	- IEC 60083		P
	- 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		P
	- not delivered/ mounting instruction		N
	- factory assembled		N
	- socket outlet loaded (A).....:		N
	- temperatures..... :		N
	Green-yellow for earth only		N
20.11 (5.3.1.1)	Internal wiring connected directly to fixed wiring		P
	Cross-Sectional area (mm^2)	>0.5mm^2	P
	Insulation thickness	>0.6mm	P

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Clause	Requirement - Test	Result - Remark	Verdict
	Extra insulation added where necessary		N
20.11 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limited device		N
	Adequate cross-section area and insulation thickness		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		N
20.11 (5.3.1.6)	Insulation thickness other than PVC or rubber		N
20.11 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		P
	Joints, raising/lowering devices		P
	Telescopic tubes etc.		P
	No twisting over 360^0		P
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
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
20.11.1(--)	Type of cable……..…:		N
	- for ordinary lighting chains using series-connected lampholders	H03VH7-H	N
	- for Class II ordinary lighting chains using parallel-connected lampholders	H03VV-F or H03VVH2-F	N
	- for Class III lighting chains using parallel-connected lampholders and with a maximum rated wattage exceeding 50 W	H03VVH2-F	N
	- for other lighting chains using series-connected lampholders	H03RN-F	P
	- for other lighting chains using parallel-connected lampholders	H05RNH2-F or H05RN-F	N
	- for other lighting chains where the length of cable between the supply plug and the nearest lampholder exceeds 3 m for that	H07RN-F	N

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Clause	Requirement - Test	Result - Remark	Verdict
	part of the cable		
	a) 0,5 mm² for lighting chains with E5 or E10 lampholders or similar small lampholders of push-in type;		N
	b) 0,75 mm² for lighting chains with E14, E27, B15 or B22 lampholders and fitted with series-connected lamps;		P
	c) 1,5 mm² for lighting chains with E14, E27, B15 or B22 lampholders and fitted with parallel connected lamps		N
20.11.2(--)	For lighting chains incorporating a single-core cable, the test described in 5.2.10.3 of section 5 of EN 60598-1 is made in the following way. The cable is subjected 50 times to a pull of 30 N. The torque test is not made.		N
20.11.3(--)	lugs of lighting chains shall meet the requirements of IEC 60083.		N
	Splash-proof plug or permanent connection if for outdoor use		N
	Length of the cable between the plug and first lampholder not less than 1,5 m		N
20.12 (8)	**PROTECTION AGAINST ELECTRIC SHOCK**		P
20.12 (8.2.1)	Live parts not accessible with standard test finger	Class II	P
	Basic insulated parts not used on the outer surface without appropriate protection		P
	Basic insulated parts not accessible with standard test finger on portable and adjustable luminaires		N
	Basic insulated parts not accessible with ø50mm probe from outside, within arms reach, on wall-mounted luminaires		P
	Lamp and startholders in portable and adjustable luminaires comply with double or reinforced insulation requirements	No such parts	N
	Basic insulation only accessible under lamp or starter replacement		N
	Double-ended tungsten filament lamp		N
	Insulation lacquer not reliable		P
	Double-ended high pressure discharge lamp		N
	Relevant warming according to 3.2.18 fitted to the luminaire		P

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Clause	Requirement - Test	Result - Remark	Verdict
20.12 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N
20.12 (8.2.3 a)	Class II luminaire:		P
	- basic insulated metal parts not accessible during starter or lamp replacement		P
	- basic insulated not accessible other than during starter or lamp replacement		N
	- glass protective shields not used as supplementary insulation		N
20.12 (8.2.3b)	BC lampholder of metal in class I luminaires shall be earthed		N
20.12 (8.2.3c)	Class III luminaires with expose SELV parts:		N
	Ordinary luminaire :		N
	- touch current		N
	- no-load voltage		N
	- other than ordinary luminaire:		N
	- nominal voltage		N
20.12 (8.2.4)	Portable luminaire:		N
	- protection independent of supporting surface		N
	- terminal block completely covered		N
20.12 (8.2.5)	Compliance with the standard test finger or relevant probe		P
20.12 (8.2.6)	Covers reliably secured	Cover not removable without tool	P
20.12 (8.2.7)	Discharging of capacitors >0,5 µF		N
	Portable plug connected luminaire with capacitor		N
	Discharge device on or within capacitor		N
	Discharge device mounted separately		N
20.12.1(--)	For lighting chains with means for retaining lamps other than E10 or larger lampholders, the protection against electric shock shall be at least equivalent to that required for lighting chains provided with E10 lampholders.	No lampholders	N
	If the plug of a lighting chain incorporates a means for disconnecting one end of the chain to facilitate installation, the connector		P

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Clause	Requirement - Test	Result - Remark	Verdict
	fitted at the end of the cable shall have an entry such that the diameter of the opening and the distance from the front to live parts are equal to the corresponding dimensions specified in Figure 1. The two parts of the connector shall not separate when subjected to a pull force of 10 N.		
	For metal parts of lampholders and for the cap of bayonet lamps, compliance shall be checked by a test with the standard test finger specified in IEC 60529.	No lampholders	N
	A lamp with the longest commercially available lamp-cap shall be inserted when the inaccessibility of bayonet lamp-caps is checked.	No such lamp-cap	N
	For plugs incorporating means for disconnecting one end of the chain, the degree of protection against electric shock shall be such that it is not possible to touch the contact piece with the standard test finger specified in IEC 60529. In general, the contact piece is a pin fitted in the body of the plug, the pin being shrouded by the body of the plug or otherwise protected.		P
20.12.2(--)	Lighting chains shall not electrify tinsel or other metallic decorations with which they are used.		P
20.12.3(--)	Lampholder contact shall be reliably secured in the lampholder body by means other than friction to avoid such a displacement of the lampholder contacts that live parts of the chain become accessible. An example of an adequate securing method is by the provision of ears on the contacts of the lampholder.	No lampholders	N

20.13 (12)	**ENDURANCE TEST AND THERMAL TEST**		P
20.13 (12.3)	Endurance test:		P
	- mounting-position ..... :		P
	- test temperature (°C) ..... :	35ºC	P
	- total duration (h) ..... :	240hrs. Totally 10 cycles, each 24h	P
	- supply voltage: Un factor; calculated voltage (V) .....:	1.1×240V	P
	- lamp used .....:	LEC lamp	P

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Clause	Requirement - Test	Result - Remark	Verdict
20.13 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N
	- marking legible		P
	- no cracks, deformation etc.		P
20.13 (12.4)	Thermal test (normal operation)	No part of the temperature over limits (see table 12.4)	P
20.13 (12.5)	Thermal test (abnormal operation)		N
	Short-circuit of starter contacts		N
	Lamps removed and not replaced		N
20.13 (12.6)	Thermal test (failed lamp control gear condition):		P
20.13 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A)		P
	- case of abnormal conditions ..... :		P
	- electronic ballast		P
	- measured winding temperature (°C): at 1,1 Un		N
	- 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
	- manual reset cut-out		N
	- auto reset cut-out		N
	- track-mounted luminaires		N
20.13 (12.7)	Thermal test (failed ballast or transformer in plastic luminaires):		P
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 V		N
	Test according to 12.7.1.1:		N
	- case of abnormal conditions		N
	- Ballast failure at supply voltage (V)		N

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Clause	Requirement - Test	Result - Remark	Verdict
	- Components retained in place after the test		N
	- Test with standard test finger after the test		N
	Test according to Annex V:		N
	- case of abnormal conditions		N
	- measured winding temperature (°C): at 1,1 Un.. :		N
	- measured temperature of fixing point/exposed part (°C): at 1,1Un..... :		N
	- calculated temperature of fixing point/ exposed part (°C) .....:		N
	Ball-pressure test:		N
	- part tested; temperature (°C)..... :		N
	- part tested; temperature (°C)..... :		N
20.13 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		N
	- case of abnormal conditions		N
	- measured winding temperature (°C): at 1,1 Un.. :		N
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un..... :		N
	- calculated temperature of fixing point/exposed part (°C) ..... :		N
	Ball-pressure test:		N
	- part tested; temperature (°C)..... :		N
	- part tested; temperature (°C)..... :		N
20.13 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N
	- case of abnormal conditions		N
	- 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		--
	- thermal link		N
	- manual reset cut-out		N
	- auto reset cut-out		N
	- case of abnormal conditions		N
	- highest measured temperature of fixing point/exposed part (°C):..... :		N
	Ball-pressure test:		N
	- part tested; temperature (°C)..... :		N

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Clause	Requirement - Test	Result - Remark	Verdict
	- part tested; temperature (°C)..... :		N
20.14 (9)	**RESISTANCE TO DUST AND MOISTURE**		**P**
20.14 (9.2)	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP .....:	IP67	P
	- mounting position during test ..... :		P
	- fixing screws tightened; torque (Nm) .....:	No screws	P
	- tests according to clauses ..... :		P
	- electric strength		P
	a) no deposit in dust-proof luminaire		N
	b) no talcum in dust- tight luminaire		P
	c) no trace of water on current-carrying parts or SELV parts or where it could become a hazard		P
	d) i) For luminaires without drain holes – no water entry		P
	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)		N
	f) no entry into enclosure (IP 3X and IP 4X)		N
	f) no contact with live parts (IP3X and IP4X)		N
	g) no trace of water on part of lamp requiring protection from splashing water		N
	h) no damage of protective shield or glass envelope		N
20.14 (9.3)	Humidity test 48h	Relative humidity 93%, temperature 25℃, 48h, followed by hi-pot test	P
20.15 (10)	**INSULATION RESISTANCE AND ELECTRIC STRENGTH**		P
20.15 (10.2.1)	Insulation resistance test:		P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø ..... :		P
	Insulation resistance:		P
	SELV:		--
	- between current-carrying parts of different polarity..... :		N
	- between current-carrying parts and mounting surface ..... :		N

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Clause	Requirement - Test	Result - Remark	Verdict
	- between current-carrying parts and accessible parts of the luminaire ..... :		N
	Other than SELV:		--
	- between live parts of different polarity :	>100MΩ, limit: 2 MΩ	P
	- between live parts and mounting surface.:	>100MΩ, limit: 4 MΩ	P
	- between live parts and accessible parts.. :	>100MΩ, limit: 4 MΩ	P
	- between live parts of different polarity through action of a switch ..... :	No such bushing	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:		--
	- between current-carrying parts of different polarity.....		N
	- between current-carrying parts and mounting surface ..... :		N
	- between current-carrying parts and accessible parts of the luminaire ..... :		N
	Other than SELV:		P
	- between live parts of different polarity ..... :	1480Vac, 1min, no breakdown	P
	- between live parts and mounting surface..... :	2960Vac, 1min, no breakdown	P
	- between live parts and accessible parts..... :	2960Vac, 1min, no breakdown	N
	- between live parts of different polarity through action of a switch ..... :		N
20.15 (10.3)	Touch current (mA) ..... :	0.05mA<0.7mA	P
	Protective conductor current (mA) .....:		N

20.16 (13)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		P
20.16 (13.2.1)	Ball-pressure test:		P
	- part tested; temperature (°C) ..... :	Enclosure, 125℃, 0.6mm	P
	– for flexible pipes of sealed chains the test of 13.2.1 is replaced by the test of Clause 8 of IEC 60811-3-1.		N
20.16 (13.3.1)	Needle flame test (10 s):		N

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Clause	Requirement - Test	Result - Remark	Verdict
	- part tested .....:		N
	- part tested .....:		N
	- part tested .....:		N
20.16 (13.3.2)	Glow-wire test :		P
	- part tested .....:	Enclosure, 125℃, no burning	P
	- part tested .....:		N
	- part tested .....:		N
20.16 (13.4.2)	Tracking test: part tested .....:		N
Annex A	**TEST TO ESTABLISH WHETHER A CONDUCTIVE PART MAY CAUSE AN ELECTRIC SHOCK**		N
A.2	Voltage not exceed 35 V a.c. peak or 60 V ripple free d.c.		N
A.3	Touch-current not exceed:		N
	- for a.c.: 0,7 mA (peak);		N
	- for d.c.: 2,0 mA		N
Annex B	**TEST LAMP**		N
Annex C	**ABNORMAL CIRCUIT CONDITIONS**		N
	a) Short-circuit of starter contacts		N
	b) Lamp rectification		N
	c) Lamps removed and not replaced		N
	d) One electrode of lamp open-circuited		N
	e) Lamp will not start, but both electrodes are intact		N
	f) Blockage of the motor(s) contained in the luminaire		N
Annex D	**DRAUGHT-PROOF ENCLOSURE**		N
Annex E	**DETERMINATION OF WINDING TEMPERATURE RISES BY THE INCREASE—IN-RESISTANCE METHOD**		N
Annex F	**TEST FOR RESISTANCE TO STRESS CORROSION OF COPPER AND COPPER ALLOYS**		N
Annex G	**MEASUREMENT OF TOUCH CURRENT AND PROTECTIVE CONDUCTOR CURRENT**		P

EN 60598-2-20			
Clause	Requirement - Test	Result - Remark	Verdict
	CENELEC COMMON MODIFICATIONS (EN)		**--**
3	**MARKING**		**--**
	Adequate warning on the package		--
5	**EXTERNAL AND INTERNAL WIRING**		--
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		N
5.2.2	Cables equal to HD21 S2 or HD22 S2		N
ZB	**ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)**		N
(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)**		N
(4&5)	FR: Shuttered socket-outlets 10/16A		N
(13.3)	GB: Requirements according to United Kingdom Building Regulation		N
(13.3.2)	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

Tables

	ANNEX 1: components					**P**
object/part No.	Code	manufacturer/trademark	type/model	technical data	standard	mark(s) of conformity
PCB	B	Shenzhen Jove Enterprise Co., Ltd.	JYE-S4(e)	V-0, 130℃	UL 796	UL E232940
Power plug	B	Kenic Electric Mfg. Co. Ltd.	KE-23	16A, 250VAC	DIN VDE 0620-1	VDE 40002191
Alternative	B	Chang Xiao Hardware Appliance Factory	CWL668	13A, 250VAC	BS 1363 Pt 1-4: 1995	BSI KM 82901
Power cords	B	Shenzhen Tongyuan Industrial Co., Ltd.	H03VV-F	300/500V, 0.75mm2	DIN VDE 0281-5	VDE 101980
Enclosure	B	Cheil Industries Inc Chemicals Div	EN-1052(+)	V-0, 130℃, Min.2.2mm thickness	UL 94	UL E115797

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 authorized by the test house

C - Integrated component tested together with the appliance

D - Alternative component

	ANNEX 2: temperature measurements, thermal tests of Section 12		P
	Type reference ……..…..:	YH-HRF305050220S-W	P
	Lamp used ……..……....:	LED lamp	P
	Lamp control gear used……..…....:	--	P
	Mounting position of luminaire……:	See product manual	P
	Supply wattage (W) ……..:	10W/M	P
	Supply current (A) ……..……..:		P
	Calculated power factor……....:		P
	Table: measured temperatures corrected for ta = 25℃：		P
	- abnormal operating mode……..……..……..:		N
	- test 1: rated voltage……....:	204V~	P
	- test 2: 1,06 times rated voltage or 1,05 times Rated wattage ……..……:	240VX1.06	P
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage .....:		N

Tables

	- test 4: 1,1 times rated voltage or 1,05 times rated wattage .....:	240VX1.1	P
	Through wiring or looping-in wiring loaded by a current of A during the test .....:		N

Temperature(℃) of part	Clause 12.4 - normal				Clause 12.5 - abnormal	
	Test 1	Test 2	Test 3	Limits	Test 4	Limit
PCB LED lamp	58.8	59.4	---	130	66.5	130
Power cord	42.3	44.1	---	105	50.6	105
Enclosure	34.5	36.2	---	70	43.4	70
Enclosure inside	38.4	39.8	---	130	46.7	130
BD	43.1	44.5	---	80	52.7	80
Lamp joint	42.5	43.7	---	--	52.1	--
Ambient	25.5	25.3	---	--	25.1	--

	ANNEX 3: screw terminals (part of the luminaire)		**--**
(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 (mm²).....:		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)..... :		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

Tables

(14.4.8)	Without undue damage		N

	ANNEX 4: screwless terminals (part of the luminaire)		**N**
(15)	**SCREWLESS TERMINALS**		**N**
(15.2)	Type of terminal.....:	Non-permanent connections	—
	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		--
	Voltage drop (mV) after 1 h (4 samples).....:		N
	Voltage drop of two inseparable joints		N
	Number of cycles.....:		N
	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
(15.7)	Terminals external wiring		N
	Terminal size and rating		N
(15.8.1)	Pull test spring-type terminals (4 samples); pull (N)		N

Tables

	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 5: EMF test result according to EN 62493: 2015				P
4.2.d	**MEASUREMENT RESULTS**				P
	Measuring with “Van der Hoofden” test head				P
	EUT operation model: ☒ Normal operation ☐ Other operation:				P
	Voltage:	AC200-240V	Frequency:	50/60Hz	--
	Temperature:	25°C	Humidity:	55% R.H.	--
	Location of EuT	Measuring distance (cm)	Result (F)	Limit (F)	Verdict
	YH-HRF305050220S-W	50	0.17	0.85	P

Attachment No.1

Summary of requirements and test clause of:

EN 62031: 2008+A1: 2013+A2: 2015: LED modules for general lighting - Safety specifications

6	Classification		---
	Built-in.....:		N
	Independent.....:		N
	Integral.....:		P
7	Marking		N
7.1	Mandatory marking for built-in or independent modules		N
7.2	Location of marking		N
7.3	Durability and legibility of marking		N
8	Terminals		N
9	Provisions for protective earthing		N
10	Protection against accidental contact with live parts		N
11	Moisture resistance and insulation		P
12	Electric strength		P
13	Fault conditions		P
13.1	Fault conditions accrding to IEC 61347-1, Clause 14		P
13.2	Overpower condition	No damage	P
14	Conformity testing during manufacture		N
15	Construction		P
	Non Wood, cotton, silk, paper and similar fibrous material used as insulation.		P
16	Creepage distances and clearances		N
17	Screws, current-carrying parts and connections		N
18	Resistance to heat, fire and tracking		N
19	Resistance to corrosion		N
20	Information for luminaire design		N
21	Heat management		N
22	Photobiological safety		P
22.1	UV radiation		P
22.2	Blue light hazard		P
22.3	Infrared radiation		N

Annex A	Test		--

Annex C	Conformity testing during manufacture		--

Annex D	Information for luminaire design		--

Attachment No.2

Summary of requirements and test clause of:

EN 62471: 2008: Photobiological safety of lamps and lamp systems

4	**EXPOSURE LIMITS (EL'S)**		**---**
4.2	Specific factors involved in the determination and application of retinal exposure limits		P
4.2.1	Pupil diameter		P
4.2.2	Angular subtense of source and measurement field-of-view		P
4.3	Hazard exposure limits		P
4.3.1	Actinic UV hazard exposure limit for the skin and eye		N
4.3.2	Near-UV hazard exposure limit for the eye		N
4.3.3	Retinal blue light hazard exposure limit		P
4.3.4	Retinal blue light hazard exposure limit - small source		P
4.3.5	Retinal thermal hazard exposure limit		N
4.3.6	Retinal thermal hazard exposure limit – weak visual stimulus		P
4.3.7	Infrared radiation hazard exposure limits for the eye		N
4.3.8	Thermal hazard exposure limit for the skin		P
5	**MEASUREMENT OF LAMPS AND LAMP SYSTEMS**		**P**
5.1	Measurement conditions		P
5.1.1	Lamp ageing (seasoning)		P
5.1.2	Test environment		P
5.1.3	Extraneous radiation		P
5.1.4	Lamp operation		P
5.1.5	Lamp system operation		P
5.2	Measurement procedure		P
5.2.1	Irradiance measurements		P
5.2.2	Radiance measurements		P
5.2.3	Measurement of source size		P
5.2.4	Pulse width measurement for pulsed sources		N
5.3	Analysis methods		P
5.3.1	Weighting curve interpolations		P
5.3.2	Calculations		P
5.3.3	Measurement uncertainty		P
6	**LAMP CLASSIFICATION**		**P**
6.1	Continuous wave lamps		P
6.1.1	Exempt group		P
6.1.2	Risk Group 1 (Low-Risk)		N
6.1.3	Risk Group 2 (Moderate-Risk)		N

6.1.4	Risk Group 3 (High-Risk)		N
6.2	Pulsed lamps		N

Annex A	**SUMMARY OF BIOLOGICAL EFFECTS**	**--**

Annex B	**MEASUREMENT METHOD**	**--**

Annex C	**UNCERTAINTY ANALYSIS**	**--**

Annex D	**GENERAL REFERENCES**	**--**

Table 6.1	**Emission limits for risk groups of continuous wave lamps(based on EU directive 2006/25/EC)**							**P**
Risk	**Action spectrum**	**Symbol**	**Units**	**Emission Measurement**				
				Exempt	**Low risk**		**Mod risk**	
					Limit	**Result**	**Limit**	**Result**
Actinic UV	SUV(λ)	Es	$W•m^{-2}$	0,001	-	-	-	-
Near UV		E_{UVA}	$W•m^{-2}$	0.33	-	-	-	-
Blue light	B(λ)	L_B	$W•m^{-2}•sr^{-1}$	100	10000	-	4000000	-
Blue light, small source	B(λ)	E_B	$W•m^{-2}$	0.01*	1,0	-	400	-
Retinal thermal	R(λ)	L_R	$W•m^{-2}•sr^{-1}$	28000/α	28000/α	-	71000/α	-
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W•m^{-2}•sr^{-1}$	545000 $0.0017 \leqq \alpha \leqq 0.011$	-	-	-	-
				6000/α $0.011 \leqq \alpha \leqq 0.1$	-	-	-	-
IR radiation, eye		E_{IR}	$W•m^{-2}$	100	570	-	3200	-

* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian.
** Involves evaluation of non-GLS source

Note: The action functions: see Table 4.1 and Table 4.2

The applicable aperture diameters: see 4.2.1

The limitations for the angular subtenses: see 4.2.2

The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5

ATTACHMENT 3

Photo Documentation

View:
Model:
YH-HRF305050 220S-W

[X]General
[ ]Front
[ ]Rear
[ ]Internal
[ ]Top
[ ]Bottom
[ ]PWB

Figure 1

View:

[X]General
[ ]Front
[ ]Rear
[ ]Internal
[ ]Top
[ ]Bottom
[ ]PWB

Figure 2

ATTACHMENT 3

Photo Documentation

View:

[X]General
[ ]Front
[ ]Rear
[ ]Internal
[ ]Top
[ ]Bottom
[ ]PWB

Figure 3

View:

[X]General
[ ]Front
[ ]Rear
[ ]Internal
[ ]Top
[ ]Bottom
[ ]PWB

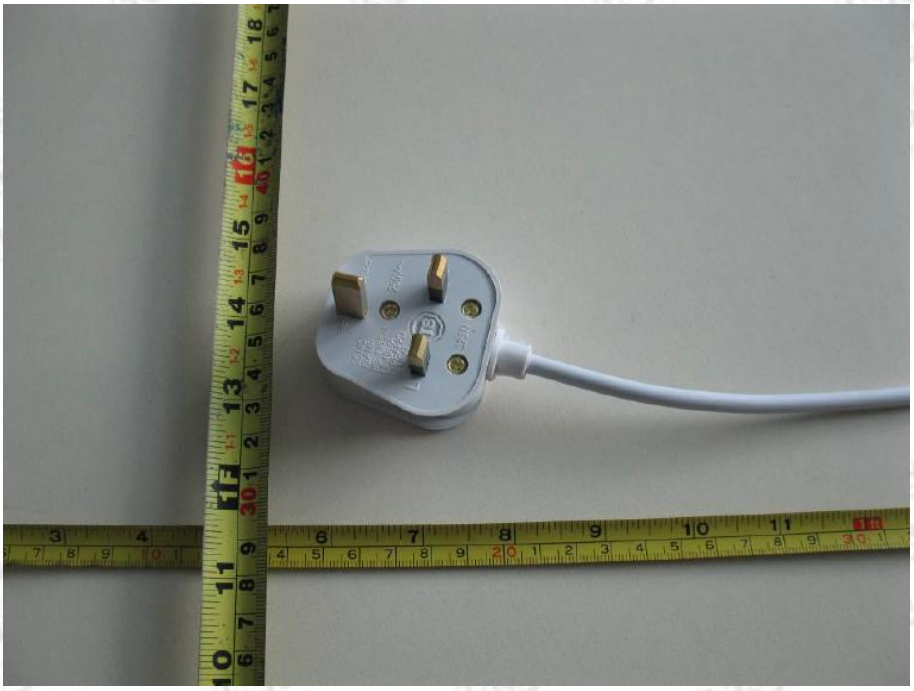

Figure 4